Imagine the result

NYSEG

Final (100%) Remedial Design Report

Wadsworth Street Former Manufactured Gas Plant Site
Site No. 8-35-015
Geneva, New York

February 2014

ARCADIS

Final (100%) Remedial Design Report

Wadsworth Street Former
Manufactured Gas Plant Site
Site No. 8-35-015

Certification

I, Jason D. Brien, certify that I am currently a New York State registered professional engineer and that this *Final (100%) Remedial Design Report* 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) and that all activities were preformed in full accordance with the DER-approved October 2010 *Remedial Design Work Plan*.

Signature

2-25-14

Date

Jason David Brien
084067

Prepared for:
NYSEG

Prepared by:
ARCADIS of New York, Inc.
6723 Towpath Road
P.O. Box 66
Syracuse
New York 13214-0066
Tel 315.446.9120
Fax 315.449.0017

Our Ref.:
B0013104

Date:
February 2014

Appendices

Attachments

1. Introduction

This *Final (100%) Remedial Design Report* (100% Remedial Design Report) has been prepared to support the implementation of the New York State Department of Environmental Conservation- (NYSDEC-) selected remedy for the NYSEG Wadsworth Street Former Manufactured Gas Plant (MGP) Site located in Geneva, New York (the site). The NYSDEC-selected remedy was presented in the March 2010 Record of Decision (ROD) (NYSDEC, 2010b).

NYSEG entered into an Order on Consent with the NYSDEC in March 1994 to investigate and, where necessary, remediate 33 former MGP sites in New York State. The Wadsworth Street Former MGP site (Site No. 8-35-015) is included on this list of 33 sites. Section VI of the Order indicates that NYSEG shall submit a remedial design to facilitate implementation of the NYSDEC-selected remedial alternative for the site. This 100% Remedial Design Report has been prepared in accordance with the following documents:

- March 1994 Order on Consent
- March 2010 Record of Decision
- NYSDEC Division of Environmental Remediation *Technical Guidance for Site Investigation and Remediation* (DER-10) (NYSDEC, 2010c)
- NYSDEC-approved *Remedial Design Work Plan* (RDWP) (ARCADIS, 2010c)

1.1 Purpose

The purpose of this 100% Remedial Design Report is to present the remedial approach and design for implementing the selected remedy for the Wadsworth Street Former MGP Site. A *Supplemental Information Package* (Attachment 1) is included with this remedial design report to provide additional information regarding site characterization; however, this information is not considered part of the contract between NYSEG and the Remediation Contractor (to be selected by NYSEG). This 100% Remedial Design Report, the associated Design Drawings, list of Technical Specifications, and supporting documents are collectively referred to hereafter as the Contract Documents.

1.2 Report Organization and Structure

The organization of this 100% Remedial Design Report is presented in the following table.

Table 1.1 Remedial Design Report Organization

Section	Description
Section 1 – Introduction	Presents the purpose of the 100% Remedial Design Report, summarizes the report organization, and presents a description of the site characterization and nature and extent of impacts.
Section 2 – Basis of Design	Presents the remedial objectives and a summary of the remedy components, and rationale supporting the components/limits of the remedial activities.
Section 3 – Organizational Structure and Responsibilities	Presents the responsibilities of NYSEG, the Design Engineer, the Remediation Engineer, and the Remediation Contractor during implementation of the remedy.
Section 4 – Pre-Remediation Activities	Describes the activities to be completed prior to the implementation of the remedial activities.
Section 5 – Remediation Activities	Summarizes the remedial activities to be conducted.
Section 6 – Post-Remediation Activities	Describes the reporting, monitoring, and administrative activities to be completed following remedial construction.
Section 7 – Schedule	Presents the anticipated schedule for the remedial design and implementation of the site remedy.
Section 8 – References	Lists select sources consulted as references.

This 100% Remedial Design is supported by the appendices and attachments listed in the table of contents.

1.3 Background

This section presents a summary of site background information, including a description of the site location and physical setting, as well as a brief site history. A more detailed site history is presented in the *Remedial Investigation Report* (RI Report)

(ARCADIS, 2008), which is included as part of the *Supplemental Information Package* (Attachment 1).

1.3.1 Site Location and Setting

The site is located in the City of Geneva, near the northwestern shore of Seneca Lake in eastern Ontario County, New York. The former MGP operated in an area comprised of a rectangular parcel of land that is now located in a mixed commercial and residential area in the east-central part of Geneva, New York. The site is bordered by Wadsworth Street to the east, Railroad Place and a railroad (Finger Lakes Railway) to the south, a restaurant to the west and residential properties to the north. The northern shore of Seneca Lake is located approximately 900 feet southeast of the site. Railroad Place intersects Wadsworth Street and bisects the site. A gas holder (Gas Holder 1) and coal shed were formerly located in the current limits of Railroad Place (see Design Drawing 2, Appendix A). Several MGP structures formerly existed at the current location of the City of Geneva’s Public Safety Building (PSB) south of Railroad Place.

The portion of the former MGP site located north of Railroad Place is currently owned by NYSEG, while the area south of Railroad Place is owned by the City of Geneva. The area owned by NYSEG includes a grass-covered area in the eastern portion of the property and an asphalt parking lot that comprises the western portion of the property. A restaurant on Railroad Place leases the parking lot from NYSEG. A gravel parking area is located in the northeast portion of NYSEG’s property and is used by residential property owners. A NYSEG gas regulator station is located near the intersection of Railroad Place and Wadsworth Street. The City of Geneva’s PSB consists of a courtroom, office space, the local jail, and an attached pole barn structure. A large parking lot used by PSB employees is located west of the PSB. A Finger Lakes Railway line is located immediately south of the PSB.

Based on utility drawings obtained from the City of Geneva, several utilities are located within the Railroad Place right-of-way, and transect former Gas Holder 1. Utilities present within Railroad Place include, but are not limited to:

- 24-inch sanitary sewer
- 8-inch potable water main
- 8-inch natural gas distribution lines

Additionally, two natural gas distribution lines are located immediately south of (and enter/exit) the NYSEG gas regulator station.

1.3.2 Site History

The gas plant was constructed in 1853 and included a retort and condenser house, purification building (including lime room, ammonia tank and cistern), coal shed and one gas holder (Gas Holder 1). A second gas holder (Gas Holder 2) was constructed circa 1900 in the northwest portion of the site. The majority of the buildings/structures associated with the gas plant were demolished between 1903 and 1909; the only remaining structures after 1909 were the second gas holder, tool house and meter house. The remaining holder was demolished between 1915 and 1925. Between 1925 and 1943, a 500,000-cubic-foot gas holder (Gas Holder 3) and a regulator house were constructed at the site to serve as a storage/distribution facility. This newer holder may have served as a remote distribution holder for the Border City MGP, which was constructed at approximately the same time that the Wadsworth MGP was decommissioned. Gas Holder 3 was demolished sometime after 1946; however, portions of the holder foundation wall and slab still exist. Railroad Place was constructed through the center of the former MGP site, covering the location of Gas Holder 1.

The following interim remedial measures (IRMs) have been completed at the site:

- Railroad Place Utility Trench (1999) – A trench was excavated along Railroad Place to facilitate installation of a new waterline by the City of Geneva in May 1999. The trench measured approximately 6 feet wide by 6 feet deep by 100 feet in length and ran through the foundation of the southernmost gas holder (Gas Holder No. 1). The material excavated from the trench was managed and disposed of in accordance with applicable rules and regulations. Based on the removal and off-site disposal of soil, the trenching/soil removal activities were considered an IRM.

- Vapor Intrusion Mitigation (2008/2009) – Based on the findings of soil vapor intrusion sampling, NYSEG conducted an IRM during 2008 and 2009 consisting of a combination of constructing a sub-slab depressurization vapor intrusion mitigation system and adjusting the HVAC operational set points in the PSB to minimize or eliminate the negative pressure conditions relative to conditions beneath the slab. Details regarding the sampling conducted in support of soil vapor intrusion evaluations are detailed in Section 1.4.2.3.

- Fencing and Cover (2010) – From March through June 2010 NYSEG completed an IRM to install a perimeter site fence and gravel cover over non-fenced areas. A detailed description of the IRM activities was provided in the July 2010

Construction Completion Report/Interim Site Management Plan (ARCADIS, 2010b). Clearing and grubbing was conducted to remove a dilapidated portion of an existing fence, extensive household and yard debris, brush, shrubs, and other vegetation which obstructed placement of the fence. A permanent chain-link fence, equipped with a locking vehicle access gate, was installed along a portion of the property boundary to prevent trespassing on the site. A recess was integrated along the northern fence line to allow ease of vehicular movement by neighboring properties. A temporary surface cover consisting of a non-woven geotextile fabric material and crushed stone was installed along the northern portion of the NYSEG property. A 6-inch layer of vegetated topsoil was placed over the area in the western side of the site that was disturbed by clearing and grubbing activities.

1.4 Site Characterization

A summary of environmental investigations conducted at the site was presented in the RI Report and *Feasibility Study Report* (FS Report) (ARCADIS, 2010a). Both reports are included as part of the *Supplemental Information Package* (Attachment 1). A brief description of the site geology/hydrogeology and nature and extent of impacts, as presented in the RI Report, is presented in the following subsections. Additionally, a summary of the March 2011 Pre-Design Investigation (PDI) is provided in this section and a PDI Summary Letter Report (ARCADIS, 2011b) is included as part of Attachment 1.

1.4.1 Geology and Hydrogeology

Three geologic units were encountered at the site during the RI. In descending order, these units consist of: 1) fill; 2) silt and clay; and 3) fine sand. These units comprise at least the upper approximately 40 feet of materials that underlie the site. Since the deepest investigation location was terminated at approximately 40 feet below grade, the geologic materials below 40 feet are unknown. The fill is the least significant hydrogeologic unit because it is generally unsaturated, especially north of Railroad Place. Approximately 1 to 2 feet of fill is saturated in the area south of Railroad Place. The bottom of the fill is typically encountered at approximately 4 to 8 feet below grade. The silt and clay unit is continuous across the site and is generally 12 to 16 feet in thickness, except in the area of former Gas Holder 1 where the silt and clay is artificially thin (approximately 1 foot in thickness), assumed due to excavation activities conducted to install Gas Holder 1. The silt and clay unit primarily consists of silt and clay with interbedded thin (i.e., on the order of a few millimeters thick) fine sand seams. The water table is located in the silt and clay unit in the northern portion of the site at a depth of approximately 8 feet below grade. The silt and clay grades into a fine sand unit at approximately 18 to 20 feet below grade. The fine sand unit is at least 22 feet in thickness and contains traces of medium sand and clay.

The horizontal hydraulic conductivity of the silt and clay and fine sand units appear to be similar. The average horizontal hydraulic conductivity for these units is low - approximately 0.09 feet/day. The vertical hydraulic conductivity of the silt and clay is expected to be less because of the horizontal bedding of this unit. As a result, groundwater in this unit likely moves more rapidly laterally along bedding than vertically across the bedding. Because of this anisotropy, the silt and clay unit is significant hydrogeologically because it may limit recharge to the fine sand unit by restricting downward infiltration of precipitation.

Groundwater beneath the site moves north-northeast. Although groundwater appears to flow away from Seneca Lake, a regional groundwater discharge boundary, it is likely that site groundwater eventually finds its way to Seneca Lake. Local variability in groundwater flow direction is common in glacial/glacio-lacustrine depositional settings (such as the site area) due to the heterogeneous nature of glacially-derived overburden materials.

1.4.2 Nature and Extent of Impacts

This subsection describes the nature and extent of the environmental impacts identified at the site and focuses on the environmental impacts to be addressed by the remedial construction activities. A detailed account of the environmental site impacts, including analytical summary tables, is presented in the RI Report.

1.4.2.1 Soil Quality

The quality of site soil was evaluated during the RI by characterizing soil samples collected during the various site investigations and submitting select soil samples for laboratory analysis for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and cyanide. A summary of the surface and subsurface soil quality is presented below.

Surface Soil

During the RI, six surface soil samples (0 to 0.2 feet below grade) were collected and analyzed for VOCs, SVOCs and total cyanide. Surface soil samples SS-1 through SS-6 were all collected from the NYSEG-owned property. Surface soil data were compared to 6NYCRR Part 375-6 unrestricted use soil cleanup objectives (SCOs) (unrestricted use SCOs). A limited number of MGP-related VOCs (i.e., benzene, toluene) were detected in the surface soil samples. However, these constituents were not detected at concentrations greater than unrestricted use SCOs. During the RI, 15 polycyclic aromatic hydrocarbons (PAHs) were detected in surface soil sample (SS-1) at concentrations greater than unrestricted use SCOs. Select PAHs were also detected at concentrations greater than unrestricted use SCOs in surface soil samples SS-2, SS-5 and SS-6. Total cyanide was not detected at concentrations greater than the unrestricted use SCO in surface soil samples collected during the RI.

Subsurface Soil

Indications of NAPL and/or sheen were observed in three areas of the site: former Gas Holder 1; at monitoring well MW-3 (near the former purifier house); and an unknown buried structure near soil borings SB-14A and SB-14-B.

Trace-to-little viscous, tar-like NAPL was observed at three soil borings (SB-5, SB-7 and SB-13) completed inside the footprint of former Gas Holder 1 at a depth interval of approximately 16 to 23 feet below grade (immediately above and below the floor of the holder).

The soil boring for monitoring well MW-3 was drilled through a possible brick foundation, likely associated with the former lime house or purifier house. MGP-related impacts were observed at monitoring well MW-3, where a moderate to faint odor, trace sheen, and slightly elevated photoionization detector (PID) readings (up to 42 parts per million [ppm]) were noted intermittently between 10 and 22 feet below grade (i.e., below the foundation).

As indicated in the ROD, both Railroad Place and the PSB serve as site cover for the minor MGP related impacts identified in these areas.

A buried structure was encountered at soil boring SB-14A (referred to herein as the “former tank”). A void was encountered from approximately 4 to 6.5 feet below grade, and contained water and a black oil-like fluid. A second boring (SB-14B) was completed approximately 5 feet west of SB-14A in an attempt to miss the apparent structure. Strong odors and relatively minor PID readings were observed at SB-14B at depths to 15 feet below grade. No visual indications of MGP-related impacts were observed in RI test pits TP-1, TP-1A and/or TP-1B that were completed immediately north of soil boring SB-14A. Additionally, benzene, toluene, ethylbenzene, and xylenes (BTEX) compounds were not detected at concentrations greater than laboratory detection limits and PAHs were not detected at concentrations greater than unrestricted use SCOs in soil samples collected from SB-14B (10-12') or TP-1 (7').

The highest concentrations of total BTEX and PAHs were detected in samples collected from the visually impacted material within or near Gas Holder 1 (i.e., samples collected from soil borings SB-5, SB-7, SB-13) and the buried structure encountered at soil boring SB-14A.

1.4.2.2 Groundwater Quality

Groundwater quality was evaluated by comparing the analytical results of groundwater samples (collected during two rounds of sampling in 2005 and 2006) to the NYSDEC *Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations* (TOGS 1.1.1). Monitoring wells are generally screened within the silt and clay unit with some wells screens extending into the upper few feet of the fine sand unit. With the exception of the groundwater samples collected from monitoring well MW-3, the groundwater in these units did not contain BTEX or PAHs at concentrations greater than TOGS 1.1.1 criteria.

Groundwater in the silt and clay and fine sand unit was found to contain low concentrations of total cyanide over a broader area than that affected by BTEX and PAHs. Low concentrations of cyanide were detected in groundwater samples collected from each of the monitoring wells located near and downgradient of the former lime house/purifier house and former Gas Holder 1. Total cyanide was only detected at concentrations greater than the TOGS 1.1.1 criteria (i.e., 200 parts per billion [ppb]) in groundwater samples collected from monitoring wells MW-2 and MW-3 (ranging from 259 to 600 ppb).

1.4.2.3 Soil Vapor Quality

A soil vapor intrusion investigation was initially conducted at the City of Geneva PSB in 2007. The investigation included collecting soil vapor samples from below the floor slab of the building, and samples of air inside and outside of the building. The investigation results indicated that several VOCs were present in vapor samples collected beneath the building foundation slab and from indoor air. However, the VOCs could not be attributed to a particular source. Several of the VOCs (most notably BTEX) are potentially related to the former MGP, but these same compounds have other possible non-MGP sources such as gasoline. Other detected VOCs, such as trichloroethene, are not related to the former MGP. The concentrations of VOCs detected in indoor air were below appropriate criteria. Based on the investigation results, subsurface MGP byproducts do not appear to be contributing VOCs to the indoor air at the PSB via soil vapor intrusion.

The NYSDEC and the NYSDOH concluded that the concentrations of BTEX and naphthalene detected below the slab present a potential for future soil vapor intrusion into the PSB. As such, the NYSDEC and the NYSDOH requested that NYSEG either install a sub-slab depressurization system or conduct additional vapor sampling during the 2007/2008 winter season. NYSEG conducted an IRM during 2008 and 2009, consisting of a combination of constructing a sub-slab depressurization vapor intrusion mitigation system and adjusting the HVAC operational set points in the PSB to minimize or eliminate the negative pressure conditions relative to conditions beneath the slab.

As discussed in Section 2, if new buildings or structures are constructed on the NYSEG-owned property in the future, a soil vapor intrusion evaluation would be conducted prior to construction to evaluate the potential need for soil vapor intrusion mitigation measures to be included in the construction design.

1.4.3 Pre-Design Investigation

In support of the remedial design for the site remedy, a PDI was conducted in March 2011. The scope of the PDI activities was presented in the NYSDEC-approved October 2010 *Remedial Design Work Plan* (RDWP) (ARCADIS, 2010c). As presented in the RDWP, the objectives of the PDI were to:

- Locate and inspect the structure observed in RI soil boring SB-14A
- Confirm the extent of soil containing MGP-related impacts in the vicinity of soil boring SB-14A
- Document the extent of dissolved phase groundwater impacts at the site
- Evaluate the microbial community present at the site to support a natural attenuation evaluation

As indicated previously, the PDI Summary Letter Report (ARCADIS, 2011b) is included as part of Attachment 1.

Soil boring SB-14C was completed at the same location as RI soil boring SB-14A to further investigate the subsurface structure encountered during the RI. As indicated in

Attachment 1, a metal tank was encountered in soil boring SB-14C when using air knife/vacuum equipment (air knife). The invert of the tank was measured (through the hole in the top of the tank created during completion of RI soil boring SB-14A) at approximately 6.5 feet below grade. The air knife was then used to determine the horizontal limits of the tank, which measures approximately 7 feet long and 3.5 to 4 feet wide. As discussed in Section 2, additional PDI soil borings completed in the vicinity of soil boring SB-14C did not contain visual MGP-impacts.

As part of the PDI, a new groundwater monitoring well (MW-10) was installed to facilitate analysis of groundwater in the vicinity of the NYSEG gas regulator station and support the *Natural Attenuation Evaluation* conducted as part of the PDI.

1.4.4 Natural Attenuation Evaluation

A summary of the results of the natural attenuation evaluation is presented below. A detailed description of the natural attenuation evaluation activities and results is presented in the *Natural Attenuation Evaluation Report* (ARCADIS, 2012) (Attachment 2).

The natural attenuation evaluation was conducted as part of the PDI to assess the effectiveness of natural attenuation processes in addressing the dissolved phase groundwater impacts at the site. During the natural attenuation evaluation activities, groundwater samples were collected from each of the existing and new monitoring wells to document the extent of dissolved phase groundwater impacts and evaluate the microbial community at the site. The results indicate that natural attenuation is occurring and appears to be an effective means for addressing the dissolved phase impacts at the site (i.e., groundwater impacts have shown a decreasing concentration trend over the past six years). In addition, microbial populations capable of and consistent with aerobic degradation of BTEX and PAH constituents have been detected at the site, with the highest populations of BTEX degrading populations measured at monitoring wells that contain MGP-related impacts, providing further evidence that natural attenuation of the hydrocarbon impacts is occurring.

Based on the results of the PDI, natural attenuation is an appropriate remedy for addressing the groundwater impacts observed at the site, and enhancement of attenuation processes is not required. However, ongoing groundwater sampling is recommended to continue monitoring the concentrations of dissolved phase MGP-related impacts. As discussed in Section 6, groundwater sampling activities will be detailed in the *Monitoring Plan* to be developed as part of the *Site Management Plan* (SMP) following the completion of remedial construction activities.

2. Basis of Design

As indicated in the ROD, the major component of the selected site remedy includes the removal of the subsurface structure and MGP-related impacted soil on the NYSEG property in the area of the former tank (near soil boring SB-14A) to remove accessible on-site source material. This section describes the process that was used to identify soil requiring remediation and presents the rationale for revisions to the NYSDEC-approved removal area. Rationale for the scope and extent of other remedy components is also presented below.

2.1 Remedial Objectives

As presented in the ROD, the selected remedy must eliminate or mitigate all significant threats to public health and/or the environment from MGP-related materials and impacted media present at the site. To achieve this goal, the following remedial objectives have been established for the protection of public health and the environment.

Table 2.1 Remedial Objectives

Public Health Protection
<u>Soil</u> • Prevent ingestion/direct contact with contaminated soil • Prevent inhalation of contaminants volatilizing from the soil • Prevent inhalation of contaminated particles from the soil
<u>Groundwater</u> • Prevent ingestion of groundwater containing contaminant levels exceeding drinking water standards • Prevent contact with contaminated groundwater • Prevent inhalation of contaminants volatilizing from groundwater
<u>Soil Vapor</u> • Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into the indoor air of buildings at or near the site

Environmental Protection
Soil
• Prevent migration of contaminants that would result in groundwater or surface water contamination
Groundwater
• Restore the groundwater aquifer to meet ambient groundwater quality criteria to the extent practicable • Prevent discharge of contaminated groundwater to surface water

2.2 Summary of Select Site Remedy

The NYSDEC-selected remedy for the site consists of the following remedial components:

- A remedial design program that would be implemented to provide the details necessary for the construction, operation, maintenance, and monitoring of the remedial program and also access the viability of enhanced natural attenuation.

- The removal of the subsurface structure and MGP-related impacted soil on the NYSEG property in the area of the former tank (near soil boring SB-14A). This excavation will remove source material (as defined in Section 2.3) that is accessible at the site.

- A site cover will be required for the properties comprising the site to allow for their continued commercial use. This cover will consist of the existing PSB and the associated pavement, sidewalks and parking lots, as well as Railroad Place for the City-owned properties. For the NYSEG-owned property, a soil cover will be installed in areas of exposed surface soil. The soil cover will consist of a minimum of one foot of soil meeting the commercial use requirements for cover material set forth in 6NYCRR Part 375-6.7(d), placed over a demarcation layer. In areas not designated for access roads or parking, the upper 6 inches of the soil cover will be of sufficient quality to maintain a vegetative layer.

- The holder foundation slab remaining on the NYSEG property (i.e., Gas Holder 3) will be uncovered, inspected, and if tar is observed, cleaned. After the inspection and any required cleaning, the slab will remain, and the site will be restored consistent with the surrounding conditions.

- Enhanced natural attenuation of the identified groundwater contamination will be evaluated as part of the remedial design, and if a viable approach is identified, it will be implemented. As discussed in Section 1, the natural attenuation evaluation concluded that natural attenuation processes are occurring at the site and enhancement of these processes is not required at this time.

- Imposition of an institutional control in the form of an environmental easement for the controlled property that:

  - requires the remedial party or site owner to complete and submit a periodic certification of institutional and engineering controls to the NYSDEC in accordance with 6NYCRR Part 375-1.8(h)(3)

  - land use is subject to local zoning laws, the remedy allows the use and development of the controlled property for commercial use

  - restricts the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by the NYSDEC, New York State Department of Health (NYSDOH) or County DOH

  - prohibits agriculture or vegetable gardens on the controlled property

  - requires compliance with a NYSDEC-approved SMP

- Development of an SMP that includes the following:

  - An *Institutional and Engineering Control Plan* that identifies all use restrictions and engineering controls for the site and details the steps and media-specific requirements necessary to assure the following institutional and/or engineering controls remain in place and effective:

    <u>Institutional Controls</u> – The environmental easement discussed above will be required for both the NYSEG- and City-owned parcels (i.e., PSB property), as well as the portion of Railroad Place located within the limits of the former MGP.

    <u>Engineering Controls</u> – The soil cover, the existing buildings, streets, paved areas, and the sub-slab depressurization system already installed in the PSB.

    This plan includes, but may not be limited to the following:

    - an *Excavation Plan* which details the provisions for management of future excavations in areas of remaining impacted soil and disposal of soil generated during future excavations
    - descriptions of the provisions of the environmental easements including any land use and groundwater use restrictions
    - provisions for management and inspection of the identified engineering controls
    - the steps necessary for the periodic review and certification of the institutional and/or engineering controls
    - provisions for the continued operation of the sub-slab depressurization system in the PSB.
  - a *Monitoring Plan* to assess the performance and effectiveness of the remedy. The plan includes, but may not be limited to the following:
    - groundwater monitoring to assess the performance and effectiveness of the remedy
    - a schedule of monitoring and frequency of submittals to be provided to the NYSDEC
    - provisions to evaluate the potential for soil vapor intrusion into building(s) that may be constructed on the site, including provisions for implementing soil vapor mitigation (as necessary)
    - provisions to evaluate the potential for soil vapor intrusion for existing buildings if building use changes significantly

2.3 Remedial Components

The remedial components of the site remedy include:

- Removal of the former tank (and MGP-related source material that may be present immediately surrounding the tank). As defined in DER-10, source material includes NAPL or grossly contaminated material that contains substantial quantities of mobile NAPL identified through visual inspection, strong odors, or is otherwise readily detectable without laboratory analysis. For the purpose of this Remedial Design, source material is defined as soil containing visual MGP-related impacts in quantities greater than slight/trace sheens, staining, or isolated blebs.

- Placement of a soil cover.
- Post-remediation groundwater monitoring to document dissolved phase COC concentrations and the effectiveness of natural attenuation processes.

Results from the March 2011 PDI were used to refine select components of the site remedy, as presented in the following sections.

2.3.1 Tank Removal and Soil Excavation

Soil excavation limits depicted in the ROD included an approximately 13-foot by 15-foot removal area to address the subsurface structure encountered during the RI and delineated during the PDI, as well as MGP-impacted soil surrounding the structure. As indicated in Section 1, the PDI included drilling soil boring SB-14C to locate the presumed structure that was encountered in RI soil boring SB-14A. Based on the observations at soil boring SB-14C, the structure at this location consists of a metal underground tank. The invert of the tank was measured, through a hole in the top of the tank, at approximately 6.5 to 7 feet bgs. Several borings (i.e., SB-16 through SB-19) were then completed during the PDI using air knife technologies to delineate the horizontal limits of the tank, which measures approximately 7 feet long and 3.5 to 4 feet wide. Visually impacted material was not observed in the PDI soil borings completed in the vicinity of the tank. Therefore, the subsurface excavation activities will be limited to removal of the former tank and any visually impacted soil located below the tank (to an assumed depth of 8 feet below grade).

2.3.2 Soil Cover Installation

Consistent with the ROD, the foundation slab of former Gas Holder 3 will be uncovered, visually inspected, and if visual impacts (i.e., visible free product) are observed on the surface of the foundation slab, the slab will be cleaned. Prior to the installation of the surface cover, the top 1-foot of existing surface cover will be removed and a demarcation layer will be installed to denote the surface cover limits. Following placement of the demarcation layer, a soil cover will be installed to generally match the existing lines and grades at the site perimeter and near the gas regulator building. Soil cover materials will consist of a combination of crushed stone and vegetated topsoil. Vegetated portions of the soil cover will consist of one foot of material that meets the commercial use allowable constituent levels for imported fill or soil provided in Appendix 5 of DER-10 (NYSDEC, 2010c), with the top six inches of soil sufficient to maintain a vegetative layer.

As indicated in the ROD, the existing PSB, asphalt pavement in parking lots and Railroad Place, and sidewalks will serve as a surface cover for properties not owned by NYSEG.

2.3.3 Natural Attenuation Evaluation/Enhancement

The NYSDEC ROD required an evaluation of the natural attenuation processes potentially occurring at the site and identification of potential means to enhance natural attenuation processes. As indicated in Section 1 (and as supported by the results of the natural attenuation evaluation presented in Attachment 2), the existing site conditions are sufficient to support the natural attenuation of dissolved phase impacts. Therefore, enhancement of attenuation processes through the addition of a groundwater amendment is not required. Post-remediation groundwater monitoring will be conducted to document dissolved phase COC concentrations.

2.4 Assumptions

The following assumptions have been made to facilitate the development of this 100% Remedial Design.

- Permanent or semi-permanent road/lane closures will be not be permitted in Railroad Place or Wadsworth Street (per March 2011 conversations with City of Geneva Department of Public Works).

- All equipment and material staging will be conducted within the fence limits of the NYSEG property. Based on site size limitations, only one field office trailer will be utilized.

- Existing site fencing will be maintained (to the extent practicable) during remedial construction activities.

- Tank removal and soil excavation activities will be completed to a maximum depth of 8 feet below grade. The limits of the tank and soil removal activities are established based on the presence of source material (as defined in Section 2.3).

- Excavation support will be required to remove the former tank based on presence of nearby gas lines and the Railroad Place. Excavation support will consist of a pre-fabricated support system (i.e., slide rail).

- Confirmation soil sampling will not be completed at the limits of remediation areas. However, one documentation sample will be collected from the bottom of the tank removal excavation area.

- Destructive testing or sampling of the Gas Holder 3 slab will not be conducted as part of the remedial action.

3. Organizational Structure and Responsibilities

NYSEG, the NYSDEC, and NYSDOH will participate jointly in the implementation of the remedial activities described in the 100% Remedial Design. NYSEG has the ultimate responsibility for implementing the remedial activities. NYSDEC and NYSDOH personnel are anticipated to be on-site periodically to observe work activities. NYSEG will be responsible for all on-site construction operations during the project, except for the operations indicated herein. The construction activities will be observed by NYSEG's Remediation Engineer for general compliance with the 100% Remedial Design. Communication with regulatory agencies and with members of the surrounding community will be managed by NYSEG.

Key NYSEG, NYSDEC, and NYSDOH personnel are identified below.

Table 3.1 Key Project Personnel

Name/Affiliation	Address	Contact Information
NYSEG		
Mr. John J. Ruspantini Remediation Project Manager	18 Link Drive P.O. Box 5224 Binghamton, NY 13094	T: 607.762.8787 F: 607.762.8451 jjruspantini@nyseg.com
NYSDEC		
Mr. Douglas MacNeal Project Manager	625 Broadway 11th Floor Albany, NY 12233-7017	T: 518.402.9564 dkmacnea@gw.dec.state.ny.us
NYSDOH		
Ms. Debbie McNaughton Project Manager	335 East Main Street Rochester, NY 14604	T: 585.423.8069
Design Engineer: ARCADIS		
Mr. Jason Brien, P.E. Project Manager Ms. Margaret Carrillo-Sheridan, P.E. Engineer of Record	6723 Towpath Road Syracuse, NY 13214	T: 315.671.9114 jason.brien@arcadis-us.com T: 315.671.9167 M.Carrillo-Sheridan@arcadis-us.com
Remediation Engineer: To Be Determined (TBD)		
Project Manager, Project Oversight, Sampling Technician	TBD	TBD

Minimum responsibilities of NYSEG, the Design Engineer, Remediation Engineer, and the Remediation Contractor for work to be conducted prior to, during, and following implementation of the remedial activities at the site are presented in the following subsections.

3.1 NYSEG Responsibilities

NYSEG will be responsible for the following:

- Coordinate with the Remediation Contractor, Design Engineer, and Remediation Engineer (as necessary) to implement the required work activities in conformance with the 100% Remedial Design.
- Secure access agreements and coordinate with property owners with respect to the implementation of the remedial activities (if necessary).
- Assist NYSDEC in preparing a Notice and Fact Sheet consistent with NYSDEC Program Policy DER-23, *Citizen Participation Handbook for Remedial Programs* (NYSDEC, 2010a) prior to beginning remedial construction activities. The Notice and Fact Sheet will be distributed by NYSDEC.
- Contract with the selected Remediation Contractor.
- Contract with a firm to serve as the Remediation Engineer.
- Contract with a laboratory (or procure laboratory services through the Remediation Contractor subcontract) for the analysis of soil, water, and other waste samples, as appropriate.
- Issue contract addenda (if any) and modifications (if any) based on input from the Remediation Engineer.
- Act as the “Generator” for material resulting from the remedial activities for off-site treatment and/or disposal of the waste.
- Contract with waste haulers and waste disposal vendors (or procure waste transportation/disposal services through the Remediation Contractor subcontract).
- Coordinate with disposal facilities to provide bills of lading/manifests for the off-site shipment of waste materials from the site. These shipping documents may be provided to the Remediation Engineer to sign as an agent for NYSEG, under separate agreement with NYSEG.
- Coordinate with the NYSDEC and NYSDOH regarding environmental-related work activities.

3.2 Design Engineer Responsibilities

The Design Engineer will provide the following services prior to and during the implementation of the remedial activities:

- Conduct pre-remediation in-situ waste characterization sampling, as described in Section 4.
- Prepare waste profiles for the Owner-selected disposal/treatment/recycling facilities.
- Prepare remedial construction bid documents (i.e., Bid Form and Payment Items) and support NYSEG during Remediation Contractor bid review and selection.

3.3 Remediation Engineer Responsibilities

The Remediation Engineer will provide the following services during implementation of the remedial activities:

- Review Remediation Contractor submittals and provide comments, if any, to the Remediation Contractor and NYSEG.
- Provide project management/oversight to observe and monitor implementation of the remedial activities.
- Maintain records of the work efforts associated with implementation of the remedial activities, including daily field reports and digital photographs of the work in progress and to document observations, problems, and deficiencies.
- Maintain records of labor, materials, and equipment utilized for the remedial activities and any unusual circumstances, if any are encountered.
- Document that the remedial activities are conducted in substantial conformance with the 100% Remedial Design and notify NYSEG of any deviations.
- Provide a sampling technician to conduct community air monitoring in accordance with the Community Air Monitoring Plan (CAMP) (included as Appendix C) and to collect waste characterization samples (as necessary) and coordinate with a NYSEG-selected laboratory for the analysis of the waste characterization samples.

Additionally, the sampling technician will collected a documentation sample from the excavation bottom.

- Monitor the Remediation Contractor’s survey control for evaluating payment quantities, as applicable.

- Provide analytical results for imported fill materials (obtained from the Remediation Contractor) to NYSDEC for review and approval prior to material being brought on-site.

- Coordinate with waste disposal facilities and waste haulers contracted by NYSEG.

- Review and sign (as an authorized agent for NYSEG) waste manifests/bills of lading for shipments of waste materials generated by the remedial activities.

- Maintain an on-site project log containing waste manifests/bills of lading for wastes generated by the remedial activities.

- Assist NYSEG in the review of Remediation Contractor invoices/requests for payment.

- Coordinate pre-construction project meeting, project construction/coordination meetings (as required), and a project close-out meeting for the remedial activities.

- Prepare and certify a *Final Engineering Report* (FER) to document completion of all remedial activities (as discussed in Section 6).

- Prepare an SMP to detail the post-remedial construction activities to be conducted at the site (as discussed in Section 6).

- Provide NYSEG with support to resolve any problems that may arise when the 100% Remedial Design is implemented.

- Issue formal design modifications (if necessary). Note that design modifications shall be signed by a New York State licensed Professional Engineer.

3.4 Remediation Contractor Responsibilities

In general, the Remediation Contractor is responsible for providing all supervision, labor, equipment, and materials needed (unless otherwise noted) to implement the activities described in the 100% Remedial Design. Remediation Contractor responsibilities are detailed throughout the Technical Specifications (Appendix B). Note that the Remediation Contractor's responsibilities also include:

- Verifying all existing site conditions, including understanding the site data summarized in the *Supplemental Information Package* (known existing site conditions are presented on Design Drawing 2, Appendix A).
- Thoroughly reviewing the Contract Documents.
- Reviewing Iberdrola's Contractor Safety Requirements (latest edition).
- Notifying the Remediation Engineer and NYSEG immediately upon discovery of a conflict between the Contract Documents and actual site conditions.

4. Pre-Remediation Activities

This section identifies the activities to be implemented prior to the initiation of remedial activities. Pre-remediation activities include, but are not limited to, the following:

- Preparing a citizen participation notice and fact sheet
- Conducting in-situ pre-remediation sampling
- Preparing Remediation Contractor pre-mobilization submittals
- Obtaining regulatory permits, access agreements, and other approvals

Additional information regarding these pre-remediation activities is provided in the following subsections.

4.1 Citizen Participation

A *Citizen Participation Plan* (CPP) describing the citizen participation activities that have been and will be completed for the site is included as Appendix G. Consistent with DEC Program Policy DER-23, *Citizen Participation Handbook for Remedial Programs* (NYSDEC, 2010a), a Notice and Fact Sheet will be sent to the site contact list before field work begins. NYSEG will work with the Division of Environmental Remediation (DER) to develop the notice that will be sent to all parties on the site contact list (i.e., residents and business owners within a specified radius of the site as well as additional community and political personnel) and to the document repository. The notice will include a Fact Sheet that describes the upcoming remediation work. The DER Project Manager will develop the Fact Sheet with assistance from NYSEG. NYSDEC is responsible for distributing the notice and Fact Sheet.

4.2 Pre-Remediation Sampling

Prior to the remedial construction activities, the Design Engineer (i.e., ARCADIS) will conduct pre-remediation in-situ sampling to characterize soil to be excavated during the remedial construction activities. Sampling will be conducted in accordance with the analytical and sampling frequency requirements provided by anticipated waste disposal/treatment facilities. A detailed description of the sampling protocol, waste characterization, air quality monitoring, and analytical requirements will be presented in the *Pre-Remediation In-Situ Sampling and Analysis Work Plan* (to be provided to NYSDEC under separate cover).

In general, soil/fill that contains visible NAPL, total BTEX and/or PAHs at concentrations greater than or equal to 10 and 1,000 mg/kg (respectively), or that is characteristically hazardous for benzene, shall be treated by low-temperature thermal desorption (LTTD). Based on NYSEG's and ARCADIS' experience, non-hazardous solid waste disposal facilities typically accept soil containing PAHs at concentrations up to 1,000 mg/kg. Therefore, remaining excavated soil will be disposed of as non-hazardous soil. Note that it is anticipated that all excavated material will be transported off-site for treatment and/or disposal (i.e., excavated material will not be reused as on-site fill).

The results of the pre-remediation sampling and laboratory analyses will be used to evaluate the potential disposal/treatment options for materials generated during the remedial construction activities. Following the receipt of analytical data, ARCADIS will prepare a *Pre-Remediation In-Situ Sampling and Analysis Report*. The report will include a brief description of work performed, tabulated summaries of sample analytical results, a plan view of sample locations, and cross sections of the excavation areas so that the information can be used by the waste disposal facilities to approve and accept the material for disposal.

4.3 Remediation Contractor Pre-Mobilization Submittals

Following contract award, the selected Remediation Contractor will be required to prepare pre-mobilization submittals for review by NYSEG, the Remediation Engineer and/or NYSDEC/NYSDOH. The Remediation Contractor will not be allowed to mobilize to the site prior to review and approval of all required pre-mobilization submittals. These submittals will include, but not necessarily be limited to, the following:

- *Site Operation Plan (SOP)* – The Site Operation Plan is required to present the Remediation Contractor's detailed approach for implementing the pertinent work activities (incorporating, as necessary, specifications, site maps, details, flow diagrams, charts, site geologic/geotechnical information, and schedules).

- *Health and Safety Plan (HASP)* – The Remediation Contractor will be required to prepare and submit a site-specific HASP (for use by the Remediation Contractor's on-site personnel during the remedial activities) to provide a mechanism for establishing safe working conditions at the site. The HASP will be prepared in accordance with all applicable rules and regulations, including 29 Code of Federal Regulations (CFR) 1910 and 29 CFR 1926, and shall be prepared by a certified by a Certified Industrial Hygienist. The Remediation Contractor is required to take all necessary precautions for the health and safety of all on-site Remediation Contractor employees in compliance with all applicable provisions of federal, state, and local health/safety laws and the provisions associated with the HASP. The

Remediation Contractor will assume sole responsibility for the accuracy and content of its HASP.

Additional requirements regarding the content of these Remediation Contractor pre-mobilization submittals and the overall submittal process are presented in the Specifications 01010 – Summary of Work and 01300 – Submittals (Appendix B).

4.4 Permitting and Access Agreements

The Remediation Contractor shall be responsible for obtaining any all pertinent and applicable local, state, or federal permits associated with the implementation of the remedial activities outlined in the 100% Remedial Design Report. However, pursuant to 6 NYCRR Part 375-1.12 (Permits), the NYSDEC may exempt a remedial party from the requirement to obtain any NYSDEC-issued permits for which the substantive requirements are met. Prior to implementing the remedial activities, NYSEG will satisfy notification requirements and obtain applicable review required by the NYSDEC.

5. Remediation Activities

This section presents a task-by-task summary of the remedial activities to be completed as part of this project. In addition to the text provided in the following subsections, Design Drawings included as Appendix A, and the Technical Specifications included as Appendix B, remediation activities shall also be conducted in accordance with the following documents:

- *Waste Management Plan* (WMP, Appendix D) – describes the characterization, handling, treatment, and disposal requirements for various waste materials to be generated as a result of the remedial activities.

- *Construction Quality Assurance Plan* (CQAP, Appendix E) – describes the materials, procedures, and testing related to construction, evaluation, and documentation during the implementation of the remedial activities.

- *Community Environmental Response Plan* (CERP, Appendix F) – presents a summary of the site monitoring and work practices that will be completed to address potential short-term impacts to the surrounding community and/or environmental resources.

- *Contingency Plan* (Appendix H) – provides responses to potential emergencies that may arise as a result of the remediation activities that will be completed at the site.

Additionally, the Remediation Contractor shall complete each remediation task in accordance with the Remediation Contractor’s HASP. The Remediation Contractor shall be responsible for conducting worker health and safety and work space monitoring.

A description of each remediation task, including references to supporting information presented elsewhere in the Contract Documents, is presented in the following subsections. The Remediation Contractor shall conduct remediation activities following the general sequence described in the following table.

Table 5.1 General Construction Sequence

Remedial Construction Component	Approximate Duration
Mobilization and site preparation	1 week
Tank removal and excavation activities	3 days
Backfill tank removal and excavation area	2 days
Surface material removal	3 days
Gas Holder 3 foundation slab inspection	2 day
Install soil cover	4 days
Final site restoration, survey and demobilization	1 week
Total Estimate Duration	5 weeks

The Remediation Contractor may propose an alternative remediation sequence. Alternate construction sequences shall be approved by NYSEG and the Design Engineer prior to implementation.

5.1 Remediation Task 1 – Mobilization

Site mobilization will be initiated by the Remediation Contractor after notification from NYSEG to proceed. In general, mobilization activities include bringing personnel, equipment, and materials to the site to support the remedial construction activities. Mobilization activities to be conducted by the Remediation Contractor include, but are not limited to, the following tasks:

- Mobilizing manpower, equipment, services, required utilities, and materials to the site, as necessary to implement the remedial activities. Equipment mobilized to the site will be subject to a visual inspection by the Remediation Engineer. Equipment that arrives at the site in unsatisfactory condition (e.g., soiled, poor operating condition), in the opinion of the Remediation Engineer, shall be removed from the site and replaced by the Remediation Contractor at no additional cost to NYSEG.

- Mobilizing and establishing one field office trailer to be utilized by the Remediation Contractor, the Remediation Engineer (and NYSEG’s on-site representative), and NYSDEC during implementation of the remedial activities. The trailer (and supporting telephone and internet services) shall conform to the requirements presented in Specification 01901 – Temporary Facilities and Office Support (Appendix B).

- Coordinating with NYSEG to obtain access to electrical service, as necessary. In the event that on-site electrical service is not available or accessible, the Remediation Contractor shall be responsible for providing electrical service, as necessary, for use during the remedial activities.

- Providing and maintaining portable sanitary services for use by on-site personnel engaged in the remedial activities. Portable sanitary services shall be installed at the location shown on Design Drawing 3 (Appendix A) and shall conform to the requirements presented in Specification 01901 – Temporary Facilities and Office Support (Appendix B).

5.2 Remediation Task 2 – Site Preparation

In general, the Remediation Contractor will conduct the following site preparation activities:

- Contacting the appropriate utility-locating agency (e.g., Dig Safely New York), as well as a private utility locator, prior to initiating intrusive activities. Underground utilities are located adjacent to the excavation area and will require demarcation to safeguard the utilities during intrusive activities. Locations of known utilities are presented on Design Drawing 2 (Appendix A). The Remediation Contractor will be responsible for identifying and protecting underground utilities (as required and in consultation with NYSEG, the Remediation Engineer, and the appropriate utility company/municipality) to facilitate the implementation of the remedial activities described herein. Additional details regarding the protection of utilities are provided in Specification 01046 – Control of Work (Appendix B).

- Verifying existing site conditions and identifying, marking, and verifying the location(s) of all aboveground and underground utilities, equipment, and structures, as necessary, to implement the remedial activities. The Remediation Contractor shall also be responsible for maintaining appropriate clearances from utilities (e.g., active overhead electric lines, underground conduit/piping). If the Remediation Contractor damages existing utilities, equipment, or structures, the Remediation Contractor shall be responsible for notifying the appropriate utility company/municipality and fully repairing all damages at no additional cost to NYSEG. Repairs (if necessary) shall be completed in accordance with all requirements of the utility company/municipality and to the satisfaction of the Remediation Engineer.

- Removing existing site fencing and installing temporary site security fencing and project/warning signs, as necessary. Requirements for the project sign are presented in Specification 01902 – Project Sign (Appendix B). Locations of temporary fencing are shown on Design Drawing 3 (Appendix A). Temporary fencing shall be 6-foot high chain link fence equipped with “No Trespassing” signs. Existing and temporary site fencing will be equipped with hedge slats or geotextile hung from fencing. At the completion of the project, the Remediation Contractor shall replace, as necessary, fences and gates at existing locations in as good or better condition.

- Establishing survey control and work limits. Requirements for establishing survey control are presented in Specification 01160 – Survey Control (Appendix B). The Remediation Contractor shall survey and mark-out the limits of the excavation area.

- Installing temporary erosion and sediment control measures. Control measures shall be installed in accordance with Design Drawings 3 and 7 (Appendix A) and Specification 01110 – Environmental Protection Procedures (Appendix B).

- Deploying work zone air monitoring equipment for worker health and safety monitoring, as required, prior to initiating intrusive activities. Although the Remediation Engineer will be responsible for conducting community air monitoring in accordance with Specification 02507 – Odor, Vapor, and Dust Control (Appendix B) and the CAMP (Appendix C), the Remediation Contractor shall verify daily that community air monitoring is being conducted prior to initiating intrusive site activities.

- Constructing the equipment and personnel decontamination areas. The Remediation Contractor shall construct decontamination areas for trucks, equipment, and personnel during implementation of the remedial activities. Anticipated areas to be used by the Remediation Contractor are shown on Design Drawing 3 and equipment decontamination area details are included on Design Drawing 8 (Appendix A).

Refer to Design Drawing 3 (Appendix A) for additional information regarding site preparation activities.

5.3 Remediation Task 3 – Vapor and Dust Monitoring and Control

As required by the NYSDOH's Generic CAMP, real-time airborne particulate monitoring will be conducted continuously during all intrusive and/or potential dust generating activities (e.g., excavation support installation, excavation, backfilling, material handling activities) using instrumentation equipped with electronic data-logging capabilities. Additionally, as required by the NYSDOH's Generic CAMP, VOCs will be monitored continuously during all intrusive and/or potential dust-generating activities.

Odors associated with MGP-related impacts to soil are anticipated to be generated during intrusive activities. The Remediation Engineer will be responsible for conducting community air monitoring for vapor and dust. However, the Remediation Contractor shall address dust and vapors in accordance with the CAMP (Appendix C) and Specification 02507 – Odor, Vapor, and Dust Control (Appendix B), and odors shall be addressed as directed by NYSEG, NYSDEC, and/or the Remediation Engineer. The following dust, vapor, and odor control measures may be used during these activities, depending upon specific circumstances, visual observations and air monitoring results:

- Water spray
- BioSolve® PinkWater®
- Polyethylene sheeting (e.g., for covering excavation faces, material stockpiles)
- Minimizing excavation surface area to be exposed at any given time
- Vapor suppression foam

Upon completion of a shift and prior to leaving the site at the end of a day, any open excavations will be backfilled to minimize potential odors, to the extent practicable, or covered with polyethylene. During the work day, exposed areas may be covered with polyethylene sheeting, foamed or temporarily covered with appropriate soil, as required, to control odors. An odor agent (e.g., Bio-Solve®, Rusmar Foam product) shall be used as necessary. Material Safety Data Sheets (MSDS) for odor suppressant products must be maintained on-site by the Remediation Contractor. Additionally, material stockpiled on-site shall be covered (i.e., with polyethylene sheeting) expect when activity managed to reduce the potential for dust generation.

A more detailed description of the air monitoring program, including routine requirements, action levels for increased monitoring, provisions for corrective actions to address air emissions, and/or provisions for remedial action modifications/work stoppage, is provided in the CAMP (Appendix C) and Specification 02507 – Odor, Vapor, and Dust Control (Appendix B).

5.4 Remediation Task 4 – Surface Material Removal

The Remediation Contractor shall be responsible for the removal of existing surface material at the site. The Remediation Contractor shall remove existing 12-inches of topsoil and gravel from the NYSEG property to facilitate inspection of the former foundation slab for Gas Holder 3 (discussed under Remediation Task 7) and installation of a new soil cover (discussed under Remediation Task 10). The Remediation Contractor shall remove surface material to the limits shown on Design Drawing 4.

Surface material removal shall be conducted in accordance with Specification 02201 – Earthwork (Appendix B). Removed material removed shall be handled and disposed/treated off-site in accordance with the WMP (Appendix D) and Specification 02415 – Impacted Material Handling and Excavation Procedures (Appendix B). An anticipated 12 inches of surface material is anticipated to be removed to facilitate installation of the site soil cover. All excavated material generated during the remedial activities is anticipated to be considered not suitable for reuse as on-site backfill and will be transported off-site for treatment/disposal. The Remediation Contractor shall stage excavated materials within the limits of the excavation area, if necessary, prior to direct-loading the material for transportation for off-site treatment/disposal.

5.5 Remediation Task 5 – Installation of Excavation Support Systems

Based on the proximity of the NYSEG gas lines (as well as water lines, sidewalks, light poles, etc. along Railroad Place), excavation support will be required to facilitate the removal of the former tank. Prior to installing the excavation support system (or conducting excavation activities), the Remediation Contractor shall air knife/vacuum soil along the slide rail alignment to verify the absence of subsurface utilities within the excavation area, as described in Specification 01046 – Control of Work (Appendix B).

The Remediation Contractor will be responsible for providing, installing, monitoring, and maintaining excavation support systems to facilitate the excavation of materials from the removal area shown on Design Drawing 4 (Appendix A). The Remediation Contractor shall utilize a pre-fabricated support system (i.e., slide rail support system) to complete excavation activities. The Remediation Contractor shall survey the corner posts and install the excavation support systems to limits as shown on Design Drawing 5 (Appendix A). Excavation support systems shall be installed in accordance with Design Drawing 5 (appendix A) and Specification 02205 – Excavation Support and Protection (Appendix B).

The Remediation Contractor may propose alternative excavation support systems as part of an alternate bid.

5.6 Remediation Task 6 – Tank and Soil Removal

The Remediation Contractor shall conduct excavation activities to remove the former tank and source material in the immediate vicinity of the tank (if encountered). As indicated in Section 2, source material is defined as soil containing visual MGP-related impacts in quantities greater than slight/trace sheens, staining, or isolated blebs. Following removal of source material, the Remediation Engineer shall collect one documentation sample from the bottom of the tank removal excavation.

The anticipated horizontal extent of the removal area is presented on Design Drawing 4 (Appendix A). The Remediation Contractor shall complete the tank removal/soil excavation activities to an anticipated depth of 8 feet below grade. Note that if source material is encountered below the tank, the Remediation Contractor will be required to remove the source material. Excavated material shall be handled/managed as discussed under Remediation Task 8. Tank and soil removal activities shall be conducted by the Remediation Contractor in accordance with following specifications (to be included in Appendix B):

- 01160 – Survey Control
- 02201 – Earthwork
- 02202 – Rock and Debris Removal
- 02205 – Excavation Support and Protection
- 02415 – Impacted Material Handling and Excavation Procedures

Note that an approximately 4-inch diameter metal pipe was encountered above the top of the former tank during the PDI. The Remediation Contractor shall coordinate with NYSEG to confirm that the pipe is not an active gas line and then cut and cap the pipe in accordance with Specification 02399 – Former Pipe Abandonment (Appendix B).

The Remediation Contractor shall pump out the contents of the tank prior to removal. Additionally, the Remediation Contractor shall dewater/stabilize materials within the excavation (if necessary) prior to removal and transportation to the off-site NYSEG-selected treatment/disposal facility. For the purpose of developing a bid, the Remediation Contractor shall assume that excavation area dewatering shall be conducted via sump installed within the excavation areas as shown on Design Drawing 8 (Appendix A). Water shall be stored in a 21,000 gallon frac tank (to be provided by the Remediation Contractor) to be staged as shown on Design Drawing 3 (Appendix A). A pre-fabricated spill containment berm shall be placed beneath the frac tank.

The Remediation Engineer shall coordinate with NYSEG-selected waste transportation vendors and disposal facilities to manage and remove the containerized water from the work area. Waste transportation and disposal activities shall be conducted in accordance with all applicable state and federal requirements, as well as the requirements set forth by the disposal facility.

Following the removal of the former tank (and visually impacted material below the tank, if encountered), the Remediation Engineer shall collect a documentation soil sample from the excavation bottom to document remaining soil conditions. Additionally, the Remediation Engineer shall coordinate with the NYSDEC to register the tank under the NYSDEC’s Bulk Storage Program. Tank registration shall be conducted in accordance with the New York State bulk storage regulations. As discussed in Section 6, the analytical results for the documentation sample and a copy tank registration shall be included in the FER.

5.7 Remediation Task 7 – Gas Holder 3 Foundation Inspection

The Remediation Contractor shall remove surface materials covering former Gas Holder 3 to facilitate inspection of the foundation slab (and any valve boxes or tar drips, if encountered). Inspection activities shall include, but not be limited to, visual inspection and photo-documentation of the former Gas Holder 3.

The Remediation Contractor shall initially remove materials outside the limits of the paved parking area to expose the northern and eastern portions of the holder foundation slab. The Remediation Engineer will visually inspect the holder foundation slab and document (through photographs) that the foundation slab is free of visual impacts (i.e., visible free product, not including staining). If free phase liquid is observed, the Remediation Contractor shall power-wash/clean/vacuum the foundation slab such that no visible free product remains, to the satisfaction of NYSEG, the Remediation Engineer, and/or NYSDEC. Additional information regarding NAPL removal procedures is included in Specification 02415 – Impacted Material Handling and Excavation Procedures (Appendix B). The Remediation Contractor will not be required to remove stained concrete.

If free phase liquid is not encountered during the initial inspection of the holder foundation slab (based on concurrence with the Remediation Engineer and NYSDEC), the Remediation Contractor will not be required to uncover the remaining portions of the holder foundation slab. However, if free phase liquid is observed on the northern and eastern portions of the holder foundation slab, the western and southern portions of the slab (i.e., below the existing asphalt parking lot and a vegetable garden) will require inspection. If inspection is required, the Remediation Contractor shall remove the vegetable garden and saw-cut the asphalt pavement to create a clean break line to the limits shown on Design Drawing 4 (Appendix A). The Remediation Contractor shall remove only the portions of the pavement necessary to expose the holder foundation. Pavement removed to facilitate the inspection shall be handled in accordance with the WMP (Appendix D) and Specification 02415 – Impacted Material Handling and Excavation Procedures (Appendix B). The Remediation Engineer will visually inspect the holder foundation slab and if free phase liquid is observed, the Remediation Contractor shall power-wash/clean/vacuum the foundation slab such that no visible free product remains, to the satisfaction of NYSEG, the Remediation Engineer, and NYSDEC.

The Remediation Contractor shall install surface materials as discussed under Remediation Task 10.

5.8 Remediation Task 8 – Excavated Material and Waste Handling

Soil, debris, water, NAPL, and miscellaneous MGP-impacted wastes generated during the remedial activities will be handled and disposed/treated off-site in accordance with the WMP (Appendix D) and all applicable federal, state, and local regulations.

As indicated in Section 4, prior to the remedial construction activities, the Design Engineer will conduct pre-remediation sampling to characterize soil to be excavated during the remedial construction activities. The results of the pre-remediation sampling and laboratory analyses will be presented in a *Pre-Remediation In-Situ Sampling and Analysis Report*. The report will include the material handling and off-site disposal/treatment requirements for soil generated during the remedial activities.

Excavated surface material is anticipated to be disposed of as non-hazardous waste at a solid waste facility (e.g., at Seneca Meadows Landfill). Excavated subsurface soil is anticipated to be treated/disposed of by low-temperature thermal desorption (LTTD) (e.g., at ESMI Fort Edward). Excavated debris not suitable for reuse (e.g., piping, asphalt, etc.) shall be direct loaded for off-site transportation and disposal/treatment/ recycling. Traffic routes to be utilized by the Remediation Contractor and waste transporters (as well as the importation of construction materials) are provided in the CERP (Appendix F).

5.9 Remediation Task 9 – Backfill

Following the completion of the soil excavation activities, the Remediation Contractor shall backfill the excavation area to facilitate placement of the soil cover. The Remediation Contractor shall backfill the removal area with a controlled low-strength material (CLSM) (i.e., flowable fill) to facilitate final site restoration, as discussed under Remediation Task 10. CSLM is a self-compacting material that would minimize settling of existing subsurface material immediately adjacent to the slide rail panel when the slide rail system is removed. Additionally, CLSM will significantly reduce/eliminate the need to compact backfill, thereby minimizing the potential for damage to adjacent infrastructure.

Backfill material requirements are presented in the following specifications (Appendix B):

- 02201 – Earthwork
- 02202 – Rock and Debris Removal
- 02206 – Selected Fill

5.10 Remediation Task 10 – Soil Cover

As indicated in Section 2, the existing PSB, asphalt pavement in parking lots and Railroad Place, and sidewalks will serve as a surface cover for properties not owned by NYSEG. The Remediation Contractor shall install a soil cover on the NYSEG property. The soil cover will generally consist of a minimum of one foot of imported fill material. Soil cover components are shown on Design Drawings 5 and 8 (Appendix A). Requirements for the soil cover materials are presented in the following specifications (Appendix B):

- 02201 – Earthwork
- 02206 – Selected Fill
- 02208 – Restoration of Surfaces
- 02210 – Topsoil and Seeing
- 02270 – Geotextile
- 02645 – Asphalt Pavement

The Remediation Contractor shall install a combination of vegetated topsoil and gravel (that meets the commercial use allowable constituent levels for imported fill or soil provided in Appendix 5 of DER-10) to serve as the soil cover. Prior to placing imported fill material, the Remediation Contractor shall install a geotextile demarcation layer. As shown on Design Drawing 5 (Appendix A), the Remediation Contractor shall install gravel surfaces in the northern portion of the NYSEG property (to serve as a parking area) and near the gas regulator station (to provide vehicle access to the building). All other areas will be covered with six inches of general fill and a minimum of six inches of topsoil suitable to maintain a vegetative layer. Note that if pavement is removed as part of the gas holder foundation inspection, surface restoration of paved areas will consist of 12 inches of crushed stone.

5.11 Remediation Task 11 – Project Close-Out and Demobilization

This section presents project close-out activities to be completed by the Remediation Contractor.

5.11.1 Remediation Task 11a – Restoration

The Remediation Contractor shall restore all other surface features disturbed, damaged, or destroyed during the remedial activities, including, but not limited to, sidewalks, pavement and curbs, vegetated surfaces, and permanent site fencing. Sidewalks, roadways, and curbs shall be replaced in kind.

Repairs to sidewalks, pavement, and curbs that are damaged by the Remediation Contractor during remedial construction shall be approved by the City of Geneva, prior to conducting surface restoration activities. The Remediation Contractor shall be responsible for gaining City approval of any repairs to damaged surfaces and meeting all local, state, and federal laws.

5.11.2 Remediation Task 11b – Decontamination

The Remediation Contractor shall decontaminate (as necessary) all personnel and equipment, and vehicles that come into contact with excavated materials. All construction vehicles leaving the site shall be decontaminated by the Remediation Contractor (as necessary) to prevent the tracking of soil off-site (including vehicles transporting clean fill to the site). The Remediation Contractor shall conduct decontamination of personnel and equipment within the constructed decontamination areas at the locations shown on Design Drawing 3 and in accordance with Design Drawing 8 (Appendix A).

At a minimum, the Remediation Contractor shall decontaminate the Remediation Contractor's project equipment (including, but not limited to, excavation equipment, trucks, pumps, and hand tools) that comes in contact with excavated materials prior to demobilizing and prior to handling clean material in accordance with Specification 01112 – Decontamination Procedures (Appendix B). In addition, equipment used to handle excavated material or liquids shall be decontaminated prior to further handling of non-impacted material. The Remediation Contractor shall perform decontamination activities until no visible soil, debris, or stains are present on the equipment surfaces (to the satisfaction of NYSEG and/or the Remediation Engineer). Equipment, such as pumps, shall be flushed using clean water and appropriate cleaning agents (as necessary) to the satisfaction of NYSEG and/or the Remediation Engineer.

Unless otherwise directed by NYSEG and/or the Remediation Engineer, any equipment to be taken off-site by the Remediation Contractor shall be cleaned within the constructed decontamination area and subject to a final visual review. Precautions shall be taken to limit contact between the equipment, personnel performing the cleaning activities, and any cleaning liquids that may accumulate in the decontamination area. The extent and method of cleaning shall be at the discretion of the Remediation Contractor; however, each piece of equipment shall be inspected by NYSEG and/or the Remediation Engineer for any visible soils, staining, or other debris prior to its demobilization from the site. Any observed soils, staining, or other debris shall be promptly removed by the Remediation Contractor to the satisfaction of NYSEG and/or the Remediation Engineer. Water that is generated during decontamination activities will be collected and containerized in appropriate containers for off-site treatment/disposal.

The Remediation Contractor shall prepare the solid and liquid waste streams generated by the decontamination activities for off-site disposal. Treatment/disposal of collected wash water, solids, and other materials shall be in accordance with Remediation Task 8 and Specification 02415 – Impacted Material Handling and Excavation Procedures (Appendix B).

5.11.3 Remediation Task 11c – Survey

The Remediation Contractor shall retain a New York State licensed surveyor to conduct survey control during completion of the remedial actions, as required by the Contract Documents. The survey information will be used to document that the remedial activities have been completed consistent with the project design requirements. The Remediation Contractor will supply the survey information (including an as-built survey, sealed and signed by the Remediation Contractor's NYS licensed surveyor) to the Remediation Engineer for inclusion in the FER upon completion of the remedial activities. Survey work associated with the remedial activities will be performed in accordance with Specifications 01160 – Survey Control and 01720 –

Project Record Documents (Appendix B). The Remediation Contractor shall provide a final as-built survey within 21 days of final site demobilization and prior to final payment by NYSEG.

5.11.4 Remediation Task 11d – Demobilization

Following completion of all remedial actions, the Remediation Contractor shall conduct the following demobilization activities:

- Completion of “punch list” items, to be identified by the Remedial Engineer, NYSEG, and/or NYSDEC.

- Dismantle the work area(s), staging area(s), and decontamination area.

- Remove from the site, all decontaminated material, equipment and support structures.

6. Post-Remediation Activities

Remedial activities to be conducted following the completion of remediation construction activities at the site include the following:

- Preparation of a *Final Engineer Report*
- Preparation of a *Site Management Plan*
- Establishment of Institutional Controls
- Completion of post-remedial action groundwater monitoring

6.1 Final Engineering Report

Upon completion of remedial construction activities presented herein, the Remediation Engineer shall prepare and submit an FER to the NYSDEC to document all remedial activities that have been completed at the site. The FER will be completed in accordance with the requirements presented in DER-10 (NYSDEC, 2010c) and, at a minimum, will include the following information:

- Description of the remediation activities completed in accordance with the approved Remedial Design, including problems encountered and variations (if any) from the NYSDEC-approved *Final (100%) Remedial Design Report.*

- Record drawings, tables, and figures detailing the remedial activities completed.

- Analytical results for the soil documentation sample collected from the excavation bottom.

- Copy of the tank application/registration to the NYSDEC database.

- Information and documentation regarding the final quantities of materials disposed/treated off site during implementation of the remedial activities, including executed manifests and bills of lading.

- Information related to the sub-slab depressurization system installed at the PSB.

- Certification statement.

The FER will be prepared in a format based on available templates on the NYSDEC website. A professional engineer licensed in New York State will sign and seal the *Final Engineering Report*, including the record drawings and certification statement.

6.2 Site Management Plan

Following completion of the remedial construction activities and consistent with the ROD and requirements of DER-10, NYSEG will prepare an SMP that will detail the post-remedial action activities to be conducted at the site. The SMP will be prepared to include the following:

- *Institutional and Engineering Control Plan* – describes the use restrictions and engineering controls that have been established at the site. This plan may include the following:
    - an *Excavation Plan* that includes procedures and protocols for testing, handling, and disposal of remaining site soil that may be excavated in the future
    - descriptions of the environmental easements and groundwater use restrictions established for the site
    - requirements for inspections and management of engineering controls
    - requirements for periodic reviews and certification of institutional and engineering controls
    - requirements for the continued operation of the sub-slab depressurization system in the PSB
- *Monitoring Plan* – used to assess the performance and effectives of the remedial activities. This plan may include the following:
    - requirements for conducting periodic groundwater monitoring
    - a schedule of the monitoring activities and submittals to be provided to NYSDEC
    - requirements to evaluate the potential for vapor intrusion at any new buildings that may be constructed onsite in the future, including provisions for implementing soil vapor mitigation (as necessary)
    - requirements to evaluate the potential for vapor intrusion for existing site buildings if building use changes significantly

Additionally the SMP will include requirements for conducting sub-slab depressurization system operation, monitoring, and maintenance, as previously presented in the February 2011 Sub-Slab Depressurization System Operation Monitoring & Maintenance Plan (ARCADIS, 2011a).

6.3 Institutional Controls

As required by the ROD, institutional controls in the form of an environmental easement will be established for the site. NYSEG will establish the environmental easement in support of the following:

- Requiring the property owner (NYSEG) to complete and submit periodic certifications to NYSDEC that the institutional and engineering controls are still in place and remain effective
- Restricting the use of the site to commercial use
- Restricting the use of groundwater at the site
- Requiring management of the site in accordance with the provisions of the SMP (as described in the following subsection)

NYSEG will establish the environmental easement following the completion of the remedial construction activities. Note that per the ROD, institutional controls are also required for City-owned portions of the site (i.e., the PSB lot and Railroad Place). NYSEG will coordinate with the City and NYSDEC to assess the feasibility of establishing institutional controls on parcels not owned by NYSEG.

6.4 Post-Remedial Action Groundwater Monitoring

Following the completion of the remedial construction activities, periodic groundwater monitoring will be conducted to document site groundwater conditions and potentially, further evaluate natural attenuation processes occurring at the site. As indicated in Section 1, the results of the natural attenuation evaluation indicate that site conditions (i.e., types and populations of microorganisms) support the natural attenuation of dissolved phase impacts. Enhancement of these conditions does not appear necessary.

Groundwater sampling will be implemented to continue monitoring the concentrations of dissolved phase COCs. The scope, frequency, and duration for post-remedial action groundwater monitoring will be recommended and incorporated into the *Monitoring Plan* to be developed as part of the SMP.

7. Schedule

This section presents the preliminary project schedule for NYSDEC review of the Contract Documents.

Table 7.1 Preliminary Project Schedule

Schedule Component	Date
100% Remedial Design to NYDSEC	February 2014
Contractor Procurement	October 2016 to August 2017
Remedial Construction	October to November 2017

Remediation scheduling will be presented as part of the Request for Proposal to potential remedial contractors at the time that NYSEG and NYSDEC decide to implement the remedial action at this site.

8. References

ARCADIS, 2008. *Remedial Investigation Report*, Wadsworth Street Former Manufactured Gas Plant Site, prepared for the NYSEG. February 2008.

ARCADIS, 2010a. *Feasibility Study Report*, Wadsworth Street Former Manufactured Gas Plant Site, prepared for the NYSEG. February 2010.

ARCADIS, 2010b. *Construction Completion Report/Interim Site Management Plan*, Wadsworth Street Former MGP Site, prepared for NYSEG. July 2010.

ARCADIS, 2010c. *Remedial Design Work Plan*, Wadsworth Street Former MGP Site, prepared for NYSEG. October 2010.

ARCADIS, 2011a. *Sub-Slab Depressurization System Operation Monitoring & Maintenance Plan*, Geneva Former MGP Site, prepared for NYSEG. February 2011.

ARCADIS, 2011b. *PDI Summary Letter Report*, Wadsworth Street Former MGP Site, prepared for NYSEG. May 2011.

ARCADIS, 2012. *Natural Attenuation Evaluation Report,* Wadsworth Street Former Manufactured Gas Plant Site, prepared for the NYSEG, January 2012.

NYSDEC. 2010a. *DER-23*. *Citizen Participation Handbook for Remedial Programs.* January, 2010.

NYSDEC, 2010b. *Record of Decision*. NYSEG, Wadsworth Street, Geneva MGP Site, Site Number 8-35-015. March 2010.

NYSDEC, 2010c. *DER-10, Technical Guidance for Site Investigation and Remediation*. May 2010.

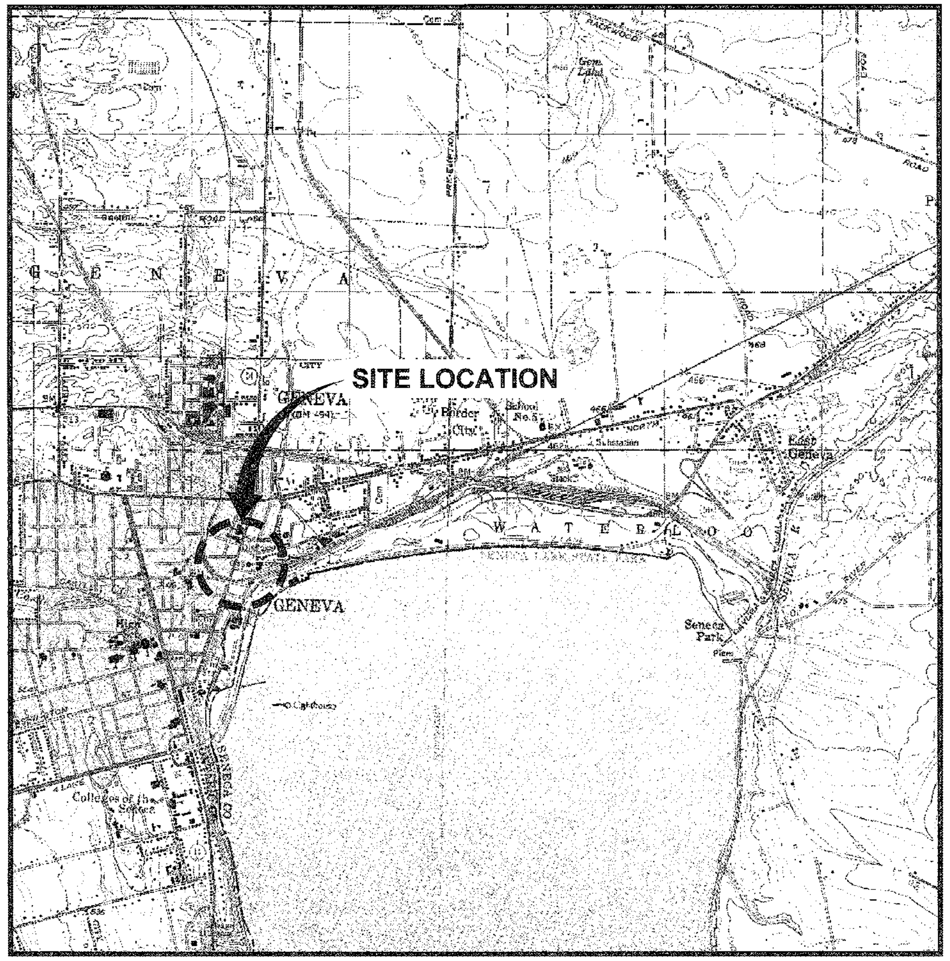
ARCADIS

Appendix A

Design Drawings

DESIGN DRAWINGS

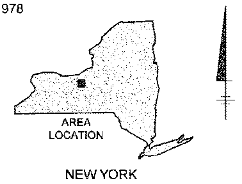
WADSWORTH STREET
FORMER MANUFACTURED GAS PLANT SITE
FINAL (100%) REMEDIAL DESIGN



REFERENCE: BASE MAP USGS 7.5 MINUTE QUADRANGLE., GENEVA S. & GENEVA N., 1953, PHOTOREVISED 1978

LOCATION MAP

0 2000' 4000'
GRAPHIC SCALE



NYSEG
GENEVA, NEW YORK

DATE ISSUED
FEBRUARY 2014

JASON DAVID BRIEN

ARCADIS

ARCADIS OF NEW YORK, INC.

INDEX TO DRAWINGS

CITY: SYRACUSE, NY DIV/GROUP:IMDV-CAD DB:B.GETTS K.SARTORI R.PETRIE LD:B.GETTS PIC: K.WHITE PM: J.BRIEN TM: J.BRIEN RB:J.GOLUBSKI LYR:ON=*;OFF=*REF*
G:\ENVCAD\SYRACUSE\ACT\B0013104\0000\00014\DWG\CONTRACT\DESIGN_FINAL\13104Q01.dwg LAYOUT: COVER SAVED: 2/21/2014 1:00 PM ACADVER: 18.1S (LMS TECH) PAGESETUP: LD-PDF PLOTSTYLETABLE: PLTCONT1.CTB PLOTTED: 2/21/2014 1:03 PM BY: PETRIE, RICH

XREFS: IMAGES:
13104X01.tif
13104X02.tif

GENERAL NOTES:

1. ACTUAL SITE FEATURES AT THE TIME OF CONSTRUCTION MAY DIFFER FROM THOSE SHOWN ON THE DESIGN DRAWINGS. THE REMEDIATION CONTRACTOR SHALL PROMPTLY NOTIFY THE OWNER AND REMEDIATION ENGINEER (IN WRITING) OF ANY SUCH DIFFERENCES THAT MAY AFFECT THE PERFORMANCE OF THE WORK.
2. THE REMEDIATION CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL OTHER FEDERAL–, STATE–, COUNTY–, AND/OR CITY–SPECIFIC PERMITS THAT MAY BE REQUIRED TO PERFORM THE WORK.
3. INFORMATION RELATED TO SUBSURFACE CONDITIONS IS APPROXIMATE AND SHOULD NOT BE RELIED ON AS A COMPLETE DEPICTION OF SITE CONDITIONS. THE REMEDIATION CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS, INCLUDING ABOVEGRADE AND SUBSURFACE FEATURES WHETHER OR NOT SHOWN ON DESIGN DRAWINGS OR OTHERWISE DESCRIBED IN THE CONTRACT DOCUMENTS.
4. THE TECHNICAL WORK AND CONTRACTOR REQUIREMENTS ARE DESCRIBED IN SEVERAL DOCUMENTS THAT COLLECTIVELY REPRESENT THE REMEDIAL DESIGN. THESE DOCUMENTS INCLUDE THE REMEDIAL DESIGN NARRATIVE, DESIGN DRAWINGS, TECHNICAL SPECIFICATIONS, CAMP, CQAP, AND CERP. THESE DOCUMENTS SHOULD BE THOROUGHLY REVIEWED BY THE REMEDIATION CONTRACTOR. ANY DIFFERENCES IDENTIFIED BY THE REMEDIATION CONTRACTOR BETWEEN THE INFORMATION PRESENTED IN THE ABOVE–LISTED DOCUMENTS SHALL BE SUBMITTED TO THE REMEDIATION AND DESIGN ENGINEER (IN WRITING) FOR REVIEW AND RESOLUTION.
5. THE REMEDIATION CONTRACTOR SHALL FOLLOW THE REMEDIAL CONSTRUCTION SEQUENCE PRESENTED IN THIS REMEDIAL DESIGN. THE REMEDIATION CONTRACTOR MAY PROPOSE AN ALTERNATE CONSTRUCTION SEQUENCE. ALTERNATE CONSTRUCTION SEQUENCES MUST BE APPROVED BY NYSEG, THE DESIGN ENGINEER, AND THE REMEDIATION ENGINEER PRIOR TO IMPLEMENTATION.

UTILITY NOTES:

1. THE LOCATIONS, ALIGNMENTS, AND CONSTRUCTION OF UTILITIES SHOWN ON THE DESIGN DRAWINGS ARE APPROXIMATE AND BASED ON INFORMATION READILY AVAILABLE TO THE OWNER/DESIGN ENGINEER. THE CONTRACTOR SHALL VERIFY THE PRESENCE AND LOCATION OF ALL OVERHEAD/UNDERGROUND SITE FEATURES AND UTILITIES RELEVANT TO AND POTENTIALLY TO BE ENCOUNTERED DURING THE WORK. ADDITIONAL SITE FEATURES AND UTILITIES MAY BE PRESENT THAT ARE NOT SHOWN ON THE DESIGN DRAWINGS.
2. THE REMEDIATION CONTRACTOR IS RESPONSIBLE FOR CONTACTING/COORDINATING WITH DIG SAFELY NEW YORK TO IDENTIFY AND LOCATE UNDERGROUND UTILITIES. THE DIG SAFELY NEW YORK PHONE NUMBER IS 811; THE WEBSITE IS WWW.DIGSAFELYNEWYORK.COM.
3. THE REMEDIATION CONTRACTOR IS RESPONSIBLE FOR SUBCONTRACTING/COORDINATING WITH AN APPROPRIATE PRIVATE UTILITY LOCATOR TO LOCATE AND IDENTIFY UNDERGROUND UTILITIES WITHIN PROPERTY LIMITS.
4. EXCEPT WHERE NOTED OR AS OTHERWISE INDICATED IN THE REMEDIAL DESIGN, THE REMEDIATION CONTRACTOR IS RESPONSIBLE FOR THE MAINTENANCE AND PROTECTION OF ALL OVERHEAD/UNDERGROUND SITE FEATURES AND UTILITIES THAT MAY BE AFFECTED BY THE WORK. ALL UTILITIES, UNLESS STATED OTHERWISE, SHALL REMAIN IN OPERATION FOR THE DURATION OF THE WORK.
5. THE REMEDIATION CONTRACTOR IS RESPONSIBLE FOR CONTACTING/COORDINATING WITH THE APPROPRIATE UTILITY COMPANIES FOR THE TEMPORARY BRACING, REMOVAL, RELOCATION, AND/OR REPLACEMENT OF ANY UTILITIES, UTILITY POLES, OR GUY WIRES.
6. THE REMEDIATION CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING/PROTECTING ALL EXISTING UNDERGROUND/ABOVEGROUND UTILITIES LINES/STRUCTURES.
7. THE REMEDIATION CONTRACTOR SHALL COORDINATE ALL ELECTRICAL AND POWER REQUIREMENTS WITH NYSEG.

REFERENCE AND SURVEY RELATED NOTES:

1. BASE MAP BASED ON SURVEYS COMPLETED BY NYSEG ON DECEMBER 14, 2005 AND OCTOBER 2006. BASE MAP UPDATED BASED ON SURVEY COMPLETED BY ARCADIS ON MARCH 23, 2011.
2. ELEVATIONS IN REFERENCE TO NGVD 1929, HORIZONTAL DATUM IS NAD 83 STATEPLANE, NEW YORK CENTRAL.
3. IT SHALL BE THE REMEDIATION CONTRACTOR'S RESPONSIBILITY TO ESTABLISH AND MAINTAIN CONSTRUCTION SURVEY CONTROL AND VERIFY GRADES DURING THE PERFORMANCE OF WORK USING A NEW YORK STATE–LICENSED LAND SURVEYOR.
4. ALL LOCATIONS ARE APPROXIMATE.

WASTE MANAGEMENT NOTES:

1. THE REMEDIATION CONTRACTOR SHALL REMOVE AND PROPERLY DISPOSE OF ALL ABOVEGROUND AND BELOW GROUND NON–EARTHEN MATERIALS INCLUDING, BUT NOT LIMITED TO: FORMER TANK, FORMER BUILDING FOUNDATIONS, DEBRIS, BRUSH, LOGS, TREES, STUMPS, REFUSE, AND RUBBISH FROM WITHIN THE PROJECT WORK LIMITS, AS REQUIRED TO PERFORM THE REMEDIAL ACTIVITIES DESCRIBED HEREIN.
2. EXISTING SITE FEATURES NOT SPECIFICALLY IDENTIFIED ON THE DESIGN DRAWINGS MAY REQUIRE REMOVAL BY THE REMEDIATION CONTRACTOR TO FACILITATE CONSTRUCTION. THE REMOVAL OF SUCH FEATURES SHALL NOT BE PERFORMED WITHOUT PRIOR APPROVAL FROM THE OWNER/REMEDIATION ENGINEER.
3. THE REMEDIATION CONTRACTOR SHALL BE RESPONSIBLE FOR THE LOADING OF ALL WASTE MATERIALS GENERATED DURING THE PROJECT. THE REMEDIATION ENGINEER SHALL COORDINATE TRANSPORTATION WITH OFF–SITE DISPOSAL FACILITIES.
4. THE REMEDIATION CONTRACTOR SHALL COLLECT, EXTRACT, CONVEY AND CONTAINERIZE ALL WATER GENERATED DURING THE PROJECT. THE REMEDIATION ENGINEER SHALL COORDINATE TRANSPORTATION WITH OFF–SITE DISPOSAL FACILITIES.

SITE MANAGEMENT/PROJECT PERFORMANCE NOTES:

1. ALL WORK SHALL BE PERFORMED WITHIN THE PROJECT WORK LIMITS. NO WORK SHALL BE PERFORMED BEYOND THE PROJECT WORK LIMITS WITHOUT PRIOR APPROVAL FROM THE OWNER/REMEDIATION ENGINEER.
2. WORK ACTIVITIES ARE PERMITTED ON NON–HOLIDAY WEEKDAYS (MONDAY THROUGH FRIDAY) BETWEEN THE HOURS OF 7:00 AM AND 5:00 PM. NO WORK SHALL BE PERFORMED OUTSIDE OF THESE HOURS WITHOUT PRIOR APPROVAL FROM THE OWNER/REMEDIATION ENGINEER.
3. ALL WORK SHALL BE PERFORMED IN A NEAT AND ORDERLY MANNER, IN CONFORMANCE WITH BEST MODERN TRADE PRACTICE, AND BY COMPETENT, EXPERIENCED PERSONNEL. MATERIALS AND INSTALLATION SHALL BE IN ACCORDANCE WITH ALL CODES, REGULATIONS, AND REQUIREMENTS OF ALL APPLICABLE CITY, STATE, FEDERAL, AND OTHER PUBLIC OR PRIVATE AUTHORITIES.
4. ALL EQUIPMENT OPERATED WITHIN THE PROJECT WORK LIMITS SHALL BE DECONTAMINATED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS PRIOR TO ARRIVING ONSITE AND PRIOR TO LEAVING THE SITE. PROJECT EQUIPMENT THAT COMES IN CONTACT WITH EXCAVATED MATERIALS SHALL BE APPROPRIATELY DECONTAMINATED PRIOR TO HANDLING IMPORTED BACKFILL MATERIAL OR EXCAVATED MATERIAL SUBJECT TO RE–USE AS ONSITE BACKFILL TO THE SATISFACTION OF THE REMEDIATION ENGINEER.
5. THE REMEDIATION CONTRACTOR SHALL ESTABLISH, MAINTAIN, AND PROTECT THE PROJECT WORK LIMITS (INCLUDING EXCLUSION, CONTAMINATION REDUCTION, AND SUPPORT ZONES) AS DEFINED IN THE CONTRACTOR'S HASP.
6. THE REMEDIATION CONTRACTOR SHALL ESTABLISH AND MAINTAIN SURVEY CONTROL THROUGHOUT THE WORK IN ACCORDANCE WITH THE REMEDIAL DESIGN.
7. NO EXCAVATED MATERIALS OR SUPPLIES OF ANY KIND SHALL BE STORED ON PRIVATE OR PUBLIC PREMISES WITHOUT PRIOR APPROVAL FROM THE OWNER/REMEDIATION ENGINEER.
8. THE REMEDIATION CONTRACTOR IS RESPONSIBLE FOR PROVIDING TEMPORARY TRAFFIC CONTROL MEASURES (E.G., FLAG MEN, SIGNS, CONES, ETC.).
9. THE REMEDIATION CONTRACTOR SHALL RESTORE ALL AREAS THAT ARE IMPACTED BY THE PROJECT, INCLUDING BUT NOT LIMITED TO, EQUIPMENT AND MATERIAL STORAGE AREAS, MATERIAL LOADING AREAS, PARKING AREAS, AND LOCATION OF SITE TRAILER, EXCEPT WHERE NOTED OTHERWISE IN THE CONTRACT DOCUMENTS.
10. THE REMEDIATION CONTRACTOR SHALL CONTROL ODORS, DUST, AND VAPORS THAT RESULT FROM THE CONSTRUCTION ACTIVITIES IN ACCORDANCE WITH THE CONTRACTOR'S HASP, THE CONTRACT DOCUMENTS, AND APPLICABLE FEDERAL, STATE, AND LOCAL REGULATIONS.
11. WORK ZONE AIR MONITORING SHALL BE PERFORMED BY THE REMEDIATION CONTRACTOR IN ACCORDANCE WITH THE REMEDIATION CONTRACTORS HASP AND THE REMEDIAL DESIGN.
12. COMMUNITY AIR MONITORING FOR VOLATILE ORGANIC COMPOUNDS AND PARTICULATES SHALL BE PERFORMED BY THE REMEDIATION ENGINEER ON A CONTINUOUS BASIS DURING ALL INTRUSIVE AND/OR POTENTIAL DUST GENERATING ACTIVITIES (E.G., INSTALLATION OF EROSION AND SEDIMENT CONTROL MEASURES, INSTALLATION OF EXCAVATION SUPPORT SYSTEMS, EXCAVATION/MATERIAL HANDLING ACTIVITIES, ETC.). THE REMEDIATION CONTRACTOR SHALL ENSURE THAT COMMUNITY AIR MONITORING IS BEING PERFORMED PRIOR TO INITIATING INTRUSIVE AND/OR POTENTIAL DUST GENERATING ACTIVITIES EACH DAY.
13. ALL AREAS IMPACTED BY OR OTHERWISE DISTURBED DURING THE PROJECT SHALL BE RESTORED TO PRE–CONSTRUCTION CONDITION AND/OR AS INDICATED IN THE REMEDIAL DESIGN BY THE REMEDIATION CONTRACTOR IN A TIMELY MANNER AND PRIOR TO CONTRACTOR DEMOBILIZATION.
14. THE REMEDIATION CONTRACTOR IS REQUIRED TO MAINTAIN SITE ACCESS FOR NYSEG UTILITY PERSONNEL AND EQUIPMENT AT ALL TIMES AND IS RESPONSIBLE FOR SNOW REMOVAL/MANAGEMENT DURING REMEDIAL ACTIVITIES.
15. IF THE REMEDIATION CONTRACTOR DAMAGES EXISTING UTILITY EQUIPMENT OR STRUCTURES, THE REMEDIATION CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING THE UTILITY COMPANY OR MUNICIPALITY AND FULLY REPAIRING DAMAGES IN ACCORDANCE WITH THE REQUIREMENTS OF THE UTILITY COMPANY / MUNICIPALITY.

ABBREVIATIONS:

AMSL	ABOVE MEAN SEA LEVEL
BTEX	BEAZENE, TOLUENE, ETHYLBENZENE, XYLENE
CAMP	COMMUNITY AIR MONITORING PLAN
CERP	COMMUNITY AND ENVIRONMENTAL RESPONSE PLAN
CFR	CODE OF FEDERAL REGULATIONS
CLSM	CONTROLLED LOW–STRENGTH MATERIAL
CQAP	CONSTRUCTION QUALITY ASSURANCE PLAN
CY	CUBIC YARDS
EA.	EACH
EL.	ELEVATION
HASP	HEALTH AND SAFETY PLAN
HDPE	HIGH–DENSITY POLYETHYLENE
LTTD	LOW TEMPERATURE THERMAL DESORPTION
MAX.	MAXIMUM
MGP	MANUFACTURED GAS PLANT
MIN.	MINIMUM
MSDS	MATERIAL SAFETY DATA SHEET
NAPL	NON–AQUEOUS PHASE LIQUID
NYCRR	OFFICIAL COMPILATION OF CODES, RULES, AND REGULATIONS OF THE STATE OF NEW YORK
NYSDEC	NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
OSHA	OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
PAH	POLYCYCLIC AROMATIC HYDROCARBONS
PPM	PARTS PER MILLION
PDI	PRE–DESIGN INVESTIGATION
PVC	POLYVINYL CHLORIDE
RI	REMEDIAL INVESTIGATION
SQ.	SQUARE
TYP.	TYPICAL
UST	UNDERGROUND STORAGE TANK

SAFETY NOTES:

1. THE REMEDIATION CONTRACTOR SHALL PROVIDE EVIDENCE OF ALL ONSITE PERSONNEL COMPLETING OSHA 40–HOUR TRAINING AND 8–HOUR REFRESHER TRAINING PRIOR TO INITIATING REMEDIAL CONSTRUCTION ACTIVITIES.
2. THE REMEDIATION CONTRACTOR IS RESPONSIBLE FOR IMPLEMENTING, MAINTAINING, AND SUPERVISING ALL SAFETY MEASURES AND PROGRAMS IN CONNECTION WITH THE PROJECT. THE REMEDIATION CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS FOR THE SAFETY OF, AND SHALL PROVIDE THE NECESSARY PRECAUTIONS TO PROTECT, SITE WORKERS, CONSTRUCTION OVERSIGHT PERSONNEL, AND SITE VISITORS.
3. THE REMEDIATION CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE LAWS, ORDINANCES, RULES, REGULATIONS, AND ORDERS OF PUBLIC BODIES HAVING JURISDICTION FOR THE SAFETY OF PERSONS OR PROPERTY OR TO PROTECT THEM FROM DAMAGE, INJURY, OR LOSS, INCLUDING, WITHOUT LIMITATION, THE DEPARTMENT OF LABOR SAFETY AND HEALTH REGULATIONS FOR CONSTRUCTION PROMULGATED UNDER THE OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970 (PL 91–596) AND UNDER SECTION 107 OF THE CONTRACT WORK HOURS AND SAFETY STANDARDS ACT (PL 91–54) AND AMENDMENTS THERETO. THE REMEDIATION CONTRACTOR SHALL COMPLY WITH THE REQUIREMENTS SET FORTH UNDER 29 CFR 1910 AND 29 CFR 1926. THE REMEDIATION CONTRACTOR SHALL ERECT AND MAINTAIN, AS REQUIRED BY THE CONDITIONS AND THE PROGRESS OF THE WORK, ALL NECESSARY SAFEGUARDS FOR THE SAFETY AND PROTECTION OF PERSONS AND PROPERTY AND SHALL COMPLY WITH ALL APPLICABLE RECOMMENDATIONS OF THE MANUAL OF ACCIDENT PREVENTION IN CONSTRUCTION OF THE ASSOCIATED GENERAL CONTRACTORS OF AMERICA, INC.
4. THE REMEDIATION CONTRACTOR SHALL FURNISH AND PLACE PROPER GUARDS FOR PREVENTION OF ACCIDENTS, AND PROVIDE ALL EXCAVATION SHORING/BRACING, SCAFFOLDING, SHIELDING, DUST/VAPOR/ODOR PROTECTION, MECHANICAL/ELECTRICAL PROTECTION, SPECIAL GROUNDING, SAFETY RAILINGS, BARRIERS, OR OTHER SAFETY FEATURES REQUIRED. AS NEEDED, THE REMEDIATION CONTRACTOR SHALL PROVIDE AND MAINTAIN SUFFICIENT LIGHT DURING NIGHT HOURS TO SECURE SUCH PROTECTION. THE REMEDIATION CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AND MAINTAINING SECURITY ON SITE DURING NON–WORKING HOURS FROM THE DATE OF INITIAL MOBILIZATION UNTIL THE DATE OF FINAL DEMOBILIZATION, OR AS OTHERWISE DIRECTED BY THE OWNER/ENGINEER.
5. THE MATERIALS SUBJECT TO HANDLING AS PART OF THE PROJECT MAY CONTAIN HAZARDOUS CONSTITUENTS OR CHEMICALS AND SHOULD BE HANDLED IN ACCORDANCE WITH APPLICABLE REGULATIONS. THE REMEDIATION CONTRACTOR SHALL DEVELOP AND IMPLEMENT APPROPRIATE HEALTH AND SAFETY MEASURES FOR ITS EMPLOYEES, SUBCONTRACTORS, AND SITE VISITORS, AND FOR THE PROTECTION OF THE ENVIRONMENT AND SURROUNDING COMMUNITY. THE REMEDIATION CONTRACTOR'S HASP SHALL BE DEVELOPED IN ACCORDANCE WITH APPLICABLE OSHA, FEDERAL, STATE, AND LOCAL REGULATIONS.
6. SEVERAL CONTRACTOR ACTIVITIES WILL BE PERFORMED WITHIN, ADJACENT TO, OR IN THE VICINITY OF THE EXCAVATION/BACKFILL AREA(S). THE REMEDIATION CONTRACTOR'S HASP SHALL RECOGNIZE THE TYPES OF ACTIVITIES TO BE PERFORMED, THE UNIQUE HAZARDS SPECIFIC TO THESE ACTIVITIES, AND SPECIAL PRECAUTIONS AND CONTROLS THAT ARE TO BE IMPLEMENTED. OF ADDITIONAL NOTE AND EMPHASIS ARE THOSE ACTIVITIES THAT POTENTIALLY INVOLVE WORK WITHIN THE EXCAVATION AREA(S) ONCE EXCAVATION/BACKFILL ACTIVITIES ARE INITIATED, AND THAT POTENTIALLY REQUIRE WORKER ACCESS INTO THE EXCAVATED AREA(S). THE REMEDIATION CONTRACTOR SHALL CLEARLY IDENTIFY AND EVALUATE THE SPECIFIC TYPES OF ACTIVITIES THAT COULD INVOLVE WORKER ENTRY INTO THE EXCAVATION AREA(S), SPECIFIC INGRESS/EGRESS ROUTES AND PROVISIONS, PERSONNEL AND WORK AREA MONITORING, PERSONAL PROTECTIVE EQUIPMENT, COMMUNICATIONS, ETC. FURTHER, TO THE EXTENT PRACTICABLE (AS DETERMINED BY THE CONTRACTOR), THE CONTRACTOR IS ENCOURAGED TO MINIMIZE WORKER ENTRY INTO THE EXCAVATED AREA(S).
7. SEVERAL CONTRACTOR ACTIVITIES WILL BE PERFORMED ADJACENT TO, OR IN THE VICINITY OF, UTILITY POLES, OVERHEAD AND UNDERGROUND ELECTRICAL LINES, AND TRANSFORMERS. THE REMEDIATION CONTRACTOR'S HASP SHALL RECOGNIZE THESE HAZARDS AND INCORPORATE SPECIAL PRECAUTIONS AND CONTROLS SPECIFIC TO WORKING NEAR SUCH HAZARDS.
8. THE REMEDIATION CONTRACTOR SHALL PROVIDE A LIST OF ALL CHEMICAL PRODUCTS AND AN MSDS FOR ALL CHEMICAL PRODUCTS TO BE USED ON–SITE. THE LIST MUST BE APPROVED BY THE OWNER PRIOR TO BEING BROUGHT ON–SITE.
9. THE REMEDIATION CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL SAFETY PROGRAMS FOR THEIR EMPLOYEES, SUBCONTRACTORS, AND ANY OTHER PERSONS WHO MAY BE AFFECTED THEREBY. THE REMEDIATION CONTRACTOR SHALL PREPARE A SITE–SPECIFIC HASP THAT SHALL BE REVIEWED BY THE REMEDIATION ENGINEER AND THE OWNER PRIOR TO THE START OF ANY WORK.

XREFS: 13104X00
IMAGES:

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING — USE TO VERIFY FIGURE REPRODUCTION SCALE

No.	Date	Revisions	By	Ckd

Professional Engineer's Name: JASON D. BRIEN
Professional Engineer's No: 084067
State: NY
Date Signed: 2/24/14
Project Mgr: JDB
Designed by: JRG
Drawn by: BGG
Checked by: JDB

ARCADIS
ARCADIS OF NEW YORK, INC.

NYSEG • GENEVA, NEW YORK
WADSWORTH STREET FORMER MANUFACTURED GAS PLANT SITE
FINAL (100%) REMEDIAL DESIGN

NOTES AND ABBREVIATIONS

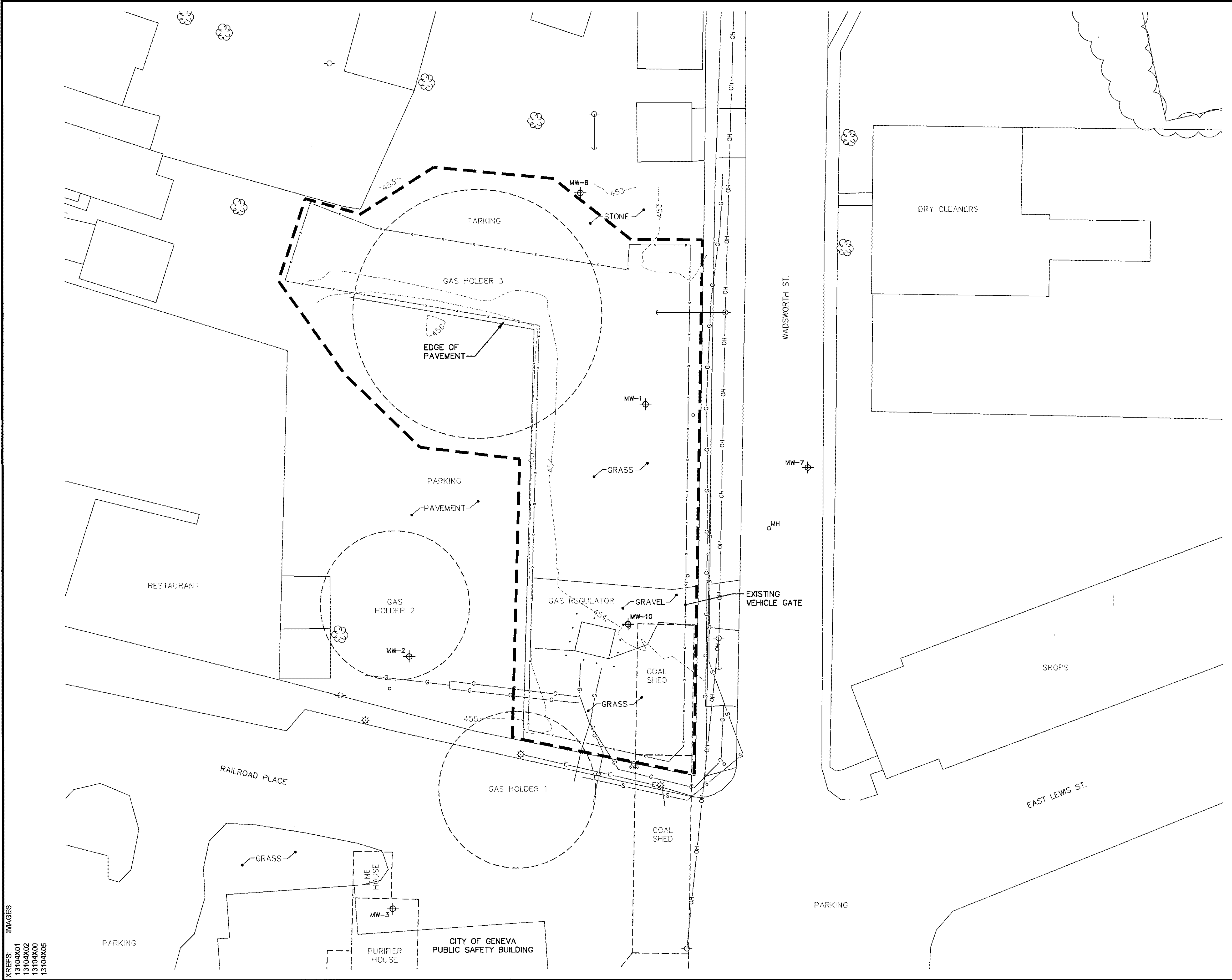
ARCADIS Project No. B0013104.0000.00014
Date: FEBRUARY 2014
ARCADIS
6723 Towpath Road
P O. Box 66
Syracuse, NY 13214
Tel. 315.446 9120

1

CITY. SYRACUSE, NY DIV/GROUP:IMDV-CAD DB:B.GETTS K.SARTORI R.PETRIE LD:B.GETTS PIC K.WHITE PM J.BRIEN TM: J.BRIEN RB J.GOLUBSKI LYR.ON=*,OFF=*REF*
G:\ENVCAD\SYRACUSE\ACT\B0013104\0000\00014\DWG\CONTRACT\DESIGN_FINAL\13104G01.dwg LAYOUT: 1 SAVED: 2/21/2014 10.44 AM ACADVER 18.1S (LMS TECH) PAGESETUP. LD-PDF PLOTSTYLETABLE: PLTCONT1.CTB PLOTTED. 2/21/2014 1:03 PM BY: PETRIE, RICH

CITY: SYRACUSE, NY DIV/GROUP: IMDV-CAD DB: B.GETTS K.SARTORI R.PETRIE LD: B.GETTS PIC: K.WHITE PM: J.BRIEN TM: J.BRIEN RB: J.GOLUBSKI LYR:ON=*;OFF=*REF*
G:\ENVCAD\SYRACUSE\ACT\B0013104\0000\00014\DWG\CONTRACT\DESIGN_FINAL\13104G02.dwg LAYOUT: 2 SAVED: 2/21/2014 10:44 AM ACADVER: 18.1S (LMS TECH) PAGESETUP: LD-PDF PLOTSTYLETABLE: PLTCONT1.CTB PLOTTED: 2/21/2014 1:03 PM BY: PETRIE, RICH

XREFS: 13104X01 13104X02 13104X00 13104X05 IMAGES



LEGEND:

---453---	GROUND SURFACE CONTOUR
—x—x—	FENCE
- - - -	FORMER MGP STRUCTURE
—S—	SEWER LINE
—G—	GAS LINE
—E—	ELECTRIC LINE (SUBSURFACE)
—OH—	ELECTRIC LINE (OVERHEAD)
-○-	UTILITY POLE
☼	LIGHT POLE
←—	GUY WIRE
○ ○-○	POST, SIGN
☒	HYDRANT
○MH	MANHOLE
⌖	MONITORING WELL LOCATION
▬ ▬ ▬	PROJECT WORK LIMITS

NOTE:

1. SITE FEATURES ARE APPROXIMATE AND SHALL BE VERIFIED BY THE REMEDIATION CONTRACTOR PRIOR TO INITIATING WORK.

20' 0 20' 40'
1"=20'

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING — USE TO VERIFY FIGURE REPRODUCTION SCALE

No.	Date	Revisions	By	Ckd

THIS DRAWING IS THE PROPERTY OF THE ARCADIS ENTITY IDENTIFIED IN THE TITLE BLOCK AND MAY NOT BE REPRODUCED OR ALTERED IN WHOLE OR IN PART WITHOUT THE EXPRESS WRITTEN PERMISSION OF SAME.

Professional Engineer's Name **JASON D. BRIEN**		
Professional Engineer's No 084067		
State NY	Date Signed 3/24/14	Project Mgr JDB
Designed by JRG	Drawn by BGG	Checked by JDB

JASON DAVID BRIEN 084067

ARCADIS

ARCADIS OF NEW YORK, INC.

NYSEG • GENEVA, NEW YORK
WADSWORTH STREET FORMER MANUFACTURED GAS PLANT SITE
FINAL (100%) REMEDIAL DESIGN

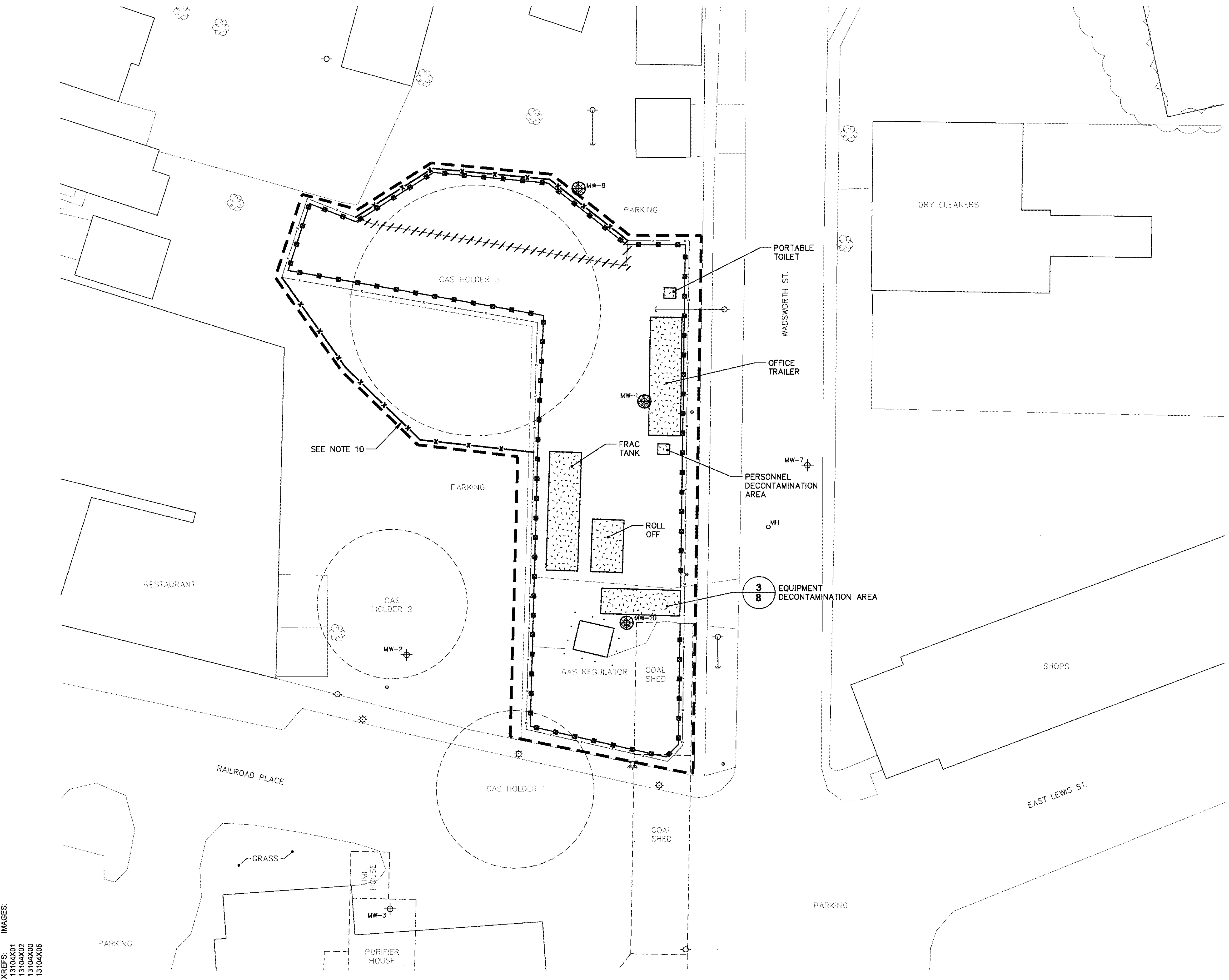
EXISTING SITE PLAN

ARCADIS Project No.
B0013104.0000.00014

Date
FEBRUARY 2014

ARCADIS
6723 Towpath Road
P O Box 66
Syracuse, NY 13214
Tel: 315.446 9120

2



LEGEND:

—x—x—	FENCE
- - - - -	FORMER MGP STRUCTURE
-○-	UTILITY POLE
☼	LIGHT POLE
←—	GUY WIRE
• •—•	POST, SIGN
⌖	HYDRANT
○MH	MANHOLE
⌖	MONITORING WELL LOCATION
— — —	PROJECT WORK LIMITS
//////	EXISTING SITE FEATURE TO BE REMOVED
⊗	EXISTING SITE FEATURE TO BE PROTECTED
—x—	TEMPORARY SITE SECURITY FENCE
—■—■—	STRAW BALE DIKE OR SILT FENCE (1,2/7)

NOTES:

1. THE REMEDIATION CONTRACTOR SHALL INSTALL EROSION AND SEDIMENT CONTROL MEASURES PRIOR TO DISTURBING EXISTING SITE SOILS AND VEGETATION.
2. ALL NECESSARY PRECAUTIONS SHALL BE TAKEN TO PREVENT MIGRATION OF CONSTRUCTION RELATED SOILS, DEBRIS, FUELS, SOLVENTS, LUBRICANTS, CONCRETE, LEACHATE, OR ANY OTHER POLLUTANT BEYOND THE PROJECT WORK LIMITS.
3. ACTUAL LOCATION OF EROSION AND SEDIMENT CONTROL MEASURES MAY VARY BASED ON ACTUAL SITE CONDITIONS ENCOUNTERED AT THE TIME OF CONSTRUCTION.
4. ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES MAY BE REQUIRED AT TIME OF CONSTRUCTION TO CONTROL EROSION AND SEDIMENTATION.
5. TEMPORARY EROSION AND SEDIMENT CONTROL DURING CONSTRUCTION INCLUDING, BUT NOT LIMITED TO, INSPECTION, MAINTENANCE, AND INSTALLATION OF ADDITIONAL CONTROLS (AS NEEDED, AND IN COORDINATION WITH THE REMEDIATION ENGINEER) SHALL BE THE RESPONSIBILITY OF THE REMEDIATION CONTRACTOR. ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE LATEST EDITION OF THE NEW YORK STATE STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL.
6. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSPECTED, DAILY BY THE REMEDIATION ENGINEER. INSPECTION RESULTS SHALL BE SUMMARIZED IN A WEEKLY INSPECTION REPORT FOR REVIEW. REFER TO THE CQAP FOR INSPECTION REPORT REQUIREMENTS.
7. THE REMEDIATION CONTRACTOR SHALL PROVIDE PORTABLE, PRE-FABRICATED SPILL CONTAINMENT FOR THE 21,000 GALLON FRAC TANK.
8. THE REMEDIATION CONTRACTOR MAY PROPOSE ALTERNATE AREAS FOR THE OFFICE TRAILER. ALTERNATE AREAS SHALL BE APPROVED BY THE OWNER AND THE REMEDIATION ENGINEER PRIOR TO USE.
9. THE REMEDIATION CONTRACTOR SHALL EQUIP SITE SECURITY FENCING WITH 'DANGER, CONSTRUCTION AREA, AUTHORIZED PERSONNEL ONLY' SIGNS AND HEDGE SLATS INTERWOVEN THROUGHOUT ENTIRE FENCE FABRIC OR GEOTEXTILE HUNG FROM FENCE.
10. ADDITIONAL TEMPORARY SITE SECURITY FENCE TO BE INSTALLED DURING CONTINGENCY HOLDER INSPECTION (IF REQUIRED).
11. THE REMEDIATION CONTRACTOR SHALL PROTECT ALL ABOVE AND BELOW GRADE UTILITIES.
12. THE REMEDIATION CONTRACTOR SHALL MAINTAIN SITE ACCESS FOR NYSEG AT ALL TIMES.

CITY: SYRACUSE, NY DIV/GROUP:IMDV-CAD DB:B.GETTS K.SARTORI R.PETRIE LD:B.GETTS PIC: K.WHITE PM: J.BRIEN TM: J.BRIEN RB:J.GOLUBSKI LYR:ON=*;OFF=*REF*
G:\ENVCAD\SYRACUSE\ACT\B0013104\0000\00014\DWG\CONTRACT\DESIGN_FINAL\13104G03.dwg LAYOUT: 3 SAVED: 2/21/2014 10:44 AM ACADVER: 18.1S (LMS TECH) PAGESETUP: LD-PDF PLOTSTYLETABLE: PLTCONT1.CTB PLOTTED: 2/21/2014 1:03 PM BY: PETRIE, RICH

XREFS:
13104X01
13104X02
13104X00
13104X05

IMAGES:

1"=20' 20' 0 20' 40'

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING: USE TO VERIFY FIGURE REPRODUCTION SCALE

No.	Date	Revisions	By	Ckd

THIS DRAWING IS THE PROPERTY OF THE ARCADIS ENTITY IDENTIFIED IN THE TITLE BLOCK AND MAY NOT BE REPRODUCED OR ALTERED IN WHOLE OR IN PART WITHOUT THE EXPRESS WRITTEN PERMISSION OF SAME.

Professional Engineer's Name: **JASON D. BRIEN**
Professional Engineer's No.: 084067

State	Date Signed	Project Mgr.
NY	2/24/14	JDB
Designed by	**Drawn by**	**Checked by**
JRG	BGG	JDB

JASON DAVID BRIEN
084067

ARCADIS

ARCADIS OF NEW YORK, INC.

NYSEG • GENEVA, NEW YORK
WADSWORTH STREET FORMER MANUFACTURED GAS PLANT SITE
FINAL (100%) REMEDIAL DESIGN

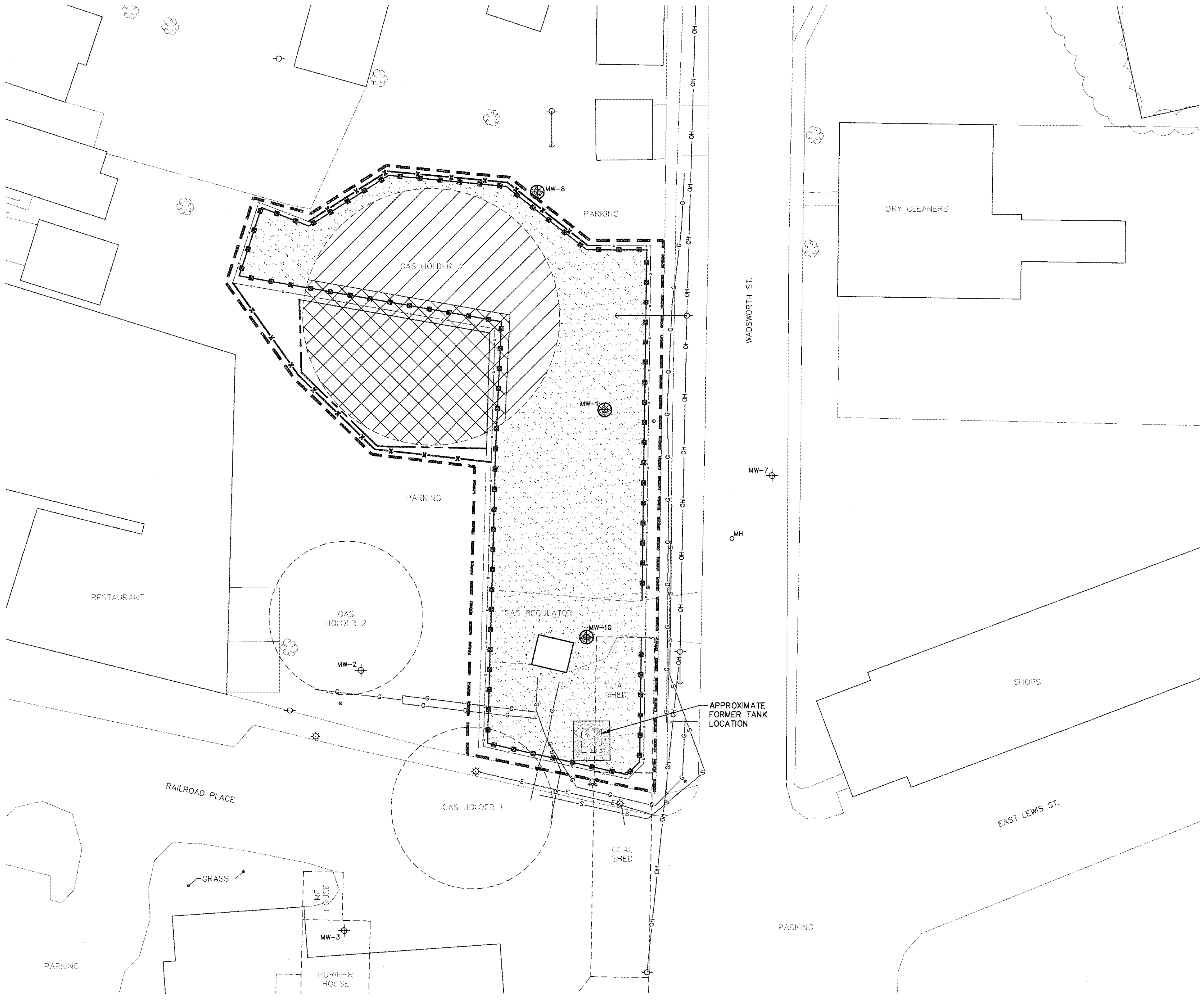
SITE PREPARATION PLAN

ARCADIS Project No.
B0013104.0000.00014

Date
FEBRUARY 2014

ARCADIS
6723 Towpath Road
P.O. Box 66
Syracuse, NY 13214
Tel: 315.446.9120

3



LEGEND:

- —x—x— FENCE
- – – – – FORMER MGP STRUCTURE
- —S— SEWER LINE
- —G— GAS LINE
- —E— ELECTRIC LINE (SUBSURFACE)
- —OH— ELECTRIC LINE (OVERHEAD)
- -○- UTILITY POLE
- ☼ LIGHT POLE
- ← GUY WIRE
- ○ ○-○ POST, SIGN
- HYDRANT
- ○MH MANHOLE
- ⊕ MONITORING WELL LOCATION
- ▬ ▬ ▬ PROJECT WORK LIMITS
- ⊗ EXISTING SITE FEATURE TO BE PROTECTED
- —x—x— TEMPORARY SITE SECURITY FENCE
- —■—■— STRAW BALE DIKE OR SILT FENCE (1,2 / 7)
- — — — ASPHALT SAW CUT (SEE NOTE 8)
- ▨ HORIZONTAL EXTENT OF TANK AND SOIL REMOVAL
- ▨ HORIZONTAL EXTENT OF SURFACE MATERIAL REMOVAL
- ▨ HORIZONTAL EXTENT OF INITIAL GAS HOLDER 3 FOUNDATION SLAB VISUAL INSPECTION
- ▩ HORIZONTAL EXTENT OF FOUNDATION SLAB VISUAL INSPECTION IF FREE PRODUCT IS OBSERVED DURING INITIAL VISUAL INSPECTION

AREA	VOLUME (CY)
SURFACE MATERIAL	530
TANK REMOVAL	50
HOLDER CONTINGENCY	120

TABLE NOTES:

1. TANK REMOVAL DOES NOT INCLUDE TANK.
2. HOLDER CONTINGENCY IS ONLY REQUIRED IF VISUAL IMPACTED MATERIAL IS OBSERVED DURING INSPECTION OF THE NORTHERN PORTION OF THE GAS HOLDER 3 FOUNDATION.

NOTES:

1. EXCAVATION ACTIVITIES SHALL BE COMPLETED IN ACCORDANCE WITH ALL APPLICABLE OSHA REQUIREMENTS.
2. THE REMEDIATION CONTRACTOR IS RESPONSIBLE FOR REMOVING AND DISPOSING OF THE FORMER TANK IN ACCORDANCE WITH APPLICABLE LOCAL, STATE, AND FEDERAL REQUIREMENTS.
3. TANK AND SOIL REMOVAL ACTIVITIES SHALL BE COMPLETED TO AN ASSUMED DEPTH OF 8 FEET BELOW GRADE.
4. AN APPROXIMATELY 4-INCH DIAMETER METAL PIPE WAS ENCOUNTERED ABOVE THE TOP OF THE FORMER TANK DURING THE PDI. THE REMEDIATION CONTRACTOR SHALL COORDINATE WITH NYSEG TO CONFIRM THAT THE PIPE IS NOT AN ACTIVE GAS LINE AND THEN CUT AND CAP THE PIPE AS PART OF THE TANK REMOVAL ACTIVATES.
5. THE REMEDIATION CONTRACTOR IS REQUIRED TO REMOVE THE TOP 12 INCHES OF EXISTING SURFACE MATERIAL AS SHOWN.
6. THE REMEDIATION CONTRACTOR SHALL VISUALLY INSPECT ANY TAR DRIPS OR VALVE BOXES ASSOCIATED WITH GAS HOLDER 3, IF ENCOUNTERED.
7. IF FREE PHASE LIQUID (I.E., NAPL) IS OBSERVED DURING HOLDER FOUNDATION INSPECTION, THE REMEDIATION CONTRACTOR SHALL POWER WASH/CLEAN/VACUUM THE FOUNDATION SLAB SUCH THAT NO VISIBLE FREE PRODUCT REMAINS, TO THE SATISFACTION OF THE REMEDIATION ENGINEER. THE REMEDIATION CONTRACTOR WILL NOT BE REQUIRED TO REMOVE STAINED CONCRETE.
8. THE REMEDIATION CONTRACTOR WILL BE REQUIRED TO REMOVE THE ASPHALT PAVEMENT COVERING THE WESTERN AND SOUTHERN PORTIONS OF THE HOLDER IF FREE PRODUCT IS OBSERVED ON THE NORTHERN OR EASTERN PORTION OF THE FORMER FOUNDATION FOR GAS HOLDER 3. IF NECESSARY, THE REMEDIATION CONTRACTOR SHALL SAW CUT THE PAVEMENT TO CREATE A CLEAN BREAK LINE AND ONLY REMOVE PORTIONS OF THE PAVEMENT NECESSARY TO EXPOSE THE HOLDER FOUNDATION.
9. THE REMEDIATION ENGINEER SHALL COMPLETE ALL TANK REGISTRATION ACTIVITIES IN ACCORDANCE WITH NYSDEC REQUIREMENTS.

CITY: SYRACUSE, NY DIV/GROUP:IMDV-CAD DB:B.GETTS K.SARTORI R.PETRIE LD:B.GETTS PIC: K.WHITE PM: J.BRIEN TM: J.BRIEN RB:J.GOLUBSKI LYR:ON=*;OFF=*REF*
G:\ENVCAD\SYRACUSE\ACT\B0013104\0000\00014\DWG\CONTRACT\DESIGN_FINAL\13104G04.dwg LAYOUT: 4 SAVED: 2/21/2014 10:44 AM ACADVER: 18.1S (LMS TECH) PAGESETUP: LD-PDF PLOTSTYLETABLE: PLTCONT1.CTB PLOTTED: 2/21/2014 1:03 PM BY: PETRIE, RICH

XREFS: 13104X01 13104X02 13104X00 13104X05 IMAGES:

20' 0 20' 40'
1"=20'

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING: USE TO VERIFY FIGURE REPRODUCTION SCALE

No.	Date	Revisions	By	Ckd

THIS DRAWING IS THE PROPERTY OF THE ARCADIS ENTITY IDENTIFIED IN THE TITLE BLOCK AND MAY NOT BE REPRODUCED OR ALTERED IN WHOLE OR IN PART WITHOUT THE EXPRESS WRITTEN PERMISSION OF SAME.

Professional Engineer's Name: **JASON D. BRIEN**
Professional Engineer's No.: 084067
State: NY
Date Signed: 2/24/14
Project Mgr.: JDB
Designed by: JRG
Drawn by: BGG
Checked by: JDB

JASON DAVID BRIEN 084067

ARCADIS

ARCADIS OF NEW YORK, INC.

NYSEG • GENEVA, NEW YORK
WADSWORTH STREET FORMER MANUFACTURED GAS PLANT SITE
FINAL (100%) REMEDIAL DESIGN

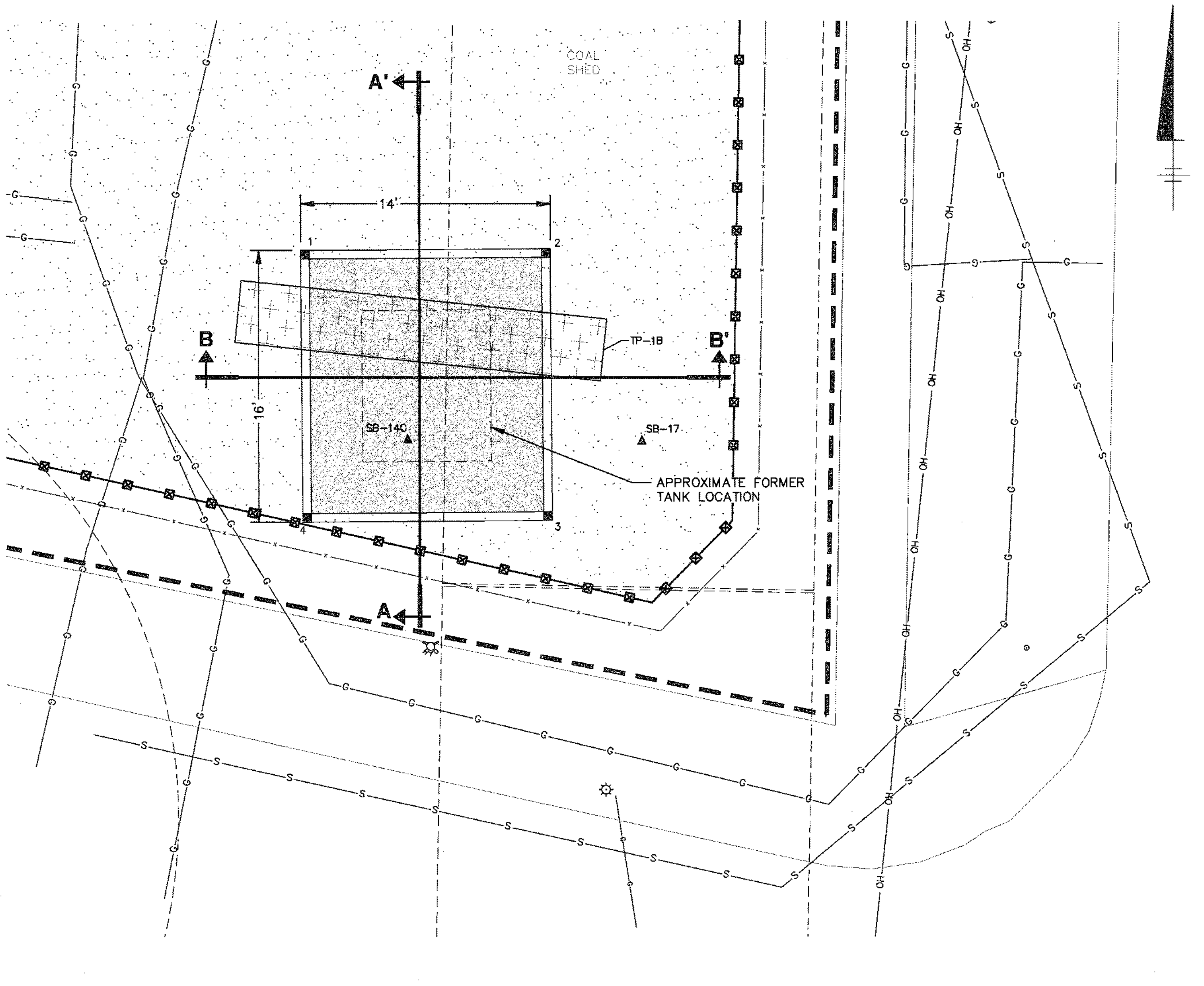
REMOVAL PLAN

ARCADIS Project No.
B0013104.0000.00014

Date
FEBRUARY 2014

ARCADIS
6723 Towpath Road
P.O. Box 66
Syracuse, NY 13214
Tel: 315.446.9120

4



PLAN

0 5' 10'
SCALE: 1"=5'

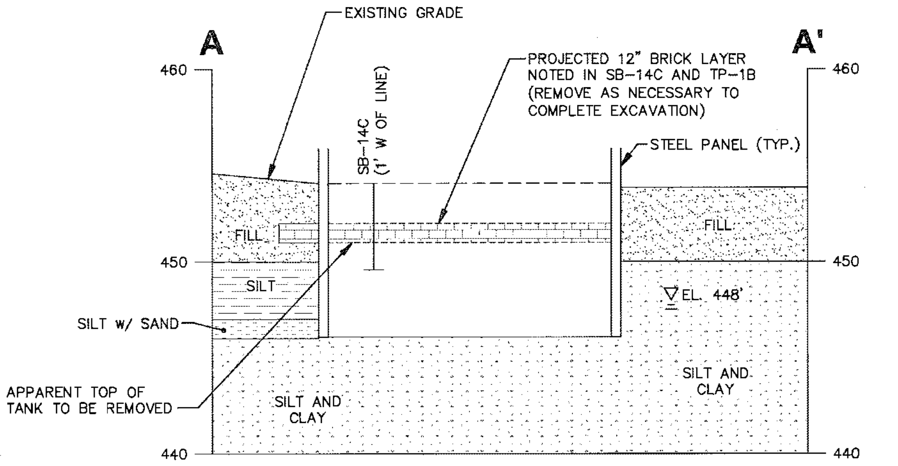
LEGEND:

- ▣ SLIDE RAIL POST/SURVEY CONTROL POINT
- —x— FENCE
- —S— SEWER LINE
- —G— GAS LINE
- —OH— ELECTRIC LINE (OVERHEAD)
- ☼ LIGHT POLE
- ○ ○—○ POST, SIGN
- HYDRANT
- ▲SB-17 SOIL BORING
- TP-1B TEST PIT
- PROJECT WORK LIMITS
- STRAW BALE DIKE OR SILT FENCE (1,2 / 7)
- ▨ HORIZONTAL EXTENT OF TANK AND SOIL REMOVAL
- ▨ HORIZONTAL EXTENT OF SURFACE MATERIAL REMOVAL
- SLIDE RAIL PANEL
- FORMER MPG STRUCTURE

REMOVAL AREA - SURVEY CONTROL		
CONTROL POINT	EASTING	NORTHING
1	714255.4634	1046485.5625
2	714269.4035	1046485.6697
3	714269.5207	1046470.4341
4	714255.5805	1046470.3270

NOTES:

1. REFER TO DRAWING 4 FOR ADDITIONAL NOTES RELATED TO EXCAVATION ACTIVITIES.
2. SUBSURFACE CONTACTS SHOWN ARE INDICATIVE AND APPROXIMATE ONLY. ACTUAL STRATA BOUNDARIES CAN VARY FROM THAT SHOWN. REFER TO AVAILABLE INVESTIGATION REPORTS FOR GEOTECHNICAL DATA AND SUBSURFACE INFORMATION.
3. INFORMATION RELATED TO SUBSURFACE CONDITIONS SHOULD BE CONSIDERED APPROXIMATE AND SHOULD NOT BE RELIED UPON AS A COMPLETE DEPICTION OF SITE CONDITIONS.
4. PRIOR TO CONDUCTING EXCAVATION OR SLIDE RAIL INSTALLATION ACTIVITIES, THE REMEDIATION CONTRACTOR SHALL AIR KNIFE/VACUUM SOIL ALONG THE SLIDE RAIL ALIGNMENT TO A MINIMUM DEPTH OF 5 FT BELOW GRADE TO VERIFY THE ABSENCE OF SUBSURFACE UTILITIES. EXPLORATORY EXCAVATIONS SHALL BE IMMEDIATELY BACKFILLED UNLESS OTHERWISE DIRECTED BY THE REMEDIATION ENGINEER.
5. STABILITY OF EXCAVATIONS ARE THE SOLE RESPONSIBILITY OF THE REMEDIATION CONTRACTOR. ALL EXCAVATIONS MUST BE CONDUCTED IN ACCORDANCE WITH OSHA REGULATIONS.
6. STEEL PANELS AND POSTS SHOWN ARE A REQUIRED COMPONENT OF THE SLIDE RAIL EXCAVATION SUPPORT SYSTEM. ACTUAL DIMENSIONS OF INDIVIDUAL COMPONENTS WILL VARY DEPENDING UPON REMEDIATION CONTRACTOR'S SELECTED SLIDE RAIL MANUFACTURER. ALL COMPONENTS MUST MEET THE MINIMUM REQUIREMENTS AS SPECIFIED IN SECTION 2205 – EXCAVATION SUPPORT AND PROTECTION.
7. THE REMEDIATION CONTRACTOR SHALL ONLY REMOVE FORMER STRUCTURES (I.E., BUILDING WALLS AND FLOORS) NECESSARY TO COMPLETE TANK REMOVAL ACTIVITIES TO THE LIMITS AND DEPTHS PRESENTED IN THE REMEDIAL DESIGN.
8. REMEDIATION CONTRACTOR SHALL FOLLOW NYSEG PROCEDURES AND GUIDELINES FOR MONITORING AND PROTECTING EXISTING GAS LINE DURING REMOVAL AND BACKFILLING.
9. ANY DAMAGE TO EXISTING CONSTRUCTION (E.G. SIDEWALKS, ROADWAYS) SHALL BE REPAIRED IN-KIND BY THE REMEDIATION CONTRACTOR.
10. NO STOCKPILING LOADING OR STAGING OF EXCAVATED SOILS OR BACKFILL WITHIN 15 FT OF THE EXCAVATION AREA.
11. BACKFILL EXCAVATION AREA WITH CONTROLLED LOW STRENGTH MATERIAL IN ACCORDANCE WITH THE TECHNICAL SPECIFICATIONS.

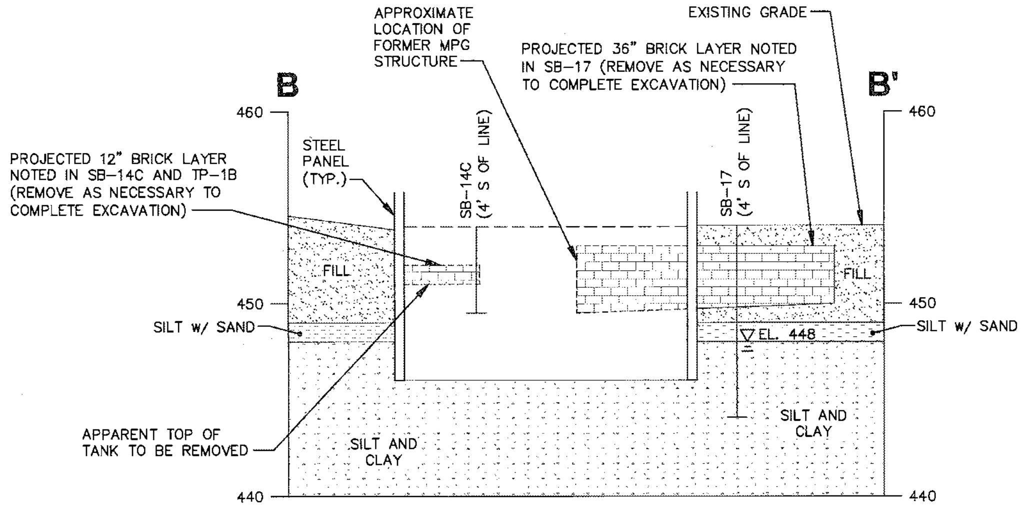


NOTE:

1. VERTICAL ELEVATIONS PRESENTED IN NGVD 1929.

SECTION A-A'

0 5' 10'
SCALE: 1"=5'



NOTE:

1. VERTICAL ELEVATIONS PRESENTED IN NGVD 1929.

SECTION B-B'

0 5' 10'
SCALE: 1"=5'

CITY: SYRACUSE, NY DIV/GROUP:IMDV-CAD DB:B.GETTS K.SARTORI R.PETRIE LD:B.GETTS PIC: K.WHITE PM: J.BRIEN TM: J.BRIEN RB:J.GOLUBSKI LYR:ON=*;OFF=*REF*
G:\ENVCAD\SYRACUSE\ACT\B0013104\0000\00014\DWG\CONTRACT\DESIGN_FINAL\13104G05.dwg LAYOUT: 5 SAVED: 2/21/2014 10:44 AM ACADVER: 18.1S (LMS TECH) PAGESETUP: LD-PDF PLOTSTYLETABLE: PLTCONT1.CTB PLOTTED: 2/21/2014 1:03 PM BY: PETRIE, RICH

XREFS: IMAGES:
13104X01
13104X02
13104X00
13104X05

SCALE AS INDICATED

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING: USE TO VERIFY FIGURE REPRODUCTION SCALE

No.	Date	Revisions	By	Ckd

THIS DRAWING IS THE PROPERTY OF THE ARCADIS ENTITY IDENTIFIED IN THE TITLE BLOCK AND MAY NOT BE REPRODUCED OR ALTERED IN WHOLE OR IN PART WITHOUT THE EXPRESS WRITTEN PERMISSION OF SAME.

Professional Engineer's Name
JASON D. BRIEN
Professional Engineer's No.
084067

State	Date Signed	Project Mgr.
NY	2/24/14	JDB
Designed by	Drawn by	Checked by
KLW	BGG	APC

JASON DAVID BRIEN
084067

ARCADIS

ARCADIS OF NEW YORK, INC.

NYSEG • GENEVA, NEW YORK
WADSWORTH STREET FORMER MANUFACTURED GAS PLANT SITE
FINAL (100%) REMEDIAL DESIGN

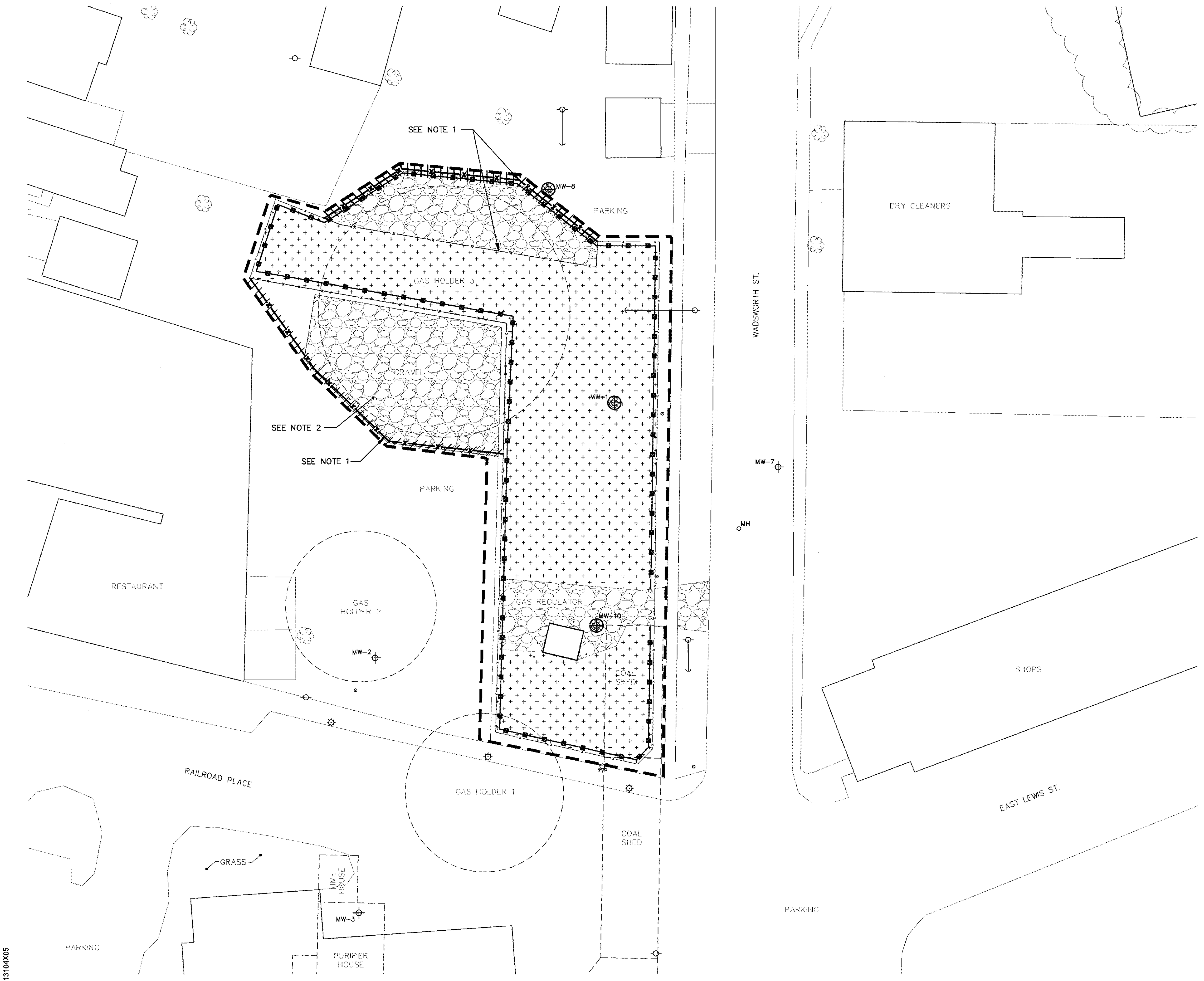
EXCAVATION SUPPORT DETAILS

ARCADIS Project No.
B0013104.0000.00014

Date
FEBRUARY 2014

ARCADIS
6723 Towpath Road
P.O. Box 66
Syracuse, NY 13214
Tel: 315.446.9120

5



LEGEND:

- —x—x— FENCE
- - - - - FORMER MGP STRUCTURE
- -○- UTILITY POLE
- ☼ LIGHT POLE
- ←—— GUY WIRE
- ● ●-● POST, SIGN
- ✠ HYDRANT
- ○MH MANHOLE
- ⊕ MONITORING WELL LOCATION
- ▬ ▬ ▬ PROJECT WORK LIMITS
- \\\\\\\\ SITE FEATURE TO BE REMOVED
- ⊗ EXISTING SITE FEATURE TO BE PROTECTED
- ——x—— TEMPORARY SITE SECURITY FENCE
- —■—■— STRAW BALE DIKE OR SILT FENCE
- ▨ GRAVEL 1/8
- ▨ VEGETATED TOPSOIL 2/8

NOTES:

1. REMEDIATION CONTRACTOR TO REMOVE TEMPORARY SITE SECURITY FENCE AND REPLACE EXISTING FENCE TO ORIGINAL LOCATION.
2. ASPHALT PAVEMENT (IF REMOVED) SHALL BE REPLACED WITH GRAVEL SURFACE COVER TO MATCH PREVIOUS LINES AND GRADES.
3. THE REMEDIATION CONTRACTOR SHALL RESTORE DISTURBED AREAS TO MATCH PREVIOUSLY EXISTING LINES AND GRADES, TO MAINTAIN CURRENT DRAINAGE PATTERNS.
4. THE REMEDIATION CONTRACTOR SHALL BE RESPONSIBLE FOR ESTABLISHING A MINIMUM 80% DENSITY OF PERENNIAL VEGETATION IN ALL RESTORED VEGETATED AREAS.
5. REMEDIATION CONTRACTOR TO REMOVE EROSION CONTROLS AT COMPETITION OF REMEDIAL CONSTRUCTION ACTIVITIES.
6. OTHER SITE FEATURES REMOVED OR DAMAGED AS A RESULT OF THE CONSTRUCTION ACTIVITIES SHALL BE RESTORED BY THE REMEDIATION CONTRACTOR TO PRE-CONSTRUCTION CONDITIONS, UNLESS OTHERWISE NOTED.

CITY: SYRACUSE, NY DIV/GROUP:IMDV-CAD DB:B.GETTS K.SARTORI R.PETRIE LD:B.GETTS PIC: K.WHITE PM: J.BRIEN TM: J.BRIEN RB:J.GOLUBSKI LYR:ON=*;OFF=*REF*
G:\ENVCAD\SYRACUSE\ACT\B0013104\0000\00014\DWG\CONTRACT\DESIGN_FINAL\13104G06.dwg LAYOUT: 6 SAVED: 2/21/2014 10:44 AM ACADVER: 18.1S (LMS TECH) PAGESETUP: LD-PDF PLOTSTYLETABLE: PLTCONT1.CTB PLOTTED: 2/21/2014 1:03 PM BY: PETRIE, RICH
XREFS: 13104X01 13104X02 13104X00 13104X05 IMAGES:

20' 0 20' 40'
1"=20'

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING: USE TO VERIFY FIGURE REPRODUCTION SCALE

No.	Date	Revisions	By	Ckd

THIS DRAWING IS THE PROPERTY OF THE ARCADIS ENTITY IDENTIFIED IN THE TITLE BLOCK AND MAY NOT BE REPRODUCED OR ALTERED IN WHOLE OR IN PART WITHOUT THE EXPRESS WRITTEN PERMISSION OF SAME.

Professional Engineer's Name **JASON D. BRIEN**		
Professional Engineer's No. 084067		
State NY	Date Signed 2/24/14	Project Mgr. JDB
Designed by JRG	Drawn by BGG	Checked by JDB

JASON DAVID BRIEN
084067

ARCADIS

ARCADIS OF NEW YORK, INC.

NYSEG • GENEVA, NEW YORK
WADSWORTH STREET FORMER MANUFACTURED GAS PLANT SITE
FINAL (100%) REMEDIAL DESIGN

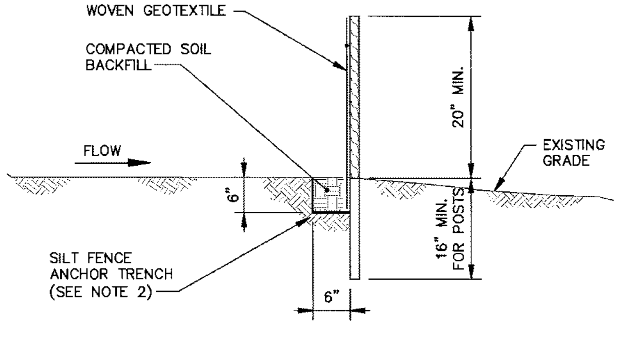
SITE RESTORATION PLAN

ARCADIS Project No.
B0013104.0000.00014

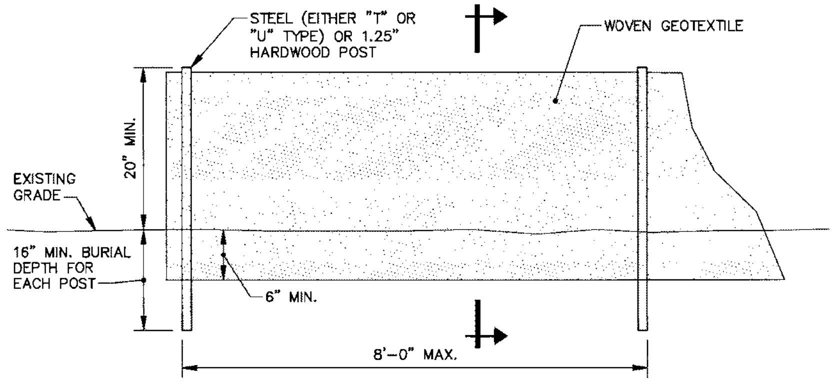
Date
FEBRUARY 2014

ARCADIS
6723 Towpath Road
P.O. Box 66
Syracuse, NY 13214
Tel: 315.446.9120

6



SECTION



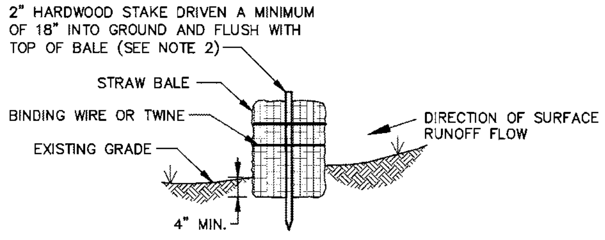
PROFILE

NOTES:

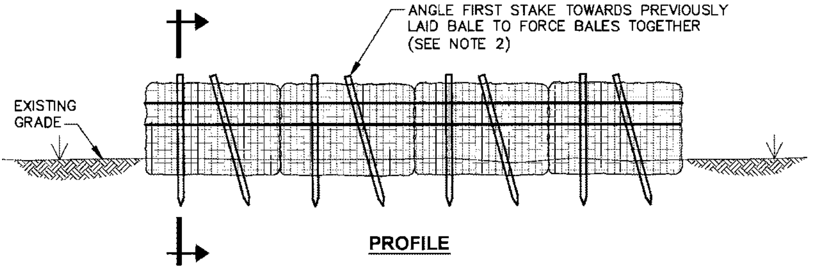
1. SEDIMENT DEPOSITS SHALL BE REMOVED WHEN "BULGES" DEVELOP IN SILT FENCE OR AS DIRECTED BY ENGINEER.
2. THE SILT FENCE SHALL BE FOLDED INTO A TRENCH AND BACKFILLED.
3. TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE LATEST EDITION OF THE NEW YORK STATE STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL.

SILT FENCE ①

NOT TO SCALE



SECTION



PROFILE

NOTES:

1. BALES SHALL BE BOUND WITH BALE TIES INTACT.
2. WITHIN AREAS WHERE STAKES CANNOT BE EASILY DRIVEN (I.E., PAVEMENT/CONCRETE), THE REMEDIATION CONTRACTOR SHALL PROVIDE AN ALTERNATE MEANS OF ANCHORING STRAW BALES (E.G., SAND BAGS) SUCH THAT EXISTING PAVEMENT/CONCRETE IS NOT DAMAGED.
3. TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE LATEST EDITION OF THE NEW YORK STATE STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL.
4. BALES USED ON PAVED SURFACES SHALL BE SECURED WITH SAND BAGS OR OTHER APPROPRIATE MEANS.
5. THE REMEDIATION CONTRACTOR MAY USE EITHER, OR A COMBINATION OF, SILT FENCE OR STRAW BALES FOR EROSION CONTROL.

STRAW BALE DIKE ②

NOT TO SCALE

CITY: SYRACUSE, NY DIV/GROUP:IMDV-CAD DB:B.GETTS K.SARTORI R.PETRIE LD:B.GETTS PIC: K.WHITE PM: J.BRIEN TM: J.BRIEN RB:J.GOLUBSKI LYR:ON=*;OFF=*REF*
G:\ENVCAD\SYRACUSE\ACT\B0013104\0000\00014\DWG\CONTRACT\DESIGN_FINAL\13104G07.dwg LAYOUT: 7 SAVED: 2/21/2014 10:44 AM ACADVER: 18.1S (LMS TECH) PAGESETUP: LD-PDF PLOTSTYLETABLE: PLTCONT1.CTB PLOTTED: 2/21/2014 1:03 PM BY: PETRIE, RICH

XREFS: IMAGES:
13104X00

NOT TO SCALE

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING: USE TO VERIFY FIGURE REPRODUCTION SCALE

No.	Date	Revisions	By	Ckd

THIS DRAWING IS THE PROPERTY OF THE ARCADIS ENTITY IDENTIFIED IN THE TITLE BLOCK AND MAY NOT BE REPRODUCED OR ALTERED IN WHOLE OR IN PART WITHOUT THE EXPRESS WRITTEN PERMISSION OF SAME.

Professional Engineer's Name
JASON D. BRIEN
Professional Engineer's No.
084067

State	Date Signed	Project Mgr.
NY	2/24/14	JDB
Designed by	Drawn by	Checked by
JRG	BGG	JDB

JASON DAVID BRIEN
084067

ARCADIS

ARCADIS OF NEW YORK, INC.

NYSEG • GENEVA, NEW YORK
WADSWORTH STREET FORMER MANUFACTURED GAS PLANT SITE
FINAL (100%) REMEDIAL DESIGN

EROSION AND SEDIMENT CONTROL DETAILS

ARCADIS Project No.
B0013104.0000.00014

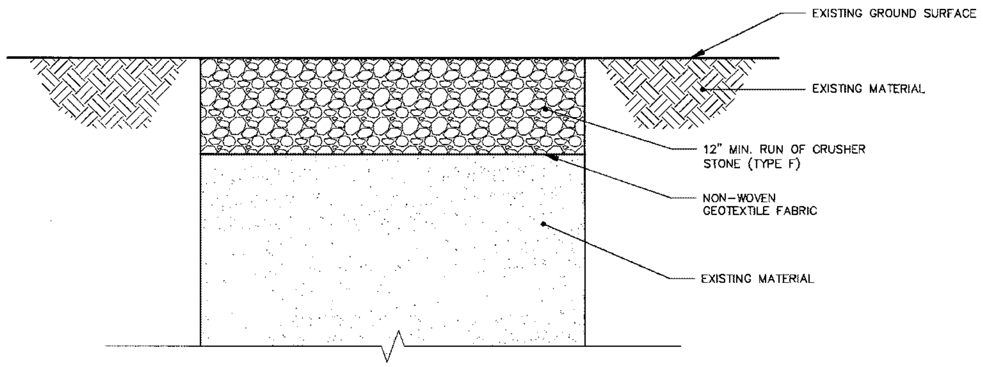
Date
FEBRUARY 2014

ARCADIS
6723 Towpath Road
P.O. Box 66
Syracuse, NY 13214
Tel: 315.446.9120

7

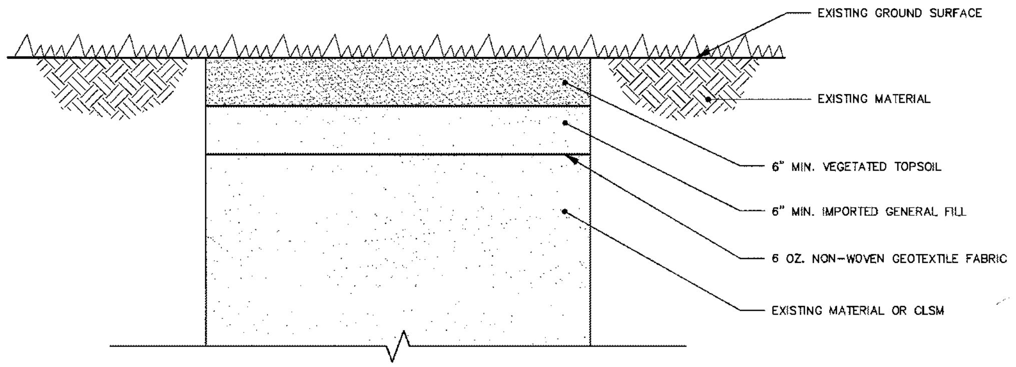
CITY: SYRACUSE, NY DIV/GROUP:IMDV-CAD DB:B.GETTS K.SARTORI R.PETRIE LD:B.GETTS PIC: K.WHITE PM: J.BRIEN TM: J.BRIEN RB:J.GOLUBSKI LYR:ON=*;OFF=*REF*
G:\ENVCAD\SYRACUSE\ACT\B0013104\0000\00014\DWG\CONTRACT\DESIGN_FINAL\13104G08.dwg LAYOUT: 8 SAVED: 2/21/2014 10:44 AM ACADVER: 18.1S (LMS TECH) PAGESETUP: LD-PDF PLOTSTYLETABLE: PLTCONT1.CTB PLOTTED: 2/21/2014 1:03 PM BY: PETRIE, RICH

XREFS: IMAGES:
13104X00



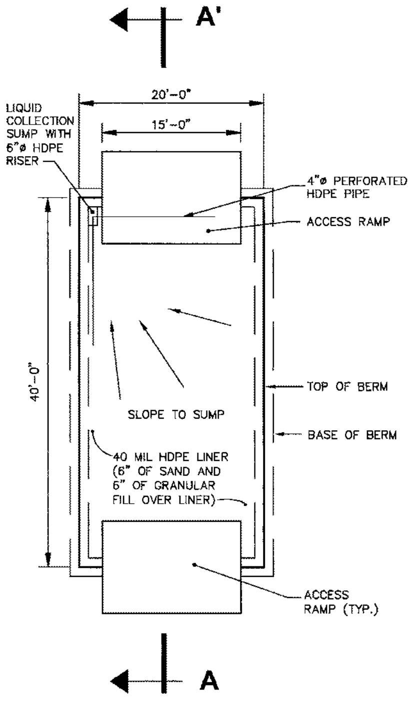
GRAVEL SURFACE RESTORATION ①

NOT TO SCALE

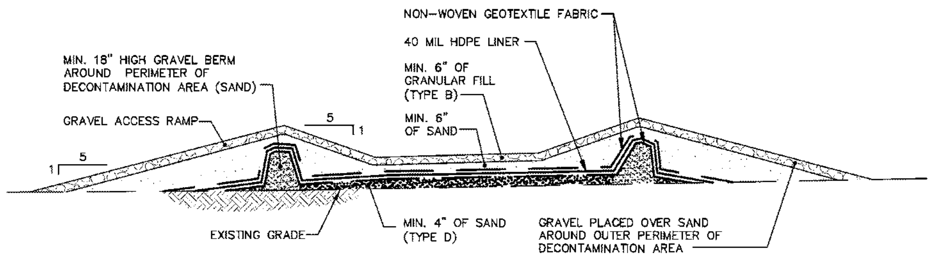


VEGETATIVE SURFACE RESTORATION ②

NOT TO SCALE



PLAN



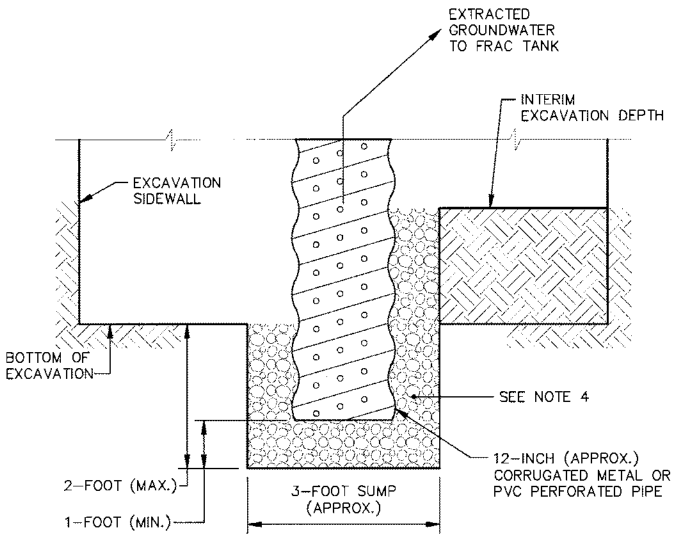
SECTION A-A'

NOTES:

1. DECONTAMINATION AREA SHALL HAVE A GENERAL SLOPE TOWARD A COLLECTION SUMP TO FACILITATE THE COLLECTION OF WASH FLUIDS. FLUIDS SHALL BE PUMPED FROM COLLECTION SUMP INTO 55 GALLON DRUMS OR A TEMPORARY STORAGE TANK (IF NECESSARY).
2. UPON COMPLETION OF CONSTRUCTION ACTIVITIES, THE DECONTAMINATION AREA, INCLUDING HDPE LINER, IS TO BE REMOVED BY THE REMEDIATION CONTRACTOR FOR DISPOSAL.

EQUIPMENT DECONTAMINATION AREA ③

NOT TO SCALE



NOTES:

1. THE INFORMATION SHOWN ON THIS DETAIL IS CONCEPTUAL AND PROVIDED FOR INFORMATIONAL PURPOSES.
2. TO THE EXTENT PRACTICABLE, THE REMEDIATION CONTRACTOR SHALL TAKE MEASURES TO MINIMIZE THE PRESENCE OF SOLIDS IN THE EXTRACTED GROUNDWATER.
3. THE REMEDIATION CONTRACTOR SHALL SUBMIT PROPOSED DEWATERING TECHNIQUE, LOCATIONS, DIMENSIONS, AND OTHER RELEVANT INFORMATION AS PART OF THE EXCAVATION AND MATERIAL DEWATERING PLAN.
4. WHERE THE PERFORATED PIPE EXTENDS INTO THE EXISTING SOIL FORMATION, A SUMP SHALL BE CREATED, THE PIPE INSTALLED, AND WASHED GRAVEL PLACED IN THE REMAINING SUMP AREA. IN THE ABSENCE OF GRAVEL, THE PIPE SHALL BE WRAPPED IN A NON-WOVEN GEOTEXTILE FABRIC.

SUMP DETAIL ④

NOT TO SCALE

NOT TO SCALE

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING: USE TO VERIFY FIGURE REPRODUCTION SCALE

No.	Date	Revisions	By	Ckd

THIS DRAWING IS THE PROPERTY OF THE ARCADIS ENTITY IDENTIFIED IN THE TITLE BLOCK AND MAY NOT BE REPRODUCED OR ALTERED IN WHOLE OR IN PART WITHOUT THE EXPRESS WRITTEN PERMISSION OF SAME.

Professional Engineer's Name
JASON D. BRIEN
Professional Engineer's No.
084067

State	Date Signed	Project Mgr.
NY	2/24/14	JDB
Designed by	Drawn by	Checked by
JRG	BGG	JDB

JASON DAVID BRIEN
084067

ARCADIS

ARCADIS OF NEW YORK, INC.

NYSEG • GENEVA, NEW YORK
WADSWORTH STREET FORMER MANUFACTURED GAS PLANT SITE
FINAL (100%) REMEDIAL DESIGN

MISCELLANEOUS DETAILS

ARCADIS Project No.
B0013104.0000.00014

Date
FEBRUARY 2014

ARCADIS
6723 Towpath Road
P.O. Box 66
Syracuse, NY 13214
Tel: 315.446.9120

8

ARCADIS

Appendix B

Technical Specifications

List of Specifications
Final (100%) Remedial Design Report

NYSEG – Wadsworth Street Former Manufactured Gas Plant Site – Geneva, New York

SECTION 01010

SUMMARY OF WORK

PART 1 - GENERAL

1.01 LOCATION AND DESCRIPTION OF WORK

A. The NYSEG Wadsworth Street Former Manufactured Gas Plant (MGP) Site (the site) is located in the City of Geneva, near the northwestern shore of Seneca Lake in eastern Ontario County, New York. The former MGP operated in an area comprised of a rectangular piece of land that is now located in a mixed commercial and residential area in the east-central part of Geneva, New York. Seneca Lake is located approximately 900 feet southeast of the site. The site is bordered by Wadsworth Street to the east, Railroad Place and a railroad (Finger Lakes Railway) to the south, a restaurant to the west and residential properties to the north. Railroad Place intersects Wadsworth Street and bisects the site. A gas holder (Gas Holder 1) and coal shed were formerly located in Railroad Place. Several MGP structures formerly existed at the current location of the City of Geneva's Public Safety Building (PSB) south of Railroad Place.

The portion of the former MGP site located north of Railroad Place is currently owned by NYSEG, while the area south of Railroad Place is owned by the City of Geneva. The area owned by NYSEG includes a grass-covered area in the eastern portion of the property and an asphalt parking lot comprises the western portion of the property. A restaurant on Railroad Place leases the parking area from NYSEG. A gravel parking area is located in the northeast portion of NYSEG's property and is used by residential property owners. A NYSEG gas regulator station is located near the intersection of Railroad Place and Wadsworth Street. The City of Geneva's PSB consists of a courtroom, office space, the local jail, and an attached pole barn structure. A large parking lot used by PSB employees is located west of the PSB. A Finger Lakes Railway line is located immediately south of the PSB.

The remedial construction will be performed by a Remediation Contractor, contracted by NYSEG (Owner); the *Final (100%) Remedial Design* (Remedial Design) has been prepared by ARCADIS. A summary of the project and Remediation Contractor's overall responsibilities are provided herein. Additionally, reference to other components of the Remedial Design is provided, as well as certain implementation details.

B. The work generally comprises but is not limited to the following:

1. Mobilization
2. Site Preparation
3. Earthwork/Soil Excavation
4. Water Handling
5. Material Disposition
6. Site Restoration
7. Demobilization

C. The remedial construction will be performed by a Remediation Contractor, contracted by NYSEG (Owner); the 100% Remedial Design Report (100% RD Report) for the site has been prepared by ARCADIS. A summary of the Project and Remediation Contractor's overall responsibilities are provided herein. Additionally, references to other components of the 100% RD Report are provided, as well as certain implementation details.

D. The Remediation Contractor shall perform all activities and furnish all labor, materials, equipment, subcontractor services, and incidentals necessary to implement the Remedial Design in accordance with the Contract between the Owner and the Remediation Contractor. In general, the remedial construction involves: 1) removal of the former tank and source material (i.e., an estimated in-situ 50 cy) in the immediate vicinity of the tank; 2) removal of existing 12-inches (i.e., 530 in-situ cubic yards [cy]) of surface material (i.e., topsoil and gravel) to facilitate installation of a new soil cover; 3) visual inspection of Gas Holder 3 foundation (and removal of dense non-aqueous phase liquids [DNAPLs] if encountered); 4) placement of backfill materials within the excavation area; and 5) Installation of a demarcation layer and placement of a minimum of 1-foot clean fill materials.

E. The technical work and Remediation Contractor requirements are described in several components that collectively represent the Remedial Design. These components include the following:

1. Remedial Design narrative
2. Design Drawings
3. Technical Specifications
4. Community Air Monitoring Plan (CAMP)
5. Waste Management Plan (WMP)
6. Construction Quality Assurance Plan (CQAP)
7. Community and Environmental Response Plan (CERP)
8. Citizens Participation Plan (CPP)
9. Contingency Plan

The above components should be thoroughly reviewed by the Remediation Contractor. Nothing presented in one of the above documents should relieve the Remediation Contractor’s obligations to satisfy the components specified in the other documents. In addition, in the event that there are discrepancies in the information contained in the above-listed documents, the Remediation Contractor shall identify such discrepancies in writing for the Owner’s and Design and Remediation Engineers’ review.

As part of the Remediation Contractor selection process, and to provide an opportunity for the Remediation Contractor to familiarize himself with the Project scope, site conditions, physical setting, etc., a mandatory pre-bid meeting and site visit will be required. In addition, the perspective Remediation Contractors will be provided with various information related to environmental and geotechnical investigations and investigation results. Such information will be provided as supplemental information to prospective Remediation Contractors during the procurement process and is not part of the Remedial Design. This information is available to assist the selected Remediation Contractor in understanding site conditions and preparing certain of the required technical and operational submittals.

1.02 WORK SEQUENCE/WORK HOURS

A. The Remediation Contractor shall follow the remedial construction sequence presented in the 100% RD Report and in accordance with the Remediation Contractor’s Site Operation Plan. The Remediation Contractor may propose an alternate construction sequence. Alternate construction sequences shall be pre-approved by NYSEG, the Design Engineer, and the Remediation Engineer prior to implementation.

B. The Owner anticipates that work activities can be conducted between the hours of 7:00 a.m. and 5:00 p.m. on non-holiday Monday through Friday, except in cases of emergency or unless prior approval has been obtained from the Owner.

C. Project implementation shall be in accordance with the approved construction schedule submitted by the Remediation Contractor.

1.03 REMEDIATION CONTRACTOR’S USE OF PREMISES

A. Remediation Contractor shall limit its activities to the Project Work Limits shown on the Design Drawings. All conflicts over use of the premises shall be resolved without additional cost to the Owner. Costs related to the Remediation Contractor’s use of the property (e.g., telephone, electric) shall be borne by the Remediation Contractor.

B. To the extent practicable, all Work shall be conducted in such manner as will cause the minimum inconvenience and disturbance to the surrounding community.

C. Remediation Contractor shall assume full responsibility for the security of all of its and its subcontractors’ materials and equipment stored within the Project Work Limits, including the project trailer.

D. At all times, Remediation Contractor shall maintain the Project in a neat, orderly, and safe manner. In addition, safe and clean access shall be available to areas of the Owner’s property that are not specifically part of the Project Work Limits.

E. Promptly repair damage to premises caused by construction operations. Upon completion of the work, restore premises to specified condition; if condition is not specified, restore to pre-construction condition.

1.04 CARE AND PROTECTION OF WORK

A. The Remediation Contractor shall be responsible for the care and protection of materials, supplies, and equipment delivered at the site intended to be used for the Project (whether provided by the Remediation Contractor or the Owner); and all injury or damage to the same from whatever cause, shall be the responsibility of the Remediation Contractor. The Remediation Contractor shall provide suitable means of protection for and shall protect all materials intended to be used. The Remediation Contractor shall take all necessary precautions to prevent theft, injury or damage by flood, fire, freezing, or from other inclement weather.

1.05 MONITORING OF WORK

A. Remediation Engineer

1. The Remediation Engineer will provide on-site and office-based assistance to the Owner for the duration of the Project. The Remediation Engineer will observe the progress and quality of the project work and determine, in general, if the Project is proceeding in substantial compliance with the Remedial Design. The

Remediation Engineer may disapprove Project Components as failing to conform to the Remedial Design. Whenever the Remediation Engineer considers such disapproval necessary or advisable for the proper implementation of the intent of the Remedial Design, the Remediation Engineer will bring this to the attention of the Owner.

2. Except where specifically established within the Remedial Design, the **Remediation Engineer will not have any duty or obligation with reference to and will not be responsible for** (1) the Remediation Contractor's construction means, methods, techniques, sequences, or procedures; (2) the Remediation Contractor's safety precautions and programs in connection with the Project; and (3) for the Remediation Contractor's failure to carry out the Project in substantial compliance with the Remedial Design. **The Remediation Engineer's duties, services, and work shall in no way supersede or dilute the Remediation Contractor's obligation to implement the Project.**

3. The Remediation Engineer will provide a sampling technician to conduct community air monitoring in accordance with the CAMP.

B. Owner

1. The Owner will be on site periodically to observe the progress and quality of the executed Work and to determine, in general, if the Work is proceeding in accordance with the 100% RD Report. The Owner will not be required to make exhaustive or continuous work area inspections to check the quality or quantity of the Work. The Owner may disapprove Work as failing to conform to the 100% RD Report. Whenever the Owner considers it necessary or advisable to ensure the proper carrying out of the intent of the 100% RD Report, the Owner shall have authority to require the Remediation Contractor to make special examination or testing of the work (whether or not fabricated, installed or completed).

   No matter how extensive or intensive the Owner's inspection, **the Owner will not be responsible for construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work, and the Owner will not be responsible for the Remediation Contractor's failure to carry out the Work in accordance with the 100% RD Report. The Owner's duties, services, and work shall in no way supersede or dilute the Remediation Contractor's obligation to perform the Work in conformance with all Project requirements.**

2. The Owner is empowered to determine the amount, quality, acceptability and fitness of all parts of the Work, but this authority shall not give rise to any duty or responsibility to the Remediation Contractor, the subcontractor or any of their agents or employees to do so.

C. Access to Work

1. All parties contracted to do work for the Owner at the site shall, for all purposes that may be required by their contracts, and representatives of State and Federal regulatory agencies shall, for any purpose, have access to the remedial

construction and the premises used by the Remediation Contractor, and the Remediation Contractor shall provide safe and proper facilities.

1.06 MATERIALS AND EQUIPMENT

A. Quality and Workmanship

1. All materials furnished or incorporated in the Project shall be of the best quality, and especially adapted for the service required. Whenever the characteristics of any material are not particularly specified, such material shall be utilized as is customary in first class work of a nature for which the material is employed.

2. All materials and workmanship shall be subject to inspection, examination, and tests by the Remediation Engineer and other representatives of the Owner at any and all times during manufacture or construction and at any and all places where such manufacture or construction are carried on.

3. The Remediation Contractor's selection and use of organizations for the inspection and testing of supplies, materials, and equipment shall be subject to the approval of the Owner and Remediation Engineer. Satisfactory documentary evidence shall be furnished by the Remediation Contractor that the material(s) have passed the required inspection and tests prior to the incorporation of the material(s) into the Project.

4. Costs for laboratory and field testing shall be borne by the Remediation Contractor unless specifically stated otherwise in the Contract Documents.

B. Equivalent Products and Changes to Remedial Design

1. The words "similar and equal to," "or equal," "equivalent," and such other words of similar content and meaning (hereinafter, “or equal”) shall, for the purposes of this work, be deemed to mean similar and equivalent to one of the named products or Remedial Design elements.

2. Whenever any product/design element is specified in the Remedial Design by a reference to the name, trade name, make or catalog number of any manufacturer or supplier, the intent shall not be to limit competition, but to establish a standard of quality which the Design Engineer has determined is necessary for the Project. If any product/design element other than that specified is proposed for use by the Remediation Contractor, it shall submit to the Remediation Engineer either its certification that the “or equal” strictly conforms to the Remedial Design, or a statement specifically identifying all differences between the “or equal” and the Remedial Design.

3. Any variation of a proposed “or equal” from the Remedial Design which is not specifically noted in the Remediation Contractor’s submittal shall be at the sole risk and expense of the Remediation Contractor. In addition, the Remediation Contractor shall provide all the information that the Remediation Engineer requests concerning the product/design element. The proposed product shall not be used until it has been accepted by the Remediation Engineer. Any “or equal” product incorporated into the Project without the Remediation Engineer’s written acceptance shall be at the Remediation Contractor’s sole risk, and the Remediation Engineer may require the removal and replacement of any unaccepted “or equal” product.

4. In all cases, the Remediation Engineer will determine whether a proposed “or equal” is acceptable, and the Remediation Contractor shall have the burden of proving, at its own expense, to the satisfaction of the Remediation Engineer that the proposed “or equal” is similar and equal to the named product/design element. In making such determination the Remediation Engineer may establish such criteria as it deems proper for acceptance of the “or equal.”

5. Any requested change in the Remedial Design not pertaining to an “or equal” must be submitted to the Remediation Engineer in writing and must be stated with sufficient clarity and detail to permit proper consideration by the Remediation Engineer. Unless accepted by the Remediation Engineer after submission as herein provided, any deviation from the Remedial Design, or the use of any product/design element which varies from the Remedial Design, shall be at the Remediation Contractor’s sole risk and expense.

6. The Remediation Contractor’s use of “or equal” products or design elements is at his/her own risk. In preparing a cost proposal, the Remediation Contractor may elect to include products/design elements that differ from those included in the Remedial Design. Such “or equals” shall be clearly identified in the Remediation Contractor’s submittals. In the event that the Remediation Engineer subsequently determines that the “or equal” is not suitable, the Remediation Contractor shall utilize products/design elements established in the Remedial Design without any adjustment to the Contract price.

C. Suppliers

1. All supplies and equipment shall be furnished by manufacturers who shall have at least three years of experience in the design, production, assembly, and field service of equipment of like type, size, and capacity. Where required by the Remediation Engineer, the Remediation Contractor shall supply a list of at least three successful installations.

PART 2 - PROJECT PLANNING

Notwithstanding the required submittals related to several technical aspects of the Project, the Remediation Contractor shall prepare Project-specific documents related to the overall implementation of the Project:

- Site Operation Plan
- Health and Safety Plan (HASP)

The information to be addressed in these submittals is provided below. In addition, the technical submittals required as part of the Remedial Design are included in the Specifications.

Once approved by the Owner and Remediation Engineer, certain submittals will be provided to the NYSDEC. These submittals are anticipated to include, but not be limited to: Site Operation Plan; HASP; proposed backfill source(s); and analytical data associated with the proposed source(s). The specific submittals will be identified based on consultation with the NYSDEC.

2.01 SITE OPERATION PLAN

A. To gauge the Remediation Contractor’s understanding of the Remedial Design and the related construction, objectives, procedures, and outcomes, and to address misunderstandings, clarifications, or modifications prior to Project implementation, the Remediation Contractor shall prepare and submit a Site Operation Plan for review by the Owner and Remediation Engineer.

B. The plan shall address, but not be limited to, the following items:

1. List/schedule of equipment

2. Identification of key personnel that will be on site for the duration of the Project

3. Site security/property protection procedures

4. Work schedule

5. List of subcontractors with proof of qualifications and licensing requirements (as required by various Sections)

6. Traffic Plan (see CERP for traffic control requirements)

7. Erosion and Sediment Control Plan (see Section 01110 for plan requirements)

8. Survey Control Plan (see Section 01160 for plan requirements)

9. Excavation Support Installation Plan (see Section 02205 for plan requirements)

10. Excavation and Material Dewatering Plan (see Sections 02415 for excavation and dewatering requirements)

11. Excavation and backfill sequence/technique (See Sections 02201, 02202, 02205, 02206, and 02415 for excavation and backfilling requirements)

12. Material handling/management and loading approach (see Sections 02415 and the WMP for material handling requirements)

13. Dust, odor, and noise control/suppression plan (see Section 02507 and the CAMP for control/suppression requirements)

14. Equipment cleaning procedures (see Section 01112 for decontamination requirements)

15. Further information regarding the required components and content of the Site Operation Plan is contained within the Remedial Design

C. The plan shall include a schedule that should account all elements of the Project and be neatly prepared and labeled as a bar graph indicating all anticipated start and completion dates. The Remediation Contractor shall submit a horizontal bar chart with separate lines for each section of work. At a minimum, the following major work items should be included, with appropriate subtasks included as necessary:

1. Technical Submittals

2. Mobilization

3. Site Preparation

4. Installation of Excavation Support System

5. Excavation/Material Dewatering/Disposal

6. Excavation Backfilling.

7. Surface Material Removal.

8. Site Restoration.

9. Demobilization.

D. The Remediation Contractor shall be responsible for making modification to the Site Operation Plan as work progresses (and as necessary).

2.02 HEALTH AND SAFETY PLAN

The Remediation Contractor will prepare a Project-specific HASP that identifies the health and safety procedures, methods, and requirements to be implemented by the Remediation Contractor during the performance of work activities. The Remediation Contractor's HASP shall be prepared and signed by a Certified Industrial Hygienist (CIH) and cover all personnel who will be employed by the Remediation Contractor to perform the Project, including direct employees as well as subcontractors. If the Remediation Contractor does not include subcontractors under its HASP, then each subcontractor will be responsible for developing, implementing, and submitting to the Remediation Contractor a HASP that meets the requirements outlined herein. The Remediation Contractor will be responsible for ensuring that all of its subcontractors have adequate HASPs prior to on site work by the subcontractor and are adhering to the HASPs during the work activities. If a subcontractor agrees to be included under the Remediation Contractor's HASP, then a statement to this effect shall be submitted by the Remediation Contractor.

Prior to commencement of field activities, the Remediation Contractor must certify (and demonstrate in a submittal to the Owner) that their personnel employed at the work site who are directly involved with remedial activities, including employees and subcontractors, have completed a 40-hour health and safety training course and are current (annual refresher training) in accordance with 29 CFR 1910.120 and 29 CFR 1926.65. The Remediation Contractor must also certify that any individuals who later become employed by the Remediation Contractor also have received such training prior to performing work at the work site.

The Remediation Contractor must certify that all personnel who will be employed by the Remediation Contractor to perform work at the site, including direct employees as well as subcontractors, have received the initial and annual (if applicable) medical examinations and are enrolled in an ongoing medical surveillance program as required by 29 CFR 1910 and 29 CFR 1926. The Remediation Contractor must also comply with the Department of Labor Safety and Health Regulations for construction promulgated under the Occupational Safety and Health Act of 1970 (PL 91-596) and under Section 107 of the Contract Work Hours and Safety Standards Act (PL 91-54).

The Remediation Contractor will be responsible for the safety of its employees, subcontractors, suppliers, and other parties at the site as a result of the Remediation Contractor's direction. Health and safety and community air monitoring shall be conducted by on the Remediation Contractor’s health and safety subcontractor.

The Remediation Contractor must prepare, submit, and implement a HASP in accordance with 29 CFR 1910.120 and 29 CFR 1926.65. The plan must address, but not be limited to, the following components:

A. Identification of Key Personnel - Identify, by name and by title, the on site and off-site health and safety personnel responsible for the implementation of health and safety procedures. All on-site personnel involved in the measures must have OSHA 40-hour Hazardous Waste Training (29 CFR 1910.120 and 1926.65) and the corresponding 8-hour refresher course update.

B. Training - Describe and provide certification of all supervisory and on-site personnel having received appropriate health and safety training.

C. Medical Surveillance - Certify that all supervisory and on-site personnel have received appropriate medical examinations and are able to conduct the tasks required for this Project.

D. Task-specific Hazard/Risk Analysis - Identify and provide a means of mitigating all foreseeable biological, chemical, and physical hazards associated with the Project including, but not limited to, hazards associated with exposure to constituents of concern, heavy equipment operation, site conditions, weather, material handling, work around excavation areas, and work near water.

E. Work Zones - Provide a site plan that depicts the designation of zones, including: Exclusion Zone(s), Decontamination Zone(s), and Support Zone(s). The level of personal protection required for each zone must be included.

F. Personal Safety Equipment and Protective Clothing - Identify personal safety equipment and protective clothing to be available at the work site and used by their Project personnel. This shall include identifying expected levels of protection (EPA Protection Levels A, B, C, and D) for each task and the action levels for personal protective equipment (PPE) upgrades. A respiratory protection program that meets the requirements of 29 CFR 1910.134 and establishes specific requirements for respirator use shall be included.

G. Work Zone Air Monitoring - Identify protocols and criteria associated with work zone air monitoring.

H. Personnel Decontamination - Describe methods and procedures to be used for personnel decontamination.

I. Confined Space Entry - Describe procedures for confined space entry in accordance with OSHA's Confined Space Standard.

J. Material Safety Data Sheets - Provide Material Safety Data Sheets (MSDSs) for all materials to be brought on site, as well as constituents which are expected to be encountered during the course of the remedial construction.

K. Construction Safety Procedures (OSHA 1926.1 - 1926.652, Subparts A-P) to address excavation shoring and trenching safety, as well as a daily site safety inspection checklist to evaluate these items.

L. Standard Operating Procedures and Safety Programs as required by applicable sections of 29 CFR 1910 and 1926.

– END OF SECTION –

SECTION 01046

CONTROL OF WORK

PART 1 – GENERAL

1.01 DESCRIPTION

A. Work Specified

1. The Remediation Contactor is responsible for taking all precautions, providing all programs, and taking all actions necessary to protect completed Work, Work in progress, materials, supplies, equipment, and all public and private property and facilities from damage as specified in this Section.

2. To prevent damage, injury, or loss, the Remediation Contactor's actions shall include the following:

   a. Storing materials, supplies, and equipment in an orderly, safe manner that does not unduly interfere with the progress of the Work or work of other contractors or utility companies.

   b. Providing suitable storage facilities for materials and equipment subject to damage or degradation by exposure to weather, theft, breakage, or other cause.

   c. Providing and maintaining on-site suitable and sufficient equipment and materials for sustaining, supporting, and protecting from direct or indirect injury any and all existing structures and Underground Facilities not otherwise specified for removal that are uncovered, undermined, weakened, endangered, threatened, or otherwise materially affected during the Work.

   d. Placing upon the Work or any part thereof only loads consistent with the safety and integrity of that portion of the Work and existing construction.

   e. Frequently removing and disposing of refuse, rubbish, scrap materials, and debris caused by the Remediation Contactor's operations so that, at all times, the site is safe, orderly, and workmanlike in appearance.

   f. Providing temporary barricades and guard rails around openings, temporary stairs and ramps, excavations, and other hazardous areas.

3. The Remediation Contractor shall confine its operations to the Project Work Limits as shown on the Design Drawings. No work shall be performed beyond the Project Work Limits without prior approval from the Owner/Remediation Engineer. Owner will arrange for/coordinate access to the Project Work Limits.

4. The Remediation Contactor has full responsibility for preserving public and private property and facilities on and adjacent to the site. Direct or indirect damage done by, or on account of, any act, omission, neglect, or misconduct by the Remediation Contactor in executing the Work, shall be restored by the

Remediation Contactor, at its expense to condition equal to that existing before damage was done.

B. Definitions

1. Underground Facilities: All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

1.02 SITE CONDITIONS

A. The locations, alignments, and construction of existing structures and Underground Facilities shown or described on the Design Drawings are approximate, are based on information readily available to the Owner/Design Engineer, and are not guaranteed to be correct, accurate, or complete. The Remediation Contactor is responsible for verifying the accuracy and completeness of the information shown or described on the Design Drawings.

B. Information and data related to subsurface conditions are not intended as a representation or warranty of continuity of conditions between soil borings or test pits, nor of groundwater levels at dates and times other than the date and time when measured, nor that purpose of obtaining the information and data were appropriate for use by the Remediation Contactor. The Owner and Remediation Engineer will not be responsible for interpretations or conclusions drawn therefrom by the Remediation Contactor.

C. The Remediation Contactor agrees that it shall neither have nor assert against the Owner or Remediation Engineer any claim for damages by reason of the inaccuracy, inadequacy, incompleteness, or other deficiency of the information given, or the failure to furnish additional or further information in the possession of the Owner or Remediation Engineer.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 EXISTING TREES AND PLANTS

A. Protect existing trees, shrubs, and plants on or adjacent to the site, shown or designated to remain in place, against unnecessary cutting, breaking, or skinning of trunk, branches, bark, and roots.

B. Do not store materials or equipment, or park construction equipment and vehicles within the foliage drip line.

C. If branches or trunks are damaged, prune branches immediately and protect cut or damaged areas with emulsified asphalt compounded specifically for horticultural use, in manner acceptable to the Remediation Engineer.

D. When directed by the Remediation Engineer, remove and dispose of damaged trees and plants that die or suffer permanent injury, and replace at the Remediation Contactor’s expense damaged trees or plants with specimens of equal or better quality.

3.02 EXISTING STRUCTURES AND UNDERGROUND FACILITIES

A. Verification of Conditions

1. Before initiating any ground intrusive Work at the site, contact and coordinate with Dig Safely New York to field-locate and identify Underground Facilities located near or within Work areas.

2. Prior to imitating any ground intrusive Work at the site, subcontract and coordinate with a private utility located to field-located and identify Underground Facilities located near or within Work areas.

3. Prior to initiating any excavation or slide rail installation activities, conduct air knifing/vacuuming along the slide rail alignment to a minimum depth of 5 feet below grade. Air knifing/vacuuming shall be performed in a safe manner, with proper dust and odor/vapor control measures, and consistent with all applicable provisions of the 100% RD Report. The Remediation Contractor shall immediately backfill any such exploratory excavations, unless otherwise directed by the Owner/Remediation Engineer.

B. Protection

1. Unless specified for removal, the Remediation Contactor shall protect from damage any and all pavements, sidewalks, curbs, signs, fencing, buildings, drainage features, utility poles, guy wires, and other property in and around the limits of Work. If damaged during the Work, or temporarily removed to facilitate the Work, such items shall be replaced and restored to their original condition at the Remediation Contactor’s expense and to the satisfaction of the Owner.

2. Clearly mark, maintain, and protect existing monitoring wells not specified for removal. Any such wells damaged during the Work shall be repaired, or decommissioned and replaced at the Remediation Contactor’s expense.

3. Contact and coordinate with appropriate utility owners to field-verify the status (active or inactive) of Underground Facilities, and for the temporary bracing, deactivation, removal, relocation, and/or replacement of any Underground Facilities, utility poles, or guy wires that are located near or within Work areas, or that may be affected by the Work.

4. Unless specified for removal, the Remediation Contactor shall sustain in their places and protect from direct or indirect injury all existing structures and Underground Facilities located within or adjacent to the limits of the Work. Such sustaining and supporting shall be done carefully and as required by the party owning or controlling such structure or facility. Before proceeding with the Work of sustaining and supporting such structure or facility, the Remediation Contactor shall satisfy the Owner and Remediation Engineer that methods and procedures to be used have been approved by the party owning the same.

5. The Remediation Contactor shall bear all risks attending the presence or proximity of all structures and Underground Facilities within or adjacent to limits of the Work, in accordance with the 100% RD Report. The Remediation Contactor shall be responsible for damage and expense for direct or indirect injury caused by its Work to existing structures and facilities that are not otherwise specified for removal. The Remediation Contactor shall repair immediately and completely damage caused by its Work, to the satisfaction of the owner of the damaged structure or facility.

6. If damage occurs to any portion of an existing structure or Underground Facility, or to the material surrounding or supporting the same, the Remediation Contactor shall immediately notify the Owner, Remediation Engineer, and owner of the damaged structure or facility and completely repair any damage caused by its Work to the satisfaction of the owner of the damaged structure or facility.

    a. Collect, containerize, characterize, and appropriately dispose of any materials released from the damaged structure or facility.

    b. Provide provisions for alternate or temporary service until repairs are completed.

    c. Provide assistance to the utility owner during repairs unless authorized by the utility owner to undertake such repairs directly.

C. Removal

1. Where the size, location, or depth of an existing structure or Underground Facility has been anticipated and the 100% RD Report require removal, realignment, or change, all Work shall be performed in mutual cooperation with and to the satisfaction of the appropriate utility owner or other parties concerned, and in accordance with the 100% RD Report.

2. Where it is necessary to interrupt natural gas, sewer, water, or other utility service to remove, realign, or change an existing structure or Underground Facility, the Work shall:

    a. Be coordinated with the Owner, Remediation Engineer, and appropriate utility owner.

    b. Proceed with expedience.

    c. Be continuous after interruption of service until completion of the removal, realignment, or change and return of the utility service to its normal state.

3. Structures associated with former manufactured gas plant (MGP) operations shall be removed as specified on the Design Drawings and in Section 02201. Recoverable non-aqueous phase liquid (NAPL), if encountered within excavations or former MGP piping/structures, shall be collected and removed to the extent feasible and to the satisfaction of the Owner/Remediation Engineer and NYSDEC. Once removed, NAPL shall be managed in accordance with Section 02415.

D. Conditions Found Different

1. If an Underground Facility is uncovered or revealed at or contiguous to the site that is not otherwise specified for removal, and was either not shown or indicated, or not shown or indicated with reasonable accuracy in the 100% RD Report, the Remediation Contactor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith, identify the owner of such Underground Facility and give written notice to that owner and to the Owner and Remediation Engineer.

2. The Owner and Remediation Engineer, in consultation with the New York State Department of Environmental Conservation as appropriate, will promptly review the Underground Facility and determine the extent, if any, to which:

   a. A change is required in the location of the Work to avoid the Underground Facility.

   b. The Underground Facility should be removed, realigned, or changed.

   c. A change is required in the 100% RD Report to reflect and document the consequences of the existence or location of the Underground Facility.

   d. The Work can proceed without changes to the 100% RD Report.

3. During such time, the Remediation Contactor shall be responsible for the safety and protection of the Underground Facility.

4. If the Owner and Remediation Engineer conclude that a change in the 100% RD Report is required and that such change will cause an increase or decrease in the Contract Price or Contract Times, a Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price or Contract Times, or both, to the extent that they are attributable to the existence or location of an Underground Facility that was not shown or indicated or not shown or indicated with reasonable accuracy in the 100% RD Report and that the Remediation Contactor did not know of and could not reasonably have been expected to be aware of or to have anticipated.

5. Any Work required by the Remediation Contactor to remove, realign, or change the Underground Facility shall be performed as mutually agreed upon by the Owner, Remediation Engineer, Remediation Contactor, and utility owner or other parties concerned, and in accordance with the 100% RD Report and utility owner's requirements.

3.03 OPEN EXCAVATIONS

A. All open excavations shall be adequately safeguarded by providing temporary barricades, caution signs, lights, and other means to prevent unwanted/unknowing access, accidents to persons, and damage to property. Such measures shall be installed and maintained in accordance with all applicable Laws and Regulations. The length or size of excavations will be controlled by the particular surrounding conditions.

3.04 HOUSEKEEPING

A. As work progresses, the Remediation Contractor shall remove all unused tools and equipment, surplus materials, waste materials, rubbish, refuse, and other debris from the site in a timely manner and ensure that the site is at all times maintained in a neat and orderly condition.

B. At the completion of the project, the Remediation Contractor shall promptly remove all construction tools and equipment, surplus materials, waste materials, rubbish, refuse, and other debris from the site and leave the site in a neat and orderly condition.

C. If it is observed that the Remediation Contractor neglects his responsibilities as set forth above, or neglects the repairing of streets, sidewalks, fences, or other damages, the Owner/Remediation Engineer will notify the Remediation Contractor to that effect. If the Remediation Contractor does not take reasonable steps after notification to correct the neglected situation, the Owner may do so, and the expense thereby incurred shall be deducted from any monies due or that may become due to the Remediation Contractor.

- END OF SECTION -

SECTION 01110

ENVIRONMENTAL PROTECTION PROCEDURES

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Work Specified

1. The control and management of potential environmental impacts in conformance with applicable laws and regulations, during and as the result of the work.

2. The control of environmental impacts requires consideration of water, land, and air resources, and includes the management of noise, solid/liquid waste, and other pollutants.

3. Scheduling and conducting all work in a manner that will minimize the erosion of soils and accumulation of sediments in the area of the work. Furnishing, installing, and maintaining erosion and sediment control measures as required to prevent silting and muddying of existing and new drainage systems, creeks, streams, rivers, impoundments, or other water bodies.

4. Mitigating potential disturbances to the existing ecological balance between water resources and their surroundings.

5. Temporary controls include, but are not limited to, the following:

   a. Erosion, sediment, and storm water controls.
   b. Odor, vapor, and dust controls.
   c. Noise controls.
   d. Pollution controls.

B. Related Work Specified Elsewhere

1. Section 02507 – Odor, Vapor, and Dust Control

2. Waste Management Plan (WMP)

3. Community Air Monitoring Plan (CAMP)

4. Contingency Plan

C. Definitions

1. For the purpose of this section, environmental impacts are defined as chemical, physical, or biological elements or agents that adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to man; or degrade the utility of the environment for aesthetic and/or recreational purposes.

1.02 APPLICABLE CODES, STANDARDS, AND SPECIFICATIONS

A. American Association of State Highway and Transportation Officials (AASHTO). The following AASHTO specification is referenced in this section and is to be considered part of this section:

M 288	Standard Specification for Geotextile Specification for Highway Applications

B. ASTM International (ASTM). The following ASTM specifications are referenced in this section and are to be considered part of this section:

D3786	Standard Test Method for Bursting Strength of Textile Fabrics (Diaphragm Bursting Strength Tester Method)
D4355	Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture, and Heat in a Xenon Arc Type Apparatus
D4491	Standard Test Methods for Water Permeability of Geotextiles by Permittivity
D4533	Standard Test Method for Trapezoid Tearing Strength of Geotextiles
D4632	Standard Test Method for Grab Breaking Load and Elongation of Geotextiles
D4751	Standard Test Method for Determining Apparent Opening Size of a Geotextile
D4833	Standard Test Method for Index Puncture Resistance of Geomembranes and Related Products
D5261	Standard Test Method for Measuring Mass per Unit Area of Geotextiles

C. Applicable federal, state, and local laws and regulations concerning environmental pollution control and abatement.

D. New York State Standards and Specifications for Erosion and Sediment Control.

1.03 SUBMITTALS

A. The Remediation Contractor shall submit the following required information in the Soil and Sediment Erosion Control Plan (separate or as part of the Remediation Contractor’s Site Operation Plan):

1. Manufacturer's product data, specifications, and installation instructions for the following:

   a. Silt fencing.
   b. Straw bales and anchoring stakes.

2. Locations for sedimentation and erosion control measures.

3. Methods for minimizing surface water runoff into open excavations and project work areas.

1.04 NOTIFICATIONS

A. The Owner and/or Remediation Engineer will notify the Remediation Contractor of any detected non-compliance with the foregoing provisions or of any environmentally objectionable acts and corrective action to be taken. State or local agencies responsible for verification of certain aspects of the environmental protection requirements may also provide notification of any non-compliance with State or local requirements. After receipt of such notice, the Remediation Contractor shall immediately take corrective action. If the Remediation Contractor fails or refuses to comply promptly, the Owner may direct the Remediation Contractor to stop all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to any such stop orders shall be made the subject of a claim for extension of time or for excess costs or damages by the Remediation Contractor unless it is later determined that the Remediation Contractor was in compliance.

PART 2 - PRODUCTS

2.01 EROSION AND SEDIMENT CONTROLS

A. Silt Fencing

1. Filter Fabric

a. Material: Mirafi® 100X woven geotextile or approved equal meeting the geotextile survivability requirements of AASHTO M 288-96 Class 1 or Class 2.

b. Height: Minimum height of 2 feet.

2. Fence Support Posts

a. Material: Wood, metal, or synthetic posts may be used. Softwood posts shall be 1½ inches by 3½ inches, hardwood posts shall be at least 1¼ inches by 1¼ inches, steel posts shall be "T" or "U" shape in cross-section with a minimum weight of 1.3 pounds per foot.

b. Height: Minimum height of 3 feet.

3. Securely fasten filter fabric to each post in no less than four locations with heavy duty staples, wire ties, or any other fastener compatible with the post material. Post spacing shall not exceed 8 feet (center to center).

B. Straw Bale Dike

1. Bales shall be firmly-packed, unrotted straw bound firmly with intact bailing wire.

2. Straw bales shall be anchored in place with two re-bars, steel pickets, or 2-inch by 2-inch wooden stakes driven 18 inches (minimum) into the ground and flush with the top of the bale.

2.02 ODOR, VAPOR, AND DUST CONTROL

A. Requirements for odor, vapor, and dust control measures are provided in Section 02507.

2.03 POLLUTION CONTROLS

A. Provide spill kits and oil-absorbent pads, rolls, and booms as required to contain spills, should they occur, and prevent the potential migration of pollutants in accordance with all applicable Laws and Regulations.

PART 3 - EXECUTION

3.01 EROSION AND SEDIMENT CONTROL

A. General

1. The Remediation Contractor is responsible for the installation, inspection, and maintenance of all erosion, sediment, and storm water controls during the work.

2. Erosion and sediment controls shall be installed and maintained in accordance with the latest edition of the New York State Standards and Specifications for Erosion and Sediment Control.

B. Installation and Maintenance

1. Silt Fencing and Straw Bale Dikes: Install and maintain in accordance with the Design Drawings and Section 5A of the New York State Standards and Specifications for Erosion and Sediment Control.

C. Periodic Inspections and Inspection Reports

1. Temporary sediment and erosion controls shall be inspected by the Remediation Engineer daily (at a minimum) and after storm events to verify their continued effectiveness and integrity. For temporary work stoppages greater than two weeks in duration (e.g., winter shut-downs), the inspection frequency may be reduced to once every 30 calendar days if temporary stabilization measures have been applied to all disturbed surfaces, and if approved by the Owner/Remediation Engineer and NYSDEC.

2. The Remediation Engineer shall immediately notify the Remediation Contractor of any deficiencies observed, and any maintenance activities or corrective actions that are required to address those deficiencies. Maintenance activities and corrective actions shall be initiated by the Remediation Contractor immediately. If site conditions prevent the maintenance activities or corrective actions from being completed before the next scheduled inspection, such conditions shall be documented in the inspection report, and the maintenance activities/corrective actions shall be completed as soon as site conditions permit.

3. The Remediation Engineer shall prepare a weekly inspection report. Inspection reports shall include, at a minimum, the following information:

    a. Date and time of inspections.

    b. Name and title of person(s) performing inspection.

    c. Weather and soil conditions (e.g., dry, wet, saturated, etc.) at the time of the inspection.

    d. Description and sketch of areas that are disturbed at the time of the inspection and any areas that have been stabilized (temporary or final) since the previous inspection.

    e. Maintenance activities completed, or corrective actions implemented since the previous inspection. Include digital photographs, with date stamp, that clearly show the areas/items installed, repaired, or replaced.

    f. Condition of the storm water run-off at all points of discharge from the construction site.

    g. Identification of any erosion, sediment, and storm water controls that require repair or maintenance.

    h. Identification of any erosion, sediment, and storm water controls that were not installed properly or are not functioning as designed.

    i. Maintenance activities or corrective actions required to address any deficiencies observed during the inspection. Include digital photographs, with date stamp, that clearly show the deficient areas/items.

4. Each report shall be signed by the Remediation Engineer.

5. Maintain copies of periodic inspection reports in an organized manner at the site. Periodic inspection reports shall be accessible and available for review at any time by the Owner and NYSDEC.

3.02 PROTECTION OF WATER RESOURCES

A. The Remediation Contractor shall take all precautions to prevent, or reduce to a minimum, any damage to surface water from pollution by debris, sediment, or other material, or from the manipulation of equipment and/or materials within or adjacent to existing and new drainage systems, creeks, streams, rivers, impoundments, or other water bodies.

B. All water generated during the project (e.g., from excavation/material dewatering, decontamination of equipment, etc.) shall be handled/managed in accordance with the WMP.

C. The Remediation Contractor shall not discharge water from excavation/material dewatering operations directly into any live or intermittent stream, channel, wetlands, surface water or any sanitary or storm sewer unless authorized by the Owner/Remediation Engineer.

3.03 PROTECTION OF LAND RESOURCES

A. The Remediation Contractor shall confine its operations to the Project Work Limits or other areas authorized by the Owner/Remediation Engineer.

B. The Remediation Contractor shall remove all evidence of temporary construction facilities such as work areas, structures, stockpiles of excess or waste materials, or any other vestiges of construction as directed by the Owner/Remediation Engineer. Disturbed areas shall be restored as shown on the Contract Drawings or as approved by the Owner/Remediation Engineer.

C. All debris and excess material shall be disposed of in an environmentally sound manner in accordance with the WMP.

3.04 PROTECTION OF AIR RESOURCES

A. Community air monitoring for volatile organic compounds (VOCs) and particulate matter less than 10 microns in diameter (PM_{10}) will be performed by the Remediation Engineer on a continuous basis during the remedial construction activities. The Remediation Contractor shall verify that community air monitoring is being performed prior to initiating intrusive and/or potential dust-generating activities each day.

B. Real-time work zone air monitoring shall be performed by the Remediation Contractor on a continuous basis during all intrusive and/or potential dust-generating activities.

C. Odors shall be controlled to the satisfaction of the Owner/Remediation Engineer and New York State Department of Environmental Conservation (NYSDEC). Vapors and dust shall be controlled as necessary to meet the 1) community air monitoring action levels set forth in the CAMP and 2) work zone air monitoring action levels set forth in the Remediation Contractor’s Health and Safety Plan (HASP).

D. Additional requirements for odor, vapor, and dust control are provided in Section 02507.

3.05 NOISE CONTROL

A. The Remediation Contractor shall make every effort to minimize noises caused by the construction operations. Equipment shall be equipped with silencers or mufflers designed to operate with the least possible noise in compliance with federal, state, and local noise ordinances.

3.06 PROHIBITED CONSTRUCTION PROCEDURES

A. Prohibited construction procedures include, but are not limited to, the following:

   1. Dumping or disposing of spoil material, cleared trees/brush, debris, or other waste material in any surface waters, drainage ways, wetlands, or other unauthorized locations.

   2. Indiscriminate, arbitrary, or capricious operation of equipment in any existing or new drainage system, creek, stream, wetland, or other water body.

   3. Pumping of silt-laden water from trenches or other excavations to any surface waters, drainage ways, wetlands, or sewers.

   4. Damaging vegetation (if any) beyond the extent necessary for construction.

B. In the event that the Remediation Contractor utilizes prohibited construction activities, any subsequent cleanup or repair activities shall be conducted at the Remediation Contractor’s expense.

3.07 REMOVAL OF TEMPORARY CONTROLS

A. Remove temporary controls only when directed by the Owner/Remediation Engineer.

- END OF SECTION -

SECTION 01112

DECONTAMINATION PROCEDURES

PART 1 – GENERAL

1.01 DESCRIPTION

A. Work Specified

1. The decontamination of all vehicles, equipment, and personnel that come into contact with excavated or impacted materials at the site.

2. The construction and maintenance of decontamination areas.

3. Furnishing all materials, equipment, and labor necessary to construct and maintain decontamination areas and decontaminate vehicles, equipment, and personnel.

B. Related Work Specified Elsewhere

1. Section 02206 – Fill Materials

2. Section 02270 – Geotextile Fabric

3. Section 02272 – Geomembrane (HDPE Liner)

4. Section 02415 – Impacted Material Handling and Excavation Procedures

5. Waste Management Plan (WMP)

1.02 APPLICABLE CODES, STANDARDS, AND SPECIFICATIONS

A. Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (October 1985), as prepared by the National Institute of Occupational Safety and Health (NIOSH), Occupational Safety and Health Administration (OSHA), United States Coast Guard (USCG), and United States Environmental Protection Agency (USEPA).

1.03 SUBMITTALS

A. Material Safety Data Sheets (MSDS) for all cleaning/decontamination solutions shall be included in the Remediation Contractor's Health and Safety Plan (HASP).

PART 2 – PRODUCTS

2.01 MATERIALS

A. Materials used in the construction of vehicle/equipment decontamination areas shall conform to the requirements of Sections 02206, 02270, and 02272.

PART 3 – EXECUTION

3.01 GENERAL REQUIREMENTS

A. All construction vehicles leaving the site shall be decontaminated by the Remediation Contractor (as necessary) to prevent the tracking of soil off-site (including vehicles transporting clean fill to the site). Vehicles and equipment that come into contact with excavated or impacted materials at the site shall be visually inspected and decontaminated by the Remediation Contractor (to the satisfaction of the Owner/Remediation Engineer) prior to handling backfill material or leaving the site. Any visible soils or other debris shall be promptly removed and disposed of in a manner consistent with the materials excavated.

B. Precautions shall be taken to limit contact between the vehicle/equipment, personnel performing the decontamination activities, and any decontamination liquids that may accumulate in the decontamination area. Personnel engaged in decontamination activities shall use personal protective equipment, including disposable clothing, as required by the Remediation Contractor's HASP.

C. The Remediation Contractor shall decontaminate the excavation support system components within the decontamination area.

D. Wash water, solids, and other materials generated during decontamination activities shall be collected by the Remediation Contractor and handled/managed in accordance with the WMP and Section 02415. Accumulated liquids shall be removed by the Remediation Contractor on a periodic basis so as to not exceed the capacity of the decontamination area.

3.02 DECONTAMINATION AREAS

A. The Remediation Contractor is responsible for constructing and maintaining decontamination area(s) to accommodate all loads, vehicles, equipment, and migration scenarios.

B. The Remediation Contractor is responsible for constructing the decontamination area at the location shown on the Design Drawings. Alternative locations within the Project Work Limits shall be approved by the Owner/Remediation Engineer prior to construction.

C. Vehicle/equipment decontamination areas shall be constructed as specified on the Design Drawings.

D. The Remediation Contractor shall construct and maintain appropriately-sized decontamination areas for its personnel. Personnel decontamination areas shall be located within the contamination reduction zone and include those facilities necessary to decontaminate personnel upon exiting the work area (exclusion zone), in accordance with the Remediation Contractor's HASP, and in accordance with local, state, and federal laws and regulations. At a minimum, personnel decontamination areas shall include run-on/run-off controls.

- END OF SECTION -

SECTION 01160

SURVEY CONTROL

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Specified

1. Establishing and maintaining survey control throughout the remedial construction activities to ensure the proper construction, documentation, and testing of the work.

2. Furnishing all materials, equipment, and labor necessary to support the survey activities required by the Remedial Design.

B. Related Work Specified Elsewhere

1. Section 01720 – Project Record Documents

2. Section 02201 – Earthwork

1.02 SUBMITTALS

A. The Remediation Contractor shall prepare Survey Control Plan that includes (at a minimum) the following:

1. Identification (name, address, and affiliation) of licensed Professional Land Surveyor.

2. A figure depicting the Remediation Contractor's proposed survey control points for each excavation area and a listing of coordinates (northing and easting) for each proposed survey control point.

3. The Remediation Contractor's proposed method of recording survey data within each excavation area.

B. The Remediation Contractor shall submit the following survey information for each survey control point:

1. The existing elevation (submitted prior to initiating excavation activities).

2. The completed excavation elevation (submitted prior to initiating backfilling activities).

3. The completed soil fill elevation (submitted prior to placing sub-base material).

4. The final (post-construction/restoration) surface elevation (submitted following the completion of restoration activities).

C. The Remediation Contractor shall provide calculated construction quantities, including the following:

   1. Excavation volume (in units of *in-situ* cubic yards) for each excavation area.

   2. Backfill volume (in units of *in-situ* cubic yards) for each fill material type (e.g., general fill, gravel, etc.).

   3. Surface area (in units of square feet) of vegetated soil cover, gravel/stone surface cover, and other restored areas.

1.03 QUALITY ASSURANCE

A. Qualifications:

   1. Remediation Contractor's Surveyor: Retain the services of an independent Professional Land Surveyor licensed and registered in New York State to perform all surveying and layout tasks required in the Contract Documents and as required for the Work. All survey work shall be performed by or under the direct supervision of the Remediation Contractor's Surveyor. The Surveyor's responsibilities include, but are not necessarily limited to, the following:

      a. Providing all required surveying equipment, including transit, theodolite, and robotic total station, level, stakes, and surveying accessories.

      b. Performing a pre-construction survey before any work is performed to document existing (pre-construction) site conditions.

      c. Establishing required lines and grades for performing all work.

      d. Surveying survey points as specified in this Section.

      e. Preparing and maintaining professional-quality, accurate, well organized, legible notes of all measurements and calculations made while surveying and laying out the work.

      f. Performing such surveys and computations necessary to determine quantities of work performed, placed, or installed.

      g. Providing such facilities and assistance necessary for the Remediation Engineer to check lines and grade points placed by the Remediation Contractor.

      h. Performing a post-construction survey following the completion of all restoration work to document final (post-construction) Site conditions.

B. Reference Datums:

   1. Horizontal datum shall be the North American Datum of 1983 (NAD 83) New York State Plane Coordinate System.

2. Vertical datum shall be the North American Vertical Datum of 1929 (NGVD 1929).

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 PRE-CONSTRUCTION SURVEY

A. Establish survey control benchmarks and perform a detailed pre-construction survey of the site before initiating any work (sufficient to generate 1-foot topographic contours). Survey and document existing site conditions, including surface topography and grade breaks, limits of paved/unpaved surfaces and lawns, and surface features (e.g., fencing, trees, roads, curbs, sidewalks, etc.).

B. Delineate Work limits, including limits of clearing/grubbing and excavation.

C. Establish survey control points within excavation area on a maximum 5-foot grid.

1. Survey and record the coordinates (northing and easting) and existing surface elevation at each survey control point.

2. Once established, maintain survey control points throughout the Work to track excavation and backfill depths.

3.02 CONSTRUCTION SURVEYS

A. Excavation

1. Survey and document the following:

a. Existing structures and Underground Facilities encountered during the work. Provide locations, elevations, and/or alignments (as appropriate). If partially removed or altered during the work, provide locations, elevations, and/or alignments (as appropriate) of remaining or altered portions of existing structures and Underground Facilities.

b. Final horizontal limits of excavation.

2. Submit excavation survey data to the Remediation Engineer and obtain Remediation Engineer’s approval before initiating backfilling.

B. Backfilling

1. Survey and document the following:

a. Intermediate backfill surface elevations at each survey control point.

i. Provide final surface elevation of controlled low-strength material (CLSM), as appropriate, below demarcation layer for soil cover.

- ii. Provide final surface elevation of imported fill above demarcation layer for soil cover.

2. Submit backfilling survey data to the Remediation Engineer and obtain Remediation Engineer's approval before initiating restoration.

C. Establish, place, and replace as required, such additional stakes, markers, and other reference points necessary for control, intermediate checks, and guidance of construction operations.

3.03 POST-CONSTRUCTION SURVEY

A. Perform a detailed post-construction survey of the site following the completion of all restoration. Survey and document the following:

1. Final Site conditions, including surface topography and grade breaks, limits of restored surfaces (e.g., paved/unpaved surfaces, lawns, etc.), and surface features (e.g., buildings, fencing, trees, roads, curbs, sidewalks, etc.).

2. Final surface elevation at each survey control point.

3.04 SITE QUALITY CONTROL

A. Maintain the following vertical survey tolerances during the Work:

1. Excavation, Backfilling, and Grading: 0.10 foot.

- END OF SECTION -

SECTION 01200

PROJECT MEETINGS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Project meetings will be held on a regular (weekly) basis. For each meeting, the Owner/Remediation Engineer will:

1. Prepare agendas for meetings.
2. Make physical arrangements for meetings.
3. Preside at meetings.
4. Record the minutes and include significant proceedings and decisions.
5. Reproduce and distribute copies of minutes after the meeting to attendees and other parties affected by the decisions made at the meeting.

B. Representatives of the Remediation Contractor, subcontractors, and suppliers attending project meetings shall be qualified and authorized to act on behalf of the entity each represents.

C. Remediation Contractor attendance is mandatory at all project meetings.

1.02 PRE-CONSTRUCTION MEETING

A. The Remediation engineer will schedule a pre-construction meeting no later than 15 days after date of Notice to Proceed.

B. The pre-construction meeting will be held at the site or an alternate location designated by the Owner.

C. Attendance:

1. Owner.
2. New York State Department of Environmental Conservation (NYSDEC).
3. City of Geneva.
4. Design Engineer.
5. Remediation Engineer.

6. Remediation Contractor (Project Manager, Site Superintendent, Forman, Site Safety Officer, and major subcontractors and suppliers, as appropriate).

7. Major Subcontractors.

8. Others, as appropriate.

D. Anticipated Agenda Items:

1. Safety/safe work practices.

2. Distribution and discussion of:

    a. List of major subcontractors and suppliers.
    b. Phasing/sequencing of work.
    c. Critical path activities.
    d. Remediation Contractor submittals.
    e. Major construction activities.
    f. Construction schedule.
    g. Contact information for project team.

3. Major equipment deliveries and priorities.

4. Project Coordination:

    a. Designation of responsible personnel.
    b. Chain-of-communication
    c. Handling of public relations.
    d. Traffic controls.

5. Procedures and processing of:

    a. Field decisions.
    b. Proposal requests.
    c. Submittals.
    d. Change Orders.
    e. Applications for payment.

6. Procedures for maintaining Record Documents.

7. Use of premises:

    a. Office, work, and storage areas.
    b. Owner's requirements.

8. Construction facilities, controls, and construction aids.

9. Temporary utilities.

10. Housekeeping procedures.

11. Other.

1.03 PROGRESS AND COORDINATION MEETINGS

A. The Remediation Engineer will schedule weekly progress and coordination meetings at the site (as necessary and appropriate).

B. Attendance:

1. Owner.
2. NYSDEC.
3. Remediation Engineer.
4. Remediation Contractor/subcontractors.
5. Others, as appropriate.

C. Potential Agenda Items:

1. Safety/safe work practices.

2. Review/approval of prior meeting minutes.

3. Community air monitoring results.

4. Site management issues (e.g., access, security, temporary controls, maintenance and protection of traffic, and housekeeping).

5. Review of work progress since previous meeting.

6. Field observations, problems, conflicts, and resolution.

7. Revisions to construction schedule.

8. Review of Progress Schedule:

    a. Contract Times, including Milestones (if any).

    b. Critical path.

    c. Problems/issues that potentially affect Contract Times, including Milestones (if any).

    d. Corrective measures and procedures to achieve Contract Times, including Milestones (if any).

9. Submittal status and schedules.

10. Maintenance of quality standards.

11. Pending changes and substitutions.

12. Other.

D. Representatives of the Remediation Contractor who have decision-making authority shall be in attendance at all progress and coordination meetings.

1.04 DAILY SITE SAFETY/COORDINATION MEETINGS

A. The Remediation Contractor will hold daily site safety/coordination progress and coordination meetings.

B. Attendance:

1. Remediation Engineer.
2. Remediation Contractor/subcontractors.
3. Others, as appropriate.

C. Potential Agenda Items:

1. Safety/safe work practices.

2. Review of planned construction activities for the day and associated health and safety concerns/measures associated with planned activities.

3. Potential problems/conflicts that may be encountered and measures/ communication to address them.

1.05 PROJECT CLOSE-OUT MEETING

A. The Remediation Engineer will schedule the project close-out meeting.

B. Attendance:

1. Owner.
2. NYSDEC.
3. Remediation Contractor.
4. Remediation Engineer.

C. Potential Agenda Items:

1. Review/approval of prior meeting minutes.

2. Restoration/project close-out activities.

3. Debris disposal.

4. Demobilization.

5. Final site walk with Owner, NYSDEC, the Remediation Engineer, the Remediation Contractor to gain final approval of completion of work.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

- END OF SECTION -

SECTION 01300

SUBMITTALS

PART 1 - GENERAL

1.01 DESCRIPTION OF REQUIREMENTS

A. This Section specifies the general methods and requirements of submissions applicable to Remediation Contractor submittals, including plans, shop drawings, product data, samples, mock-ups, and schedules. Detailed and specific submittal requirements are specified elsewhere in the Remedial Design.

B. All submittals shall be clearly identified by reference to Section Number, Paragraph, Drawing Number, or Detail as applicable. Submittals shall be clear and legible and of sufficient size for presentation of data.

C. Submittals required prior to mobilization shall be provided per the schedule in Section 01010. Each submittal shall be prepared and transmitted to the Remediation Engineer a minimum of 10 working days in advance of the Remediation Contractor's intended performance of the related work or other applicable activities, or within the time specified in the individual work of other related sections, so that work will not be delayed by processing times (including rejections and resubmittals, if required), coordination with other submittals, testing, purchasing, fabrication, delivery, and similar sequenced activities. The Owner/Remediation Engineer will not be liable for any project costs and/or schedule delays resulting from the Remediation Contractor's failure to provide submittals in a timely manner.

1.02 SHOP DRAWINGS, PRODUCT DATA, SAMPLES

A. Shop Drawings

1. Shop drawings include work plans, samples, supporting vendor information, calculations, test reports, custom-prepared data such as fabrication and erection/installation (working) drawings, schedules for carrying out the work, setting diagrams, actual shop work manufacturing instructions, custom templates, coordination drawings, individual system or equipment inspection and test reports (including performance curves and certifications) as applicable to the work.

2. Shop drawings shall not be submitted by subcontractors and shall only be submitted to the Remediation Engineer once the Remediation Contractor has verified that they are complete. The Remediation Contractor is responsible for their submission at the proper time so as to prevent work delays.

3. Details on shop drawings shall clearly show the relation of the various parts to the main members and lines of the structure and where correct fabrication of the work depends upon field measurements. Such measurements shall be made and noted on the shop drawings before being submitted.

4. All details on shop drawings shall show clearly the relation of the various parts to the main members and lines of the structure and where correct fabrication of the work depends upon field measurements, such measurements shall be made and noted on the shop drawings before being submitted.

5. Any shop drawings submitted via facsimile or that are otherwise illegible will be rejected.

B. Product Data

1. Product data include standard prepared data for manufactured products (sometimes referred to as catalog data), such as manufacturer's product specifications and installation instructions, manufacturer's printed statements of compliances and applicability, roughing-in diagrams and templates, catalog cuts, product photographs, standard wiring diagrams, printed performance curves and operational-range diagrams, production or quality control inspection/test reports and certifications, mill reports, product operating and maintenance instructions and recommended spare-parts listing and printed product warranties, as applicable to the work.

C. Samples

1. Samples include physical examples of the work, such as sections of manufactured or fabricated work, small cuts or containers of materials, complete units of repetitively-used products, and units of work to be used by the Owner/Remediation Engineer for independent inspection and testing, as applicable to the work.

1.03 REMEDIATION CONTRACTOR'S RESPONSIBILITIES

A. Review shop drawings, product data, and samples (including those by subcontractors) prior to submission to determine and verify the following:

1. Field measurements.

2. Field construction criteria.

3. Catalog numbers and similar data.

4. Conformance with related Sections.

B. Make submittals promptly in accordance with approved schedules and in such sequence as to cause no delay in the project.

C. Notify the Remediation Engineer in writing, at the time of submittal, of any deviations in the submittal from the Remedial Design.

1.04 SUBMISSION REQUIREMENTS

A. Submittals shall be identified with a 10-character numbering system in the following manner:

1. The first character shall be a D, S, or P, representing shop/working drawing and other product data (D), sample (S), or preliminary submittal (P).

2. The next five digits shall be the applicable section number.

3. The next three digits shall be the numbers 001 to 999 to sequentially number each initial separate item or drawing submitted under each specific section number.

4. The last character shall be a letter, A to Z, indicating the submission, or resubmission of the same item (e.g., A=1st submission, B=2nd submission, C=3rd submission, etc). A typical submittal identification number would be as follows:

   D-02270-008-B
   D = Shop/working drawing or other product data
   02270 = Section for geotextile fabric
   008 = The eighth initial submittal under this section
   B = The second submission (first resubmission) of that particular item

B. Except where noted or as otherwise indicated in the Remedial Design, all submittals shall be provided electronically (in Adobe® PDF or other mutually agreeable format) to the Remediation Engineer. Where hard copies are required, the following shall be provided:

1. Shop Drawings and Product Data – Six copies. Shop drawings and product data sheets 11 by 17 inches and smaller shall be bound together in an orderly fashion.

2. Samples – Number and/or size stated in the respective sections.

C. Submittals shall include:

1. The date of submission and the dates of any previous submissions.

2. The project title and number.

3. Submittal identification number.

4. Identification of any subcontractors, suppliers, or manufacturers.

5. Identification of the product, with reference to the appropriate section number, page, and paragraph(s).

6. Field dimensions, clearly identified as such.

7. Relation to adjacent or critical features of the work or materials.

8. Applicable standards, such as ASTM International (ASTM) or Federal Standards numbers.

9. Identification of deviations (if any) from the Remedial Design.

10. Identification of revisions on resubmittals.

11. A blank space suitably sized for Remediation Contractor and Remediation Engineer stamps.

12. Where calculations are required to be submitted by the Remediation Contractor or subcontractor, the calculations shall have been checked by a qualified individual other than the preparer. The submitted calculations shall clearly show the names of the preparer and of the checker.

D. Each submittal shall be signed by the Remediation Contractor and have affixed to it the following Certification Statement: “Certification Statement: by this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data and I have checked and coordinated each item with other applicable shop drawings and all project requirements”.

E. Submittals shall be accompanied by a cover sheet or letter of transmittal that fully describes the packaged data and includes a listing of all items within the package.

1.05 REVIEW OF SUBMITTALS

A. Submittals will be reviewed by the Remediation Engineer for general conformance with the Remedial Design. All risks of error and omission are assumed by the Remediation Contractor and the Remediation Engineer will have no responsibility therefore. Remediation Engineer corrections/comments to Remediation Contractor submittals shall not be construed as:

1. Permitting any departure from the Remedial Design.
2. Relieving the Remediation Contractor of responsibility for any errors, including details, dimensions, and materials.
3. Approving departure from details furnished by the Remediation Engineer, except as otherwise provided herein.

B. If the Remediation Contractor considers any correction/comment on a shop drawing to constitute a change to the Remedial Design, the Remediation Contractor shall give written notice thereof to the Owner/Remediation Engineer at least seven (7) working days prior to release for manufacture.

C. The Remediation Contractor shall remain responsible for details and accuracy, coordinating the work with all other associated work and trades, selecting fabrication processes, techniques of assembly, and performing work in a safe manner.

D. Project work, materials, fabrication, and installation shall conform to the Remedial Design unless otherwise approved by the Owner/Remediation Engineer.

E. If shop drawings, data, or samples as submitted describe variations and show a departure from the Remedial Design that the Remediation Engineer finds to be in the interest of the Owner and to be so minor as not to involve a change in project cost or schedule, the Remediation Engineer may return the reviewed shop drawings without noting an exception.

F. Following review by the Remediation Engineer, each submittal will be returned to the Remediation Contractor under one of the following codes:

“R” “REVIEWED” is assigned when there are no notations or comments on the submittal. When returned under this code the Remediation Contractor may release the equipment and/or material for manufacture.

“N” “REVIEWED AND NOTED” is assigned when a confirmation of the notations and comments IS NOT required by the Remediation Contractor. The Remediation Contractor may release the equipment or material for manufacture; however, all notations and comments must be incorporated into the final product.

“S” “RESUBMIT" is assigned when notations and comments are extensive enough to require a resubmittal of the package. The resubmittal is to address all comments, omissions, and non-conforming items that were noted. The resubmittal is to be provided to the Remediation Engineer within 15 calendar days of the date of the Remediation Engineer's transmittal requiring the resubmittal.

"J" "REJECTED" is assigned when the submittal does not meet the intent of the Remedial Design. The Remediation Contractor must resubmit the entire package revised to bring the submittal into conformance with the Remedial Design within 15 calendar days of the date of the Remediation Engineer's transmittal requiring the resubmittal. It may be necessary to resubmit using a different manufacturer/vendor to meet the intent of the Remedial Design; however, a change in manufacturer/vendor shall not entitle the Remediation Contractor to a cost increase.

"I" "FOR YOUR INFORMATION" is assigned to acknowledge receipt of a submittal that does not require the Remediation Engineer's review and is being filed for informational purposes only. This code is generally used in acknowledging receipt of field conformance test reports and Health and Safety Plans.

G. Resubmittals shall be handled in the same manner as first submittals. On resubmittals the Remediation Contractor shall identify all revisions made to the submittals, either in writing on the letter of transmittal or on the shop drawings by use of revision triangles or other similar methods. The resubmittal shall clearly respond to each comment made by the Remediation Engineer on the previous submission. Additionally, the Remediation Contractor shall direct specific attention to any revisions made other than the corrections requested by the Remediation Engineer on previous submissions.

H. Partial submittals may not be reviewed by the Remediation Engineer. Incomplete submittals shall be returned to the Remediation Contractor and considered "Rejected" until resubmitted as a complete submittal. The Remediation Engineer may at its option provide a list or mark the submittal directing the Remediation Contractor to the areas that are incomplete.

I. When shop drawings have been completed to the satisfaction of the Remediation Engineer, the Remediation Contractor shall carry out the construction in accordance therewith and shall make no further changes therein except upon written instruction from the Remediation Engineer.

J. Work started, or materials fabricated or installed, prior to review of the applicable submittal items by the Remediation Engineer shall be at the sole risk of the Remediation Contractor. Fabrication performed, materials purchased, or on-site construction accomplished that does not conform to the Remedial Design shall be corrected at the Remediation Contractor's expense. The Owner will not be liable for any expense or delay due to corrections or remedies required to accomplish conformity with the Remedial Design.

K. Certain submittals may be subject to review/approval by the New York State Department of Environmental Conservation (NYSDEC), City of Geneva, and/or other Agencies or interested parties. Modifications required by Agencies or interested parties shall not entitle the Remediation Contractor to a cost increase or schedule delay.

1.06 DISTRIBUTION

A. The Remediation Contractor shall distribute reproductions of reviewed submittals, where required, to the job site file and elsewhere as directed by the Remediation Engineer. Number of copies shall be as directed by the Remediation Engineer but shall not exceed six.

1.07 SCHEDULES

A. The Remediation Contractor shall update the project schedule as needed (minimum of monthly), and resubmit to the Remediation Engineer.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

- END OF SECTION -

SECTION 01720

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

A. The Remediation Contractor shall maintain at the site (in an organized manner) one record copy of:

1. Remedial Design.
    a. Design Drawings
    b. Technical Specifications
    c. Community Air Monitoring Plan (CAMP)
    d. Waste Management Plan (WMP)
    e. Construction Quality Assurance Plan (CQAP)
    f. Community and Environmental Response Plan (CERP)
    g. Citizen Participation Plan (CPP)
    h. Contingency Plan
2. Remediation Contractor’s Site Operation Plan.
3. Remediation Contractor’s Health and Safety Plan.
4. Addenda.
5. Change Orders and other modifications to the Remedial Design.
6. Remediation Engineer's Field Orders or written instructions.
7. Approved shop drawings, working drawings, and samples.
8. Field test records including, but not limited to personal air monitoring data, survey information, etc.
9. Permits.
10. Appropriate training/medical monitoring certifications.
11. Material Safety Data Sheets (MSDSs) for all materials brought on-site.

12. Site and emergency contact information.

13. Emergency route(s) to hospital

14. Updated project schedule.

B. Related Work Specified Elsewhere

1. Section 01160 – Survey Control

2. Section 01300 – Submittals

1.02 MAINTENANCE OF DOCUMENTS AND SAMPLES

A. Store Record Documents and samples in the Remediation Contractor's field office apart from documents used for construction.

B. File Record Documents and samples in accordance with Construction Specifications Institute (CSI) format.

C. Maintain documents in a clean, dry, legible, condition, and in good order. Do not use record documents for construction purposes.

D. Make Record Documents and samples available at all times for inspection by the Remediation Engineer.

E. The Remedial Contractor is to exhibit up-to-date Record Documents for review by the Remediation Engineer and Owner.

1.03 RECORDING CHANGES

A. General:

1. At the start of the Project, label each document "PROJECT RECORD" in neat large printed letters.

2. Record information concurrently with construction progress. Do not conceal any work until required information is recorded.

3. Maintain a complete, accurate log for all control and survey work as it progresses.

4. Maintain an accurate record of all changes, revisions, and modifications (if any) to the Remedial Design. No additions to, deletions from, or alterations to the Remedial Design shall be made without the Design Engineer’s written authorization. If authorized by the Design Engineer, the altering Professional Engineer or Land Surveyor shall affix to the Remedial Design his or her seal and the notation “Altered By” followed by his or her signature, the date of alteration, and a specific description of the alteration.

5. Making of Entries:

    a. Use erasable, colored pencils (not ink or indelible pencil) for marking changes, revisions, additions, and deletions to record documents.

    b. Clearly describe the change by graphic line and make notations as required. Use straight-edge to mark straight lines. Writing shall be legible and sufficiently dark to allow scanning of record documents into legible electronic files.

    c. Date all entries on record documents.

    d. Call attention to changes by drawing a “cloud” around the change(s) indicated.

    e. Mark initial revisions in red. In the event of overlapping changes, use different colors for subsequent changes.

B. Contract Drawings and Approved Shop/Working Drawings

1. Record changes on plans, sections, schematics, and details as required for clarity, making reference dimensions and elevations (to Project datum) for complete record documentation.

2. Record actual construction, including:

    a. Elevations of various structure elements in relation to grade.

    b. Horizontal and vertical locations of structures and Underground Facilities referenced to permanent surface features. For each Underground Facility, including pipe fittings, provide dimensions to at least two permanent, visible surface features.

    c. Location of exposed utilities and appurtenances concealed in construction, referenced to visible and accessible features of structure.

    d. Field changes of dimensions, arrangements, and details.

    e. Changes made in accordance with Work Change Directives and Field Orders.

    f. Changes in details on the Design Drawings. Submit additional Contractor-prepared details when required to document changes.

3. Horizontal and vertical locations of underground utilities (if encountered) and appurtenances, referenced to permanent surface features.

C. Specifications and Addenda

1. Mark each Section to record:

a. Manufacturer, trade name, catalog number, and Supplier of each product and item of equipment actually provided.

b. Changes made by Addendum Work Change Directives and Field Orders

1.04 AS-BUILT SURVEY DRAWINGS

A. Within 21 days following the completion of the project, and prior to final payment, the Remediation Contractor shall provide one complete, accurate, and legible set of as-built survey drawings prepared by a licensed New York State surveyor to the Remediation Engineer depicting and documenting the following:

1. Existing (pre-construction) conditions, including surface topography and grade breaks (minimum 1-foot contours), limits of paved/unpaved areas, site features (e.g., buildings, fencing, roads, curbs, sidewalks, etc.), and subsurface features (e.g., utilities, foundations, etc.) encountered during the work.

2. Excavation limits, documenting that the required horizontal and vertical limits were achieved in each excavation area.

3. Final (post-construction) conditions, including surface topography and grade breaks (minimum 1-foot contours), limits of paved/unpaved areas, site features (e.g., buildings, fencing, roads, curbs, sidewalks, etc.), subsurface features (e.g., utilities, manholes, etc.) installed/realigned during the work, and subsurface structures encountered during the remedial construction and abandoned in-place.

B. As-built survey drawings will be reviewed by the Remediation Engineer for accuracy and completeness.

1.05 SUBMITTALS

A. Once reviewed and approved by the Remediation Engineer, the Remediation Contractor shall submit finalized as-built survey drawings stamped and signed by a New York State licensed Land Surveyor in the following format:

1. Six (6) complete sets of finalized, stamped/signed as-built survey drawings on 24- by 36-inch sheets.

2. Electronic copies (in Adobe® PDF format) of finalized, stamped/signed as-built survey drawings.

3. AutoCAD files (Release 2000 or newer) of finalized as-built survey drawings.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

- END OF SECTION -

SECTION 01901

TEMPORARY FACILITIES AND OFFICE SUPPORT

PART 1 - GENERAL

1.01 DESCRIPTION

A. The Remediation Contractor shall provide temporary facilities, utilities, and office-related equipment for the Owner/Remediation Engineer and the New York State Department of Environmental Conservation (NYSDEC) for the duration of the project.

B. Offices shall be ready for occupancy within 10 days of mobilization and shall be provided and maintained until final acceptance of the work conducted under this project.

C. Obtain required permits and pay all fees for field offices (as necessary).

1.02 APPLICABLE CODES, STANDARDS, AND SPECIFICATIONS

A. American National Standards Institute (ANSI)/International Safety Equipment Association (ISEA). The following ANSI/ISEA specification is referenced in this section and is to be considered part of this section:

Z308.1	American National Standard – Minimum Requirements for Workplace First Aid Kits and Supplies

B. Code of Federal Regulations (CFR):

1. Title 29, Labor:
    a. Part 1910, Occupational Safety and Health Standards.
    b. Part 1926, Safety and Health Regulations for Construction.

1.03 SUBMITTALS

A. Provide, as a single submittal, the following information:

1. Site plan indicating proposed location of the field office trailer, parking for the field offices, and facilities related to the field offices.

2. Information on proposed field office trailer size, construction, exterior appearance, interior finishes, and security measures.

3. Proposed layout of field office interior, showing location of offices, common areas, closets, with dimensions indicated for each.

4. Listing of utility providers.

5. Product data and technical information for combination printer/scanner/copier/facsimile machines and telephones.

PART 2 - PRODUCTS

2.01 FIELD OFFICE

A. The field office trailer shall consist of a Mobile Office manufactured by ModSpace (or equivalent) and provide a minimum of 400 square feet of floor space (with 10-foot minimum width) and shall be partitioned to provide three separate office spaces (one of which will serve as a shared common area). A minimum of two outside doors will be required. A sign reading “All Site Visitors Must Sign-In Here” shall be affixed to the trailer exterior.

1. The trailer shall be completely weather-tight and insulated.

2. Windows shall each have insect screen and operable sash. Provide each window with lock and exterior security bars approved by the Remediation Engineer.

3. The trailer shall have two doors for ingress and egress, each with landing, stairs, and railing conforming to building codes in effect at the Site.

    a. Landing and stairs shall be metal, pressure-treated wood, fiberglass, or concrete, and have slip-resistant walking surfaces.

    b. Railing shall be metal, wood, or fiberglass.

    c. Doors shall be secure and lockable, and each furnished with suitable, lockable security bar by MasterLock or equal.

4. Furnish to Remediation Engineer and NYSDEC two identical sets of keys suitable for operating all keyed locks, including ingress/egress door locks, security bars for doors, window locks, closets, and office furnishings.

B. The Remediation Contractor shall provide and maintain, in accordance with all applicable codes and regulations, the fire protection system (e.g., fire extinguishers, etc.) and electric, heating, and cooling services for the office trailers.

2.02 TEMPORARY SERVICES

A. Electrical System and Lighting:

1. Provide electric service as required to the field office trailer and pay all utility costs.

2. Provide minimum of eight 120-volt, wall-mounted, duplex convenience electrical receptacles for the field office trailer.

3. Interior lighting shall be 50 foot-candles at desktop height.

4. Provide 250-watt exterior, wall-mounted lighting at the entrance to the field office trailer.

5. Provide temporary construction lighting as needed for the protection of workers and the public.

B. Heating, Ventilating, and Air Conditioning:

1. Automatic heating shall maintain indoor temperature of at least 65°F in cold weather.

2. Automatic cooling shall maintain indoor temperature no warmer than 75°F in warm weather.

3. Furnish all fuel and pay all utility costs.

C. Sanitary Facilities:

1. Provide and maintain a minimum of one portable sanitary toilet and one portable hand wash station in accordance with all applicable Laws and Regulations, including 29 CFR Parts 1910 and 1926.

D. Telephone Service:

1. Provide private telephone service, including payment of installation, monthly, and unlimited local and long distance service costs, until removal of the office trailer.

    a. Provide three telephone lines for the Owner/Remediation Engineer, Remediation Contractor, NYSDEC. Each line shall have separate telephone number assigned by the telephone company.

E. Internet Access:

1. Obtain and pay for internet service until removal of the field office, with unlimited (untimed) internet access.

2. Provide minimum 10 Mbps fiber-optic or cable connection with appropriate modem and appurtenances for the office space.

3. Provide Wireless-G router capable of supporting a minimum of four users simultaneously for field the office trailer.

4. Set up system and appurtenances required and verify functionality in the office space.

F. Should actions of utility companies delay the complete set up of field office trailers, the Remediation Contractor shall provide temporary electricity, heat, water supply, sanitary facilities, and telephone service as required at no additional cost to the Owner.

2.03 FURNISHINGS AND EQUIPMENT

A. The office trailer shall have the following items:

1. Four flat-top movable desks (measuring a minimum of 44 inches long by 30 inches wide) with lockable filing and storage drawers.

2. Four new or used (in good condition) office chairs five-point, high backed, cushioned swivel chairs.

3. 10 folding or stacking chairs.

4. One drafting table (measuring a minimum of 48 inches long by 89 inches wide) with double storage cabinets underneath.

5. Plan rack(s) to hold a minimum of eight sets of drawings.

6. Two four-drawer legal size, fire-proof, filing cabinets with locks.

7. Three portable folding tables (measuring 60 inches long by 30 inches wide).

8. Suitable doormat at each exterior ingress/egress door.

9. Fire extinguisher with associated signage, and smoke detector, in accordance with all applicable Laws and Regulations. At minimum, provide one wall-mounted, 10-pound, Class ABC fire extinguisher and one battery-operated ceiling-mounted smoke detector.

10. Three polyethylene waste baskets, each with minimum capacity of 7 gallons.

11. One refrigerator (minimum 5 cubic-foot capacity).

12. One electric coffee maker with ten-cup capacity or larger.

13. Bottled water with electric cooler dispenser for 5-gallon bottles, with cup dispenser.

14. Three telephones (Panasonic KX-TG4024N DECT 6.0 Plus Cordless Telephone with Digital Answering Machine or approved equivalent).

15. Three combination printer/scanner/copier/facsimile machines (Brother MFC-j430w or similar).

16. One first aid kit meeting the minimum requirements of ANSI/ISEA Z308.1.

C. Provide two-way portable radios and charging units for the Owner/ Remediation Engineer and key Remediation Contractor personnel (e.g., superintendent, foreman, etc.).

D. Provide one portable emergency eye wash station.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install field office and related facilities in accordance with all applicable Laws and Regulations.

B. Install materials and equipment in accordance with manufacturer's instructions.

3.02 CLEANING, MAINTENANCE, AND SUPPLIES

A. Provide the following maintenance services:

1. Immediately repair malfunctioning, damaged, leaking, or defective field office trailer, site improvements, systems, and equipment.

2. Promptly provide snow removal for field offices, including parking areas, walkways, and stairs and landings.

3. Provide continuous maintenance and janitorial service of field offices and sanitary facilities. Clean field offices at least once per week.

4. Provide pumping and disposal of sanitary wastes at appropriate, regular intervals.

5. Properly dispose of trash as needed, at least twice per week. Dispose of other waste, if any, as required, to avoid creation of nuisances.

B. Provide the following consumables as needed:

1. Light bulbs for interior and exterior lights.

2. Toner or ink cartridges for printer/scanner/copier/facsimile machines, as required.

3. Paper supplies for printer/scanner/copier/facsimile machines.

4. Bottled water suitable for water dispensers and disposable cups.

5. Coffee supplies, including disposable cups, filters, coffee, sugar, creamer, and stir-sticks.

6. Soap, paper towels, cleansers, sanitary supplies, and janitorial implements, including broom.

7. Batteries for smoke detector and other battery-powered items furnished by the Remediation Contractor.

8. Replace fire extinguishers upon expiration.

9. Replenish contents of first-aid kits as required.

3.03 REMOVAL

A. Discontinue temporary utilities and remove the field office trailer, furnishings, and sanitary facilities when directed by the Owner/Remediation Engineer.

3.04 VEHICLE ACCESS AND PARKING

A. Vehicle Access

1. Routes of ingress and egress are subject to review and approval by the Owner/Remediation Engineer.

2. The Remediation Contractor is responsible for maintaining public roads clear of dirt and debris that result from the work activities and providing means of removing mud from vehicle wheels before entering paved roads.

3. The Remediation Contractor's means and methods for maintaining paved areas and roadways during construction are subject to review and approval by the Owner/Remediation Engineer.

B. Vehicle Parking

1. Personally-owned vehicles will not be allowed on-site except in designated employee parking areas.

2. Construction personnel shall park vehicles and construction equipment in areas where they will not impede the public. Vehicle parking shall be in full compliance with all local and state traffic laws.

3. The Remediation Contractor shall maintain designated parking areas clear of dirt and debris resulting from the work.

- END OF SECTION -

SECTION 01902

PROJECT SIGN

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Specified

1. The furnishing, installation, and maintenance of one project sign.
    a. Project identification signs.
    b. Project contact signs.
    c. Danger signs.
    d. Security signs.

2. The project sign shall be constructed per New York State Department of Environmental Conservation (NYSDEC) Signs for Remedial Programs Specifications (attached) as specified herein.

3. The project sign shall be posted in a prominent location at the site following the notice to proceed and shall be maintained throughout the course of the Project.

4. Temporary signs shall be installed within 14 calendar days of the Remediation Engineer’s approval of the submittal required by this Section.

5. Maintain temporary signs until Substantial Completion, or as otherwise directed by the Owner/Remediation Engineer.

1.02 SUBMITTALS

A. Shop drawings identifying the dimensions, materials of construction, text, fonts, colors, and graphics/logos (if any) for temporary signs, and the proposed locations and orientations of temporary signs at the Site.

PART 2 - PRODUCTS

2.01 MATERIAL AND CONSTRUCTION

A. Project Identification Signs:

1. Project identification signs, including dimensions, materials of construction, fonts, logos, and colors, shall be as specified in the New York State Department of Environmental Conservation (NYSDEC) guidance document included with this Section.

2. Location: Mounted on temporary site security fencing at the site entrance.

3. Text Inserts for Project Identification Signs: Text inserts shall be centered horizontally on sign board in the specified locations and shall read as included in the attached example sign.

4. Text Height: 1.5 inches minimum.

5. Printing: Digital or screen printing with ultraviolet-resistant inks.

6. Supports and Bracing: Provide supports and bracing as required to adequately support and brace signs for the duration of the Project.

7. Obtain Owner and Remediation Engineer approval before releasing for manufacture.

B. Project Contact Signs:

1. Location: Mounted on site security fencing the site entrance next to Project identification signs.

2. Sign Text: Text shall be centered vertically and horizontally on sign board, and shall read as follows:

    a. Line 1: "<u>PROJECT CONTACTS</u>".

    b. Line 2: "NYSDEC FIELD OFFICE TRAILER: [TELEPHONE NUMBER]". Include actual telephone number assigned to NYSDEC field office trailer where indicated on this line.

    c. Line 3: "NYSDEC OFFICES (ALBANY, NEW YORK): 518.402.9662".

    d. Line 4: "NYSDOH: MR. ANTHONY PERRETTA, PROJECT MANAGER – 518.402.7880".

    e. Line 5: "NYSEG: MR. JOHN RUSPANTINI, PROJECT MANAGER – 607.762.8787".

3. Background Color: White.

4. Text Color: Black.

5. Text Height: 1.5 inches minimum.

6. Printing: Digital or screen printing with ultraviolet-resistant inks.

7. Sign Board: Exterior-grade plywood with white vinyl surfaces, thickness of 0.75 inch.

8. Minimum Sign Board Dimensions: 4 feet wide by 3 feet high.

9. Supports and Bracing: Provide supports and bracing as required to adequately support and brace signs for the duration of the Project.

10. Obtain Owner and Remediation Engineer approval before releasing for manufacture.

C. Danger Signs:

1. Location: Mounted on temporary Site security fencing at intervals of 100 linear feet and on either side of temporary Site security gate (two signs per gate).
2. Sign Text: “DANGER” in upper panel and “CONSTRUCTION AREA AUTHORIZED PERSONNEL ONLY” in lower panel.
3. Background Color: Red upper panel, black outline along border, and white lower panel.
4. Text Color: White in upper panel and black in lower panel.
5. Printing: Digital or screen printing with ultraviolet-resistant inks.
6. Sign Board: Treated polyethylene, thickness of 0.055 inch.
7. Minimum Sign Board Dimensions: 14 inches wide by 10 inches high.
8. Supports and Bracing: Provide supports and bracing as required to adequately support and brace signs for the duration of the Project.

D. Security Signs:

1. Location: Mounted on temporary Site security fencing on each side of temporary Site security gate (two signs per gate) and at the entrances of the field office trailer (one sign per entrance).
2. Sign Text: “SECURITY NOTICE” in upper panel and “ALL VISITORS MUST SIGN-IN AT THE FIELD OFFICE” in lower panel.
3. Background Color: Yellow upper panel, black outline along border, and white lower panel.
4. Text Color: Black for upper and lower panels.
5. Printing: Digital or screen printing with ultraviolet-resistant inks.
6. Sign Board: Treated polyethylene, thickness of 0.055 inch.
7. Minimum Sign Board Dimensions: 20 inches wide by 14 inches high.
8. Supports and Bracing: Provide supports and bracing as required to adequately support and brace signs for the duration of the Project.

PART 3 - EXECUTION

3.01 INSTALLATION AND MAINTENANCE

A. Obtain Owner and Remediation Engineer approval of installation locations before installing temporary signs.

B. Install temporary signs in accordance with this Section and the manufacturer's instructions.

C. Temporary signs shall be adequately supported and braced, and properly positioned and aligned.

D. Maintain temporary signage so that signs are clean, legible, and upright. Cut grass, weeds, and other plants so that temporary signs are not covered or obscured.

E. Repair or replace damaged temporary signs. Relocate signs as required by progress of the Project.

3.02 REMOVAL

A. Remove temporary signs upon Substantial Completion, or as otherwise directed by the Remediation Engineer.

3.03 ATTACHMENTS

A. The document listed below, which follows after the "End of Section" designation, is part of this Section:

1. Example Project Identification Sign

2. Signs for Remedial Programs (two pages).

- END OF SECTION -

SIGNS FOR REMEDIAL PROGRAMS

Instructions

Signs are required at sites where remedial activities are being performed under one of the following remedial programs: State Superfund, Voluntary Cleanup Program (VCP), Brownfield Cleanup Program (BCP), Environmental Restoration Program (ERP), Brownfield Opportunity Area (BOA) Program (note: activities under this program would be for investigation). The cost of the sign will be borne by the parties performing the remedial activities based on the legal document the activities are being performed under (i.e. volunteers/participants would pay 100% of the cost under the BCP; municipalities would be reimbursed for 90% of the cost under the ERP).

Sign Requirements

Size: Horizontal format - 96" wide by 48" high

Construction Materials: Aluminum or wood blank sign boards with vinyl sheeting.

Inserts: "Site Name", "Site Number", "Name of Party Performing Remedial Activities" and "Municipal Executive".
Indicate position, size and topography for specific inserts.

Color Scheme: Copy surrounding DEC logo - "NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION" - PMS 355

DEC logo: PMS 301 Blue
PMS 355 Green

Text:

Program (choose one): PMS 301
Brownfield Cleanup Program
Voluntary Cleanup Program
Brownfield Opportunity Areas Program
Petroleum Remediation Program
State Superfund Program
1996 Clean Water/Clean Air Bond Act - Environmental Restoration Program

Site Name, Site Number, Party Performing Remedial Activities	PMS 355
Names of Governor, Commissioner, Municipal Executive	PMS 301
Transform the Past.......Build for the Future	PMS 355

Type Specifications: All type is Caslon 540, with the exception of the logotype.
Format is: center each line of copy with small caps and initial caps.

Production Notes: 96" wide x 48" high aluminum blanks will be covered with vinyl sheeting to achieve background color. Copy and logo will be silk screened on this surface.

See attached format

NYSDEC ORDER ON CONSENT Nº D0-0002-9309

Wadsworth Street Former MGP Site
Site Nº 8-35-015
NYSEG

Governor: Andrew M. Cuomo
Commissioner: Joe Martens
Mayor: Ron Alcock

Transform the Past…. Build for the Future

SECTION 02201

EARTHWORK

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Specified

1. Excavating, including the loosening and removal of all materials classified as “earth”, to the horizontal and vertical limits specified on the Design Drawings or as directed by the Remediation Engineer.

2. Backfilling, compacting, and grading excavated areas with authorized materials to the lines and grades specified on the Design Drawings.

3. Furnishing all materials, equipment, and labor necessary to complete the earthwork activities required by the Remedial Design.

B. Related Work Specified Elsewhere

1. Section 01110 – Environmental Protection Procedures

2. Section 01160 – Survey Control

3. Section 02202 – Rock and Debris Removal

4. Section 02205 – Excavation Support and Protection

5. Section 02206 – Selected Fill

6. Section 02415 – Impacted Material Handling and Excavation Procedures

7. Community Air Monitoring Plan (CAMP)

8. Section 02507 – Odor, Vapor, and Dust Control

9. Waste Management Plan (WMP)

C. Definitions

1. Earthwork – Earthwork is defined to include, but not be limited to: clearing, topsoil removal, asphalt and concrete pavement removal, gravel removal, road base removal, classified and unclassified excavation for structures, excavating and handling debris, handling and disposal of surplus materials, maintenance of excavations, removal of water, temporary excavation support, backfilling operations, rough grading, compaction, and protection of existing structures and facilities.

2. Debris – Man-placed buried material, including but not limited to brick, concrete, metal, wood, ash/cinders, glass and other construction-related solid materials.

3. Earth – All materials, such as sand, gravel, sediment, clay, loam, ashes, cinders, pavements, muck, roots, pieces of timber, soft or disintegrated rock, not requiring blasting, barring, or wedging from their original beds, and specifically excluding all ledge or bedrock and individual boulders, masonry, or debris larger than ½ cubic yard in volume.

4. Backfill – The refilling of excavated areas to the elevations indicated on the Design Drawings or as directed using specified materials for refilling of excavated areas; and the compacting of all materials used in filling or refilling by rolling, ramming, or as may be required and approved by the Owner.

5. Underground Facilities – All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

1.02 APPLICABLE CODES, STANDARDS, AND SPECIFICATIONS

A. ASTM International (ASTM). The following ASTM specification is referenced in this section and is to be considered part of this section:

D698 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft^3 (600 kN-m/m^3))

D6938 Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

B. Code of Federal Regulations (CFR) Title 29, Labor:

Part 1926, Safety and Health Regulations for Construction

1.03 SUBMITTALS

A. Results of moisture/density test performed on each proposed fill material (determined by ASTM D698).

B. Results of in-place density tests performed on fill materials (determined by ASTM D6938).

1. Names and proof of certification for the Remediation's Contractor's on-site competent person of Professional Engineer that will inspect excavations in accordance with 29 CFR 1926.

2. Copies of excavation inspection reports shall be provided to the Remediation Engineer.

1.04 SITE CONDITIONS

A. Existing Conditions:

1. The locations, alignments, and construction of existing structures and Underground Facilities shown or described on the Design Drawings are approximate, are based on information readily available to the Owner/Design Engineer, and are not guaranteed to be correct, accurate, or complete. The Remediation Contractor is responsible for verifying the accuracy and completeness of the information shown or described on the Design Drawings.

2. Information and data related to subsurface conditions are not intended as a representation or warranty of continuity of conditions between soil borings or test pits, nor of groundwater levels at dates and times other than the date and time when measured, nor that purpose of obtaining the information and data were appropriate for use by the Remediation Contractor. The Owner and Remediation Engineer will not be responsible for interpretations or conclusions drawn therefrom by the Contractor.

3. The Remediation Contractor agrees that it shall neither have nor assert against the Owner or Design Engineer any claim for damages by reason of the inaccuracy, inadequacy, incompleteness, or other deficiency of the information given, or the failure to furnish additional or further information in the possession of the Owner or Design Engineer.

PART 2 – PRODUCTS

2.01 EXCAVATION SUPPORT

A. Requirements for excavation support are provided in Section 02205.

2.02 ODOR, VAPOR, AND DUST CONTROL

A. Requirements for odor, vapor, and dust control measures are provided in Section 02507.

2.03 BACKFILL MATERIAL

A. Acceptable backfill materials are identified in Section 02206.

PART 3 - EXECUTION

3.01 PREPARATION

A. Install and maintain temporary erosion, sediment, and storm water controls in accordance with Section 01110.

B. Establish and maintain survey control throughout excavation, backfilling, and grading as specified in Section 01160.

3.02 MAINTENANCE AND PROTECTION OF STRUCTURES AND UTILITIES

A. The Remediation Contractor shall field-verify the presence and location of all overhead/underground site features and utilities (in service and out of service) relevant to and potentially to be encountered during the work.

B. Before initiating any intrusive work at the site, the Remediation Contractor is responsible for contacting/coordinating with Dig Safely New York to field-locate and identify underground utilities located near or within the Project Work Limits.

C. Except where noted or as otherwise indicated in the Remedial Design, the Remediation Contractor is responsible for the maintenance and protection of all overhead/underground site features and utilities that may be affected by the work. All utilities, unless stated otherwise, shall remain in operation for the duration of the work. Damage to any utilities (or caused as a result of the Remediation Contractor's failure to verify and/or protect utilities) shall be repaired to pre-construction condition and to the satisfaction of the affected party at no additional cost to the Owner.

D. Except where noted or as otherwise indicated in the Remedial Design, the Remediation Contractor is responsible for contacting/coordinating with the appropriate utility companies for the temporary bracing, removal, relocation, and/or replacement of any utilities, utility poles, or guy wires.

E. If encountered during excavation activities, piping associated with former manufactured gas plant (MGP) structures (i.e., not including piping associated with existing/former infrastructure) shall be either 1) cleaned of non-aqueous phase liquid (if present), excavated/removed (if feasible), and handled/managed in accordance with Section 02415 and the WMP, or 2) cleaned, capped, and abandoned in place. The Remediation Contractor shall promptly notify the Owner/Remediation Engineer if any such piping is observed during excavation activities. Any determination regarding the former/current use of the piping will be made by the Owner/Remediation Engineer in consultation with the New York State Department of Environmental Conservation (NYSDEC).

3.03 EXCAVATION

A. General

1. Excavation activities shall be performed using suitable excavation equipment (sized appropriately based on site conditions and constraints) and methods determined by the Remediation Contractor.

2. The Remediation Contractor shall furnish and install excavation support where necessary in accordance with the Design Drawings and Section 02205.

3. Provide, monitor, and maintain excavation protection system(s) in accordance with all applicable Laws and Regulations to prevent injury to persons and damage to property, including existing structures and Underground Facilities.

4. The Remediation Contractor is responsible for providing safe and adequate vehicle/equipment access to and egress from the excavations. The Remediation Contractor shall adhere to the access restrictions specified in the Remedial Design relating to excavation support structures. The Remediation Contractor

shall not drive, load, or store any equipment or materials within such restricted areas.

5. The Remediation Contractor shall excavate soils and debris (e.g., concrete, brick, piping, etc.) to the horizontal and vertical limits specified on the Design Drawings or as directed by the Remediation Engineer.

6. The final horizontal and vertical limits of excavation shall be surveyed and documented in accordance with Section 01160.

7. All open excavations shall be adequately safeguarded by providing temporary barricades, caution signs, lights, and other means to prevent unwanted/ unknowing access, accidents to persons, and damage to property. Such measures shall be installed and maintained in accordance with all applicable Laws and Regulations. The length or size of excavations will be controlled by the particular surrounding conditions.

B. Excavation Dewatering

1. The Remediation Contractor shall, at all times, provide and maintain proper and satisfactory means and devices for the removal of all water currently present within and/or entering the excavation areas. The Remediation Contractor shall keep each excavation dry during excavation and continually thereafter until backfilling operations are completed and acceptable to the Remediation Engineer.

2. Water pumped or drained from excavation areas shall be handled/managed in accordance with Section 02415 and the WMP and without injury to adjacent property, the work under construction, or to pavement, roads, drives, and water courses.

3. Remove water from excavations as fast as water accumulates.

C. Handling/Management of Excavated Materials

1. Excavated materials shall be handled/managed in accordance with Section 02415.

2. Crushing/downsizing requirements for excavated rock and debris are provided in Sections 02202 and 02206.

D. Subgrades

1. Subgrades shall be firm, dense, and thoroughly compacted and consolidated; shall be free from mud, muck, and other soft or unsuitable materials; and shall remain firm and intact under all construction operations. Subgrades that are otherwise solid but become soft or mucky on top due to construction operations shall be reinforced with crushed stone. The maximum lift thickness will be determined by Remediation Engineer based on site conditions encountered at the time of construction.

2. If, in the Remediation Engineer’s opinion, the subgrade becomes softened or mucky because of construction delays, failure to dewater properly, or other cause

within the Remediation Contractor's control, the subgrade shall be excavated to firm material or bedrock, trimmed, and backfilled with either general fill or crushed stone, as determined by Remediation Engineer, at the Remediation Contractor's expense.

E. Odor, Vapor, and Dust Control

1. Community air monitoring for volatile organic compounds (VOCs) and particulate matter less than 10 microns in diameter (PM_{10}) will be performed by the Remediation Engineer on a continuous basis during the remedial construction activities. The Remediation Contractor shall ensure that community air monitoring is being performed prior to initiating intrusive and/or potential dust-generating activities each day.

2. Real-time work zone air monitoring shall be performed by the Remediation Contractor on a continuous basis during all intrusive and/or potential dust-generating activities.

3. Odors shall be controlled to the satisfaction of the Owner/Remediation Engineer and NYSDEC. Vapors and dust shall be controlled as necessary to meet the 1) community air monitoring action levels set forth in the CAMP and 2) work zone air monitoring action levels set forth in the Remediation Contractor's HASP.

4. Additional requirements for odor, vapor, and dust control are provided in Section 02507.

3.04 BACKFILLING

A. General

1. All excavation areas shall be backfilled to the original surface of the ground or to such other grades as specified on the Design Drawings or as directed by the Owner/Remediation Engineer.

2. Backfilling shall be done with satisfactory soils or specified materials, as appropriate.

3. The Remediation Contractor shall anticipate and schedule site work to accommodate laboratory/field testing of backfill materials and review of test results.

4. Any settlement occurring in backfilled areas shall be refilled and compacted at the Remediation Contractor's expense.

5. The Remediation Contractor is responsible for any damage or injury done to utilities, structures, any existing or new site features, property, or persons due to improper placement and/or compaction backfill materials. Any such damage shall be repaired and/or replaced by the Remediation Contractor to the satisfaction of the affected party and at no additional cost to the Owner.

B. Equipment

1. Backfilling and compaction equipment shall be sized appropriately based on site conditions and constraints.

2. Compaction of backfill material in confined areas shall be accomplished by means of a drum-type, power-driven, hand-guided vibratory compactor, or by hand-guided vibratory plate tamper. The Remediation Contractor may propose alternate compaction methods. Alternate compaction methods shall be reviewed and approved by the Owner and/or Remediation Engineer.

3. If the proposed method does not produce the required degree of compaction, an alternate method shall be adopted until the required compaction is achieved.

C. Minimum Compaction Requirements

1. Unless otherwise specified in the Remedial Design, the degree of material compaction specified for the items listed in Table 1 below shall be the minimum allowable.

2. Prior to backfilling, the Remediation Contractor shall establish a test pad area adjacent to the excavation area. A maximum lift of 12 inches loose backfill shall be placed and compacted on the test pad in accordance with Table 1 with the same equipment to be used within the excavation area. The total number of compaction passes and moisture content of the material shall be recorded, along with the in-place density of the compacted material. A minimum number of compaction passes shall be established to achieve the desired compaction standard.

3. Unless the Remediation Contractor can successfully demonstrate that its methods will produce the required degree of compaction throughout the entirety of each lift, backfill material shall be placed in horizontal lifts not exceeding those specified in Table 1.

4. Following confirmation that the moisture content of the backfill material is within ±2% of the moisture content from the test pad work, the Remediation Contractor shall make the minimum number of passes on the entire lift as developed from the test pad work described above. This procedure shall be followed until the compacted backfill material reaches a depth of approximately 6 feet below final grade.

5. Within the upper 6 feet of the excavation, in-place density tests shall be performed by the Contractor on each lift of material placed or at other frequencies deemed necessary by the Remediation Engineer to reliably and consistently determine the compaction level being achieved. In-place density tests shall be performed in accordance with ASTM D6938 by a certified geotechnical testing laboratory and at the Remediation Contractor’s expense.

6. Sufficient water shall be added to backfill material during placement and compaction to achieve the minimum compaction requirements specified in Table 1. If, due to rain or other causes, the material becomes too wet and cannot be compacted as specified, the Remediation Contractor shall mechanically adjust (reduce) the moisture content of the material as necessary to achieve the required degree of compaction.

7. The Remediation Engineer shall verify that Remediation Contractor achieves the material compaction requirements listed in Table 1.

Table 1 – Minimum Compaction Requirements

Fill Material	Maximum Uncompacted Lift Thickness (inches)	Minimum Compaction Required (% of Maximum Dry Density)
1. Sub-grade (Existing Soil)	Not Applicable	Proof-Rolling
2. Soil Fill	12	95
3. Crushed Stone	Not Applicable	Not Applicable
4. Subbase Course	12	95

3.05 GRADING

A. Uniformly grade areas within the excavation limits including adjacent transition areas or areas disturbed to support the remedial activities.

B. Backfill material shall be graded by the Remediation Contractor to meet the lines, grades, and elevations specified on the Contract Drawings, taking into account any subsequent site restoration requirements (e.g. installation of new pavement).

C. The final horizontal and vertical limits of backfill material shall be surveyed and documented in accordance with Section 01160.

- END OF SECTION -

SECTION 02202

ROCK AND DEBRIS REMOVAL

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Specified

1. The Remediation Contractor shall provide labor, materials, and equipment required to:

    a. Remove of rock and debris removal to facilitate excavation to the vertical and horizontal limits shown on the Design Drawings or as directed by the Remediation Engineer.

    b. Crush/downsize removed rock and debris to facilitate off-site disposal or re-use as on-site backfill.

    c. Backfill (with acceptable materials) of areas from which rock and/or debris have been removed.

B. Related Work Specified Elsewhere

1. Section 02201 – Earthwork

2. Section 02205 – Excavation Support and Protection

3. Section 02206 – Fill Materials

4. Section 02415 – Impacted Material Handling and Excavation Procedures

5. Waste Management Plan (WMP)

C. Definitions

1. Rock – All pieces of ledge or bedrock, boulders, or masonry larger than ½-cubic yard in volume.

2. Debris – Man-placed buried material, including brick, concrete, metal, wood, ash/cinders, glass, and other construction related solid materials.

PART 2 - PRODUCTS (NOT USED)

2.01 BACKFILL MATERIAL

A. Acceptable backfill materials are identified in Section 02206.

PART 3 - EXECUTION

3.01 PREPARATION

A. Mobilize crushing/downsizing equipment to the site before initiating excavation activities. Such equipment shall remain on-site until Substantial Completion, or as otherwise directed by the Owner/Remediation Engineer.

3.02 EXCAVATION/REMOVAL

A. General

1. Rock and debris, as specified, shall be excavated and handled/managed in accordance with Section 02415 and the WMP.

2. All existing pipes or structures to remain that are exposed during excavation activities shall be adequately protected from damage before proceeding with rock and debris removal.

3. The Remediation Contractor shall account for the presence of rock and debris removal within the excavation area.

4. The Owner/Remediation Engineer reserve the right to require the Remediation Contractor to:

   a. Alter its rock and debris removal techniques, as necessary.

   b. Discontinue the removal of rock and debris removal at any time.

5. The Owner/Remediation Engineer reserve the right to require the Remediation Contractor to discontinue rock and debris removal activities at any time.

B. Repair of Damages Due to Removal

1. Any injury or damage to the work or to existing utilities shall be repaired or rebuilt at the Remediation Contractor’s expense. If damage occurs to any portion of a utility or structure, or to the material surrounding or supporting the same, the Remediation Contractor shall immediately notify the Owner and Remediation Engineer and proceed with appropriate and safe response actions to (as necessary): 1) collect, containerize, characterize, and appropriately dispose of any materials released from the damaged utility or structure; 2) provide provisions for alternate/temporary service; and 3) furnish necessary materials and repair or replace the damaged utility/structure. In the case of utilities, the Remediation Contractor shall immediately notify the appropriate utility company and provide assistance to the utility company during repairs unless authorized by the utility company to undertake such repairs directly. Any damage to existing structures shall be promptly and completely repaired by the Remediation Contractor to the satisfaction of the Owner, utility company, and/or affected party.

C. Explosives

1. Under no circumstances shall explosives be used at the site.

3.03 MATERIAL CRUSHING

A. Excavated rock and debris subject to off-site disposal shall be crushed/downsized as required by the Owner’s waste transportation and disposition vendors.

B. The Remediation Contractor shall account for the crushing/downsizing of excavated rock and debris (including the former holder foundations) in its work schedule.

C. The Remediation Contractor shall provide sufficient equipment and personnel to control dust and noise during the crushing/downsizing of excavated rock and debris.

3.04 BACKFILL

A. Excavated rock and debris shall be replaced with the quantity of acceptable material required for backfilling. Backfill material shall be placed and compacted in accordance with Section 02201.

- END OF SECTION -

SECTION 02205

EXCAVATION SUPPORT AND PROTECTION

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Specified

1. Design, furnish, install, monitor, and maintain excavation support and protection system in accordance with this section and with the lines, grades and dimensions shown on the Design Drawings.

   a. Excavation support and protection system shall consist of a slide rail system designed to support excavation sidewalls, and resist soil and hydrostatic pressures and superimposed and construction loads. Components of the slide rail system consist of, but not limited to steel panels, posts and bracing, that when assembled form a temporary steel sheeting system.

   b. Installation of slide rail system without damaging existing structures, pavement, embankments, subsurface utilities and other improvements adjacent to the excavation.

   c. Protection of existing gas line in accordance with NYSEG protocols and requirements during installation and removal of slide rail system.

   d. Installation of slide rail system to conform to the slide rail bay configuration and construction sequence as shown on the Design Drawings for the removal area. Alternative bay configurations will be considered and should be identified in the bid proposal.

2. All labor, materials, equipment, surveys and services necessary for or incidental to the following:

   a. Furnishing, installing and removing all components of the slide rail system.

   b. Removing and decontaminating/cleaning slide rail system.

3. In addition to identifying the technical requirements related to this component of the project, this specification also establishes the Owner's expectations regarding installation of the slide rail system, including the level of effort to be put forth by the Remediation Contractor concerning the installation activities. Specifically, in the event that field conditions limit the effectiveness of standard installation equipment and practices and/or preclude the advancement of the slide rail system to the bay configurations shown on the Design Drawings, the Remediation Contractor will be required to implement one or more of the contingency measures identified in this section or an Owner-approved alternate approach identified by the Remediation Contractor.

It is the Remediation Contractor's responsibility to thoroughly review the slide rail bay configuration and the available information concerning subsurface conditions. From this review, the Owner anticipates that the Remediation Contractor will understand the scope of the installation and the nature of the subsurface conditions that may be encountered during installation. The Owner also anticipates that the Remediation Contractor will provide the materials, equipment, and level and experience of labor necessary to install the slide rail components consistent with the Remedial Design.

Based on the design configuration and existing subsurface information, which may include remnants of subsurface MGP structures, additional measures (contingency measures) may be necessary above and beyond the standard methods typically employed to install slide rail system. The Remediation Contractor must recognize and respond to field conditions that could result in difficulties and/or an inability to achieve the bay configurations. In addition, the Remediation Contractor must be fully equipped and prepared to implement contingency measures if difficulties are encountered during installation. This section identifies several contingency measures that the Remediation Contractor shall be prepared to implement. In addition, the Remediation Contractor is encouraged to identify possible alternate means and methods for advancing the slide rail components in difficult installation areas. Such alternate means and methods must be identified and fully described by the Remediation Contractor and approved by the Owner, Design Engineer, and/or Remediation Engineer prior to implementation (it is preferred that the Remediation Contractor identify potential alternate approaches in his/her bid proposal, to be given an adequate level of consideration). The contingency measures identified in this section, as well as any potential Remediation Contractor-proposed and Owner-approved alternate means and methods, represent "best efforts" related to the installation of the slide rail system, and specifically the extent of the Remediation Contractor's obligations with respect to the level of effort, equipment, labor, experienced personnel, and materials necessary for installation.

In the event that after "best efforts" have been implemented, the slide rail components still do not achieve the design depths, the method to be employed to address this condition will be discussed between the Remediation Contractor, Owner, and Remediation Engineer to formulate an approach (if an alternate approach is going to be proposed to the NYSDEC) to address impacted materials to the depths depicted in the Remedial Design.

4. Excavations will not extend below or beyond the limits depicted on the Design Drawings.

B. Related Work Specified Elsewhere

1. Section 01046 – Control of Work
2. Section 01112 – Decontamination Procedures
3. Section 01160 – Survey Control
4. Section 01720 – Project Related Documents
5. Section 02201 - Earthwork
6. Section 02206 – Selected Fill

7. Section 02415 – Impacted Material Handling and Excavation Procedures

1.02 APPLICABLE CODES, STANDARDS, AND SPECIFICATIONS

A. Operators and foreman shall have a minimum of three years experience installing excavation support and protection systems.

B. Codes and Standards

1. American Society for Testing and Materials (ASTM).
2. American Institute of Steel Construction (AISC).

1.03 SUBMITTALS

A. Certification: Provide documentation of agreement with slide rail system manufacturer for provisions of quality control services during installation. Agreement shall document that manufacturer will provide field technician services during the first 3 days of operation of the slide rail system.

B. Installation Plan: Submit an Excavation Support Installation Plan that presents the following:

1. Describes the anticipated approach for installing the slide rail components to the bay configuration shown on the Design Drawings, assuming that no significant installation difficulties are encountered.

2. Includes details of proposed methods to install the slide rail components to the depths and limits indicated on the Design Drawings and to the requirements included in this specification. The plan shall reference specific equipment makes/models and accessories, quality control measures, and level of effort that will be used for slide rail system installation.

3. Identifies certain contingency measures (prior to those identified in Part 3.03 below) that the Remediation Contractor would employ in response to difficult subsurface conditions.

C. Shop Drawings: Shop drawings shall show the details of the proposed slide rail system. Shop drawings shall be signed and stamped by a licensed Professional Engineer in the State of New York and include the following:

1. Slide rail bay layout, including locations of slide rail components, panel dimensions, and sizes of posts and bracing members. Provide information related to assumptions for construction surcharge.

2. Manufacturer’s data that indicates the structural properties of the slide rail components, including moment of inertia, moment capacity, thickness, and width/depth dimensions.

3. Details pertaining to connections of slide rail components (i.e., posts to panel/bracing member).

1.04 COORDINATION

A. Notify the Remediation Engineer at least five days prior to beginning excavation support and protection installation operations at any location. Notification shall not relieve the Remediation Contractor of its responsibilities for performing the work in accordance with the Remedial Design. Prior to notification, the Remediation Contractor shall ensure that all required submittals have been submitted to the Remediation Engineer and returned by the Remediation Engineer as “Reviewed” or “Reviewed and Noted”.

1.05 PROJECT CONDITIONS

A. Employ a qualified land surveyor and establish exact elevations and northing and easting coordinates at fixed points (as shown on the Design Drawings) to act as control points. Clearly identify benchmarks and record existing elevations.

B. During installation and extraction of excavation support and protection systems, regularly resurvey benchmarks, and maintain an accurate log of surveyed elevations and positions for comparison with original elevations and positions. Promptly notify Remediation Engineer if changes in elevations or positions occur or if cracks, sags, or other damage is evident through visual observation in adjacent construction.

C. Prior to advancing slide rail components in certain areas, the remnants, or intact elements of below ground structures (e.g., former MGP structure foundations) will require demolition and removal in the excavation area. The Remediation Contractor shall remove below ground structures only to facilitate slide rail installation and achieve the removal limits specified in the Remedial Design or as directed by the Remediation Engineer.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT

A. All materials shall be undamaged and shall conform to pertinent AISC, ANSI, ASTM or other industry standards.

B. Slide Rail System:

1. Steel system comprised of plates, vertical sheets, posts and bracing conforming to ASTM A 572 – Grade 50.

2. Plates shall be a minimum of 4-inches in thickness and shall be available in lengths of 14 feet to 16 feet. Plates shall have knife edges, with the exception of extension plates. Extension plates can be flat bottomed and shall include a pinned connection to the adjoining plate.

3. Posts shall include single, double, or triple rail designs, as necessary, to accommodate the excavation depth. A positive interlock between the posts, plates and vertical sheets is required.

4. Brace assemblies must accommodate widths between 14 and 16 feet. No more than two brace extensions shall be allowed and all braced extension connections shall consist of structural bolted connections. Brace assemblies shall be either fixed connections or roller brace systems.

5. Bolts

a.	High Strength	ASTM A 325 - N
b.	Nuts for High Strength bolting	ASTM A 563
c.	Washers	ASTM F 436
d.	Self-Locking Nuts Prevailing Torque type	IFI-100, Grade A
e.	Lock Washers	Spring type, ANSI B27.1
f.	Beveled Washers	ASTM A 325 or A 490 Bolts

6. Slide rail systems as described herein shall be manufactured by Pro-Tec Equipment, Inc., or approved equal.

C. Timber Lagging: Nominal thickness shall not be less than 3 inches.

2.02 GENERAL REQUIREMENTS

A. General

1. Except as otherwise specifically noted in the Remedial Design, or specified herein, all materials and work for structural steel and miscellaneous metal work shall be in conformance with applicable provisions of the latest edition of the AISC *Steel Construction Manual*.

B. Shop Fabrication

1. All components of the slide rail system, as delivered and erected, shall be free of winds, warps, local deformations, or unauthorized bends. Holes and other provisions for field connections shall be accurate, so that proper fit will result when the slide rail components are assembled in the field.

C. Field Erection

1. Before assembly, surfaces to be in contact with each other shall be thoroughly cleaned. All parts shall be assembled accurately as shown on the Design Drawings and Remediation Contractor’s Shop Drawings.

PART 3 - EXECUTION

3.01 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, dewatering, and other hazards that could develop during excavation support operations.

B. Install slide rail system to ensure minimum interference with roads, streets, walks, and other adjacent facilities.

C. Provide adequate clearance of slide rail system within work areas to allow for proper installation/construction of required site features.

D. Monitor slide rail system daily during excavation progress and for as long as excavation remains open. Promptly correct bulges, breakage, or leaks, to ensure that excavation remains stable.

E. Damages to or destabilizing adjacent facilities, structures, pavement and/or earthen slope caused by activities associated with the installation or removal of the slide rail system shall be promptly repaired at the Remediation Contractor’s expense.

F. Determine layout of slide rail bays by survey.

3.02 INSTALLATION OF SLIDE RAIL SYSTEM

A. Pre-trenching: The Remediation Contractor shall identify the presence of obstructions by pre-trenching along the limits of the slide rail bays. If surface/near-surface obstructions are encountered and/or anticipated, the removal of materials (e.g., brick walls, concrete slabs) can be considered. Any such pre-trenching shall minimize the amount of materials to be removed, include provisions for managing the removed materials in accordance with the Remedial Design, shall not create unsafe/unstable conditions, shall not result in disturbances to areas outside of the Project Work Limits, and shall not extend into the water table. Pre-trenching will be limited to the upper 4 feet (approximate) of the site or to the extent reasonably practicable considering the area where the pre-trenching is to occur.

B. The Remediation Contractor shall remove any material that stops installation of slide rail components, or develop an alternative methodology (refer to Part 3.07 of this Section), reviewed by the Remediation Engineer, for completing installation.

C. Slide rail system shall be constructed to meet all safety requirements.

D. Slide rail components shall be installed in a top down method, advancing the system into the excavation as soils are removed.

E. Install plates starting in the outer rail of a post first, followed by installation of plates in the inner rails as excavation proceeds.

F. Monitor, prevent, and correct any tendency of slide rail components to bend, twist or rotate, or move out of alignment.

3.03 CONTINGENCY MEASURES FOR SLIDE RAIL SYSTEM INSTALLATION

A. The Remediation Contractor is expected to achieve the design configuration (including depths) through the use of conventional installation methods or through the use of “best efforts”. If the slide rail components cannot be installed to the design depth using the means and methods identified in the Remediation Contractor’s Installation Plan (see Part 1.03, B, 3 above), the Remediation Contractor shall notify the Owner and the Remediation Engineer. Subsequently, the Remediation Contractor may participate in discussions with onsite personnel representing the Owner and NYSDEC regarding the potential implementation of one or more of the contingency measures identified below, and/or any Remediation Contractor-identified/Owner-approved alternate approaches. The contingency measures or alternate approaches to be implemented (if any) will consider the specific circumstances of the installation (e.g., depth of refusal, location of slide rail component relative to design depth, measures that have already been implemented, and experience gained elsewhere within the site), and will be at the direction of the Owner. The Owner will coordinate with the NYSDEC prior to directing the Remediation Contractor with regard to implementation of contingency/alternative measures. The following contingency measures shall be considered.

   1. Pre-Drilling – Pre-drilling using 6-inch diameter augers to facilitate installation of panels and posts, confirm the depth of the refusal, possibly address/remove the obstruction, and/or further assess the nature of the obstruction and provide additional information to assess other/further contingency measures. The pre-drilling will also be used in an attempt to loosen subsurface materials or open the obstruction by drilling through it (e.g., using a tricone bit). The spacing of pre-drilling location(s) shall be field determined.

   2. Off-Set Installation/Re-Alignment – An off-set/re-aligned installation pattern can be considered should pre-trenching indicate obstructions will impede advancement of slide rail system using conventional installation methods.

B. As a supplement to the contingency measures identified above, and to fully represent and consider “best efforts” regarding attempts to achieve the slide rail bay configuration, the Remediation Contractor is encouraged to identify other potential alternate means and methods of installation for review by the Owner. Such alternate approaches shall consider other potential slide rail installation measures (i.e., measures not included in the approved Installation Plan) for installing slide rail systems in difficult subsurface conditions that the installer has used with prior success. No field trials will be permitted until the Owner is satisfied that a potential alternate measure is a viable option. To be considered as a potential alternate measure, any approach offered by the Remediation Contractor must be pre-approved by the Owner, fully described, and include:

   1. A detailed description of the alternate including cut-sheets (where applicable).

   2. An explanation of how the potential alternate approach would be implemented at the site.

   3. A summary of the alternate’s successful application in similar environs (including references for independent confirmation).

   4. A discussion of its specific applicability to the Project (e.g., the circumstances under which it may be considered for use, as well as its limitations).

3.04 REJECTION

A. If slide rail system components are rejected from the work because of deviation from location, excessive bending, twisting, or other reasons, the Remediation Contractor shall take suitable corrective action at no additional cost to the Owner and such corrective action shall be reviewed by the Remediation Engineer. Suitable action includes extracting, furnishing, and installing of replacement components, so that all components installed meet the requirements of this section and as indicated on the Design Drawings.

3.05 EXTRACTION

A. Areas supported by slide rail systems shall be backfilled with Controlled Low Strength Material (CLSM) in accordance with Section 02206.

B. Remove excavation support and protection systems when approved by the Remediation Engineer and when construction has progressed sufficiently to support excavation and bear soil and hydrostatic pressures. Remove in stages to avoid disturbing underlying soils or damaging structures, pavements, facilities, and utilities; repair the above items as needed.

C. Voids left after removal of slide rail posts shall be filled with sand as specified in Section 02206.

D. No slide rail components shall remain in the excavation.

3.06 PROVISIONS FOR REUSE OF SLIDE RAIL COMPONENTS

A. Following use and extraction of a slide rail component, the Remediation Contractor shall clean/decontaminate the slide rail component (i.e., within the equipment decontamination area) prior to any re-use or off-site transportation. The slide rail component shall also be inspected for any damage that may have occurred through installation and/or extraction. Decontamination shall be performed in the identified decontamination area.

3.07 MONITORING

A. The Remediation Contractor shall monitor and protect the existing natural gas line in accordance with all NYSEG protocols and requirements.

B. The Remediation Contractor shall monitor adjacent sidewalks roadways daily during excavation and backfilling activities, and any damage shall be reported immediately to the Owner and Remediation Engineer. The Remediation Contractor shall take measures, approved by the Remediation Engineer, to prevent further damage from occurring. The Remediation Contractor shall repair damage to existing construction at no additional cost to the owner.

- END OF SECTION -

SECTION 02206

SELECTED FILL

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Specified

1. Furnishing fill materials as specified in this section for the backfilling of excavations, restoration of surfaces, and other purposes required by Contract Documents.

B. Related Work Specified Elsewhere

1. Section 02201 – Earthwork

2. Section 02202 – Rock and Debris Removal

3. Section 02208 – Restoration of Surfaces

4. Section 02210 – Topsoil, Seeding, and Planting

5. Section 02415 – Impacted Material Handling and Excavation Procedures

6. Construction Quality Assurance Plan (QQAP)

1.02 APPLICABLE CODES, STANDARDS, AND SPECS

A. American Association of State Highway and Transportation Officials (AASHTO). The following AASHTO specification is referenced in this section and is to be considered part of this section:

M 85	Standard Specification for Portland Cement
M 157	Standard Specification for Ready-Mixed Concrete

B. ASTM International (ASTM). The following ASTM specification is referenced in this section and is to be considered part of this section:

D422	Standard Test Method for Particle-Size Analysis of Soils
D2487	Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
D4832	Standard Test Method for Preparation and Testing of Controlled Low Strength Material (CLSM) Test Cylinders
D6103	Standard Test Method for Flow Consistency of CLSM

D6938 Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

C31	Standard Method of Making and Curing Concrete Test Specimens in the Field
C39	Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
C150	Standard Specification for Portland Cement
C260	Standard Specification for Air-Entraining Admixtures for Concrete
C494	Standard Specification for Chemical Admixtures for Concrete
C495	Standard Test Method for Compressive Strength of Lightweight Insulating Concrete
C513	Standard Test Method for Obtaining and Testing Specimens of Hardened Lightweight Insulating Concrete for Compressive Strength
C618	Standard Specifications for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete

C. New York State Department of Environmental Conservation (NYSDEC) Title 6 of the Official Compilation of Codes, Rules, and Regulations (6 NYCRR) Part 375 (Environmental Remediation Programs).

D. NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation (DER-10).

Appendix 5	Allowable Constituent Levels for Imported Fill or Soil

E. New York State Department of Transportation (NYSDOT) Standard Specifications.

Section 204	Controlled Low Strength Material (CLSM)

1.03 SUBMITTALS

A. Identification of proposed off-site fill sources (names, addresses, and any state or local approvals as fill sources, and types of fill to be obtained from each source). If no prior state or local approval is available for the source, the Remediation Contractor shall provide a brief history of the use of property which is the source of the fill.

B. Laboratory test report for each proposed fill material indicating the grain-size profile (determined by ASTM D422).

C. For any off-site material proposed for use on site as General Fill, Select Fill, or topsoil, the Remediation Contractor must provide the following information (for each material) at least three weeks prior to bringing such material on site:

1. Certification that the proposed fill material is from a NYSDOT-certified source.

2. Results of analytical testing for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), pesticides/herbicides, and inorganics. Certification that the laboratory used to analyze the proposed fill material is certified by the New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) for the parameters being analyzed. Analytical testing shall be conducted in accordance with the frequency requirements presented in DER-10.

D. For any off-site material proposed for use on site as topsoil, the Remediation Contractor must provide the following information at least three weeks prior to bringing such material on site:

1. Results of Agricultural laboratory nutrient testing results and recommendations for fertilization (Dairy-One Lab, Ithaca, NY, or equivalent).

E. Bills of lading for the transport and delivery of imported fill materials to the site.

1. The Remediation Contractor shall prepare a bill of lading for each load of imported fill material transported to the site.

2. Bills of lading shall include (at a minimum) the following information:

   a. Source address.
   b. Name of shipping company.
   c. Transporter’s name.
   d. Load description (fill material type).
   e. Gross and net weight of load.

3. Bills of lading shall be maintained on-site in the project file and submitted to the Remediation Engineer on a weekly basis.

F. For CLSM provide the following:

1. Description of Remediation Contractor’s proposed CLSM mixture design, including sources and proportions of CLSM ingredients.

2. CLSM producer’s certification that the mixture design will achieve the strength specified in this section.

3. Remediation Contractor’s proposed method of placement for CLSM.

4. Certified batch reports for CLSM delivered to the site providing documentation that the CLSM was prepared in accordance with the approved mixture design.

5. Submit test reports of compressive strength testing of CLSM in accordance with the frequency required in Paragraph 3.03 of this Section.

1.04 LABORATORY TESTING AND QUALITY CONTROL

A. Imported Fill Materials

1. Any off-site materials proposed for use as General Fill, Select Fill, or topsoil must be from a NYSDOT-certified source and results of analytical testing for VOCs, SVOCs, PCBs, pesticides/herbicides, and inorganics must be presented to demonstrate that the proposed fill materials meet the following Allowable Constituent Levels for Imported Fill or Soil for commercial use presented in Appendix 5 of DER-10.

   The laboratory used to analyze the proposed fill materials shall be certified by the NYSDOH ELAP for the parameters being analyzed. The laboratory shall be capable of providing detection limits at or below the unrestricted use soil cleanup objectives outlined DER-10 to allow for comparison of the analytical results to those objectives. In accordance with DER-10, material other than soil (e.g,, channel backfill, rip rap) may be imported without analytical testing if the material consists of virgin material from a permitted mine or quarry.

2. Any off-site materials proposed for use as topsoil must be analyzed by an Agricultural laboratory (Dairy-One, Ithaca, NY, or equivalent) for nutrient analyses and recommendations for fertilizer requirements. Analyses will be required for each source of topsoil.

3. The Remediation Contractor shall provide the analytical data to the Remediation Engineer at least three weeks prior to bringing any fill material on site.

4. The Remediation Contractor shall submit a laboratory test report for each material type that indicates the grain-size profile of the material as determined by ASTM D422, at least three weeks prior to importing fill materials to the site,

5. If analytical and/or gradation sample results show that the proposed material does not meet the specified requirements, the Remediation Contractor must identify a new source for the material and provide the required data report for the new source of material prior to the use of such material on site and at no additional cost to the Owner.

PART 2 - PRODUCTS

2.01 MATERIALS

A. General

1. Top one foot of soil cover shall be free of foreign chemical contaminants and shown to meet the commercial soil cleanup objectives (SCOs) set forth in Appendix 5 of the DER-10.

2. Satisfactory Fills: Soil Classification Groups GW, GP, GM, SW, SP, and SM (as determined by ASTM D2487), or a combination of these groups; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen material, organic matter, and other deleterious materials.

3. Unsatisfactory Fills: Soil Classification Groups GC, SC, CL, ML, OL, CD, MH, OM, and PT (as determined by ASTM D2487), or a combination of these groups, unless otherwise required in the Contract Documents. Where soils of these groups are specifically required in the Contract Documents, the soils shall be considered satisfactory only for the specific use for which they are specified. Unsatisfactory soils also include satisfactory soils not maintained within 2% of optimum moisture content at time of compaction.

B. Imported Soil Fill

1. Soil fill shall consist of clean common earth fill, free from excessive moisture, organic material, coatings, sharp angular stones, unsatisfactory soils, and other deleterious materials.

2. Soil fill shall have the following gradation by weight:

Sieve	Percent Passing
3 inch	100
No. 200	10-30

C. Type "B" Crushed Stone

1. Thoroughly washed clean, sound, tough, hard crushed limestone or approved equal free from coatings.

2. Crushed stone shall have the following gradation by weight:

Sieve	Percent Passing
1½ inch	100
¾ inch	0-25
½ inch	0-5

D. Type "D" Washed Sand

1. Washed coarse sand having the following gradation by weight:

Sieve	Percent Passing
3/8 inch	100
No. 4	95-100
No. 8	80-100
No. 16	50-85
No. 30	25-60
No. 50	10-30
No. 100	2-10

E. Type "F" Run-of-Crusher Stone

1. Run-of-crusher hard durable limestone, or approved equal, having the following gradation by weight:

Sieve	Percent Passing
1½ inch	100
1 inch	95-100
½ inch	65-80
¼ inch	40-60
No. 200	0-10

F. CLSM

1. Self-compacted, cementitious fill material consisting of cement, fly ash, fine aggregate and water.

2. Type I or II Portland Cement conforming to the chemical and physical requirements of those respective types as specified in AASHTO M 85. Minimum of 50 pounds per cubic yard,

3. Fly Ash conforming to ASTM C618 Class F or C with loss on ignition less than 3 percent; no limit on quantity.

4. Clean (potable) water free from oil, salts, acid, strong alkalis, vegetable matter, and other impurities that would have an adverse effect on the quality of the CLSM.

5. Fine Aggregates: Conform to ASTM C33 (normal weight aggregate). Materials containing deleterious substances (spalling causing) are not acceptable.

6. CLSM ingredients shall be mixed to produce a uniform product with a flow of 4 to 8 inches prior to placement (as determined by ASTM D6103) and capable of achieving a 28-day unconfined compressive strength between 50 and 150 psi.

7. CLSM ingredients shall be proportioned by the ready mixed concrete supplier on the basis of field experience and laboratory trial mixtures to produce a cohesive and non-segregating mixture meeting the specified properties.

PART 3 - EXECUTION

3.01 PLACEMENT

A. General

1. In general, fill material shall be placed and compacted in horizontal layers not exceeding those thicknesses specified in Section 02201. Sub-grade that will receive fill material shall be first approved by the Remediation Engineer. Fill materials shall not be placed in areas that will not support the weight of construction equipment.

2. Each lift of fill material shall be thoroughly tamped or rolled to the required degree of compaction by mechanical tampers or vibrators as specified in Section 02201. Successive lifts shall not be placed until the lift under construction has been thoroughly compacted.

3. Where required, the Remediation Contractor shall (at its own expense) moisture-condition the fill material to meet the required degree of compaction. If the material is too wet for satisfactory compaction (due to rain or other causes), it shall be allowed to dry or be removed as required before compaction.

4. Any settlements in the finished work shall be restored to design grade by the Remediation Contractor at no additional cost to the Owner.

B. CLSM

1. CLSM shall be batched and delivered in accordance with AASTHO M 157.

2. CLSM may be transported in open haul units provided the material is placed within 30 minutes of the end of mixing. A rotating drum unit capable of 2 to 6 rotations per minute shall be used to transport CLSM that cannot be placed within 30 minutes after the end of mixing.

3. CLSM shall be placed at a uniform rate using methods identified by the Remediation Contractor and approved by the Remediation Engineer.

4. CLSM shall not be placed on frozen ground. The minimum ambient temperature at the time of placement shall be 35°F.

C. Storage and Protection

1. Fill materials shall be stored in locations approved by the Owner so as not to endanger the work, and so that easy access may be had at all times to all parts of the work area.

2. Special precautions shall be taken to permit access at all times to fire hydrants, fire alarm boxes, driveways, and other points where access may involve the safety and welfare of the general public.

3. Temporary Stockpiles

   a. Stockpiles shall be kept neatly piled and trimmed, so as to cause as little inconvenience as possible to public travelers or adjoining property holders.

   b. Stockpiles shall be securely covered at all times (during both working and non-working hours) with minimum 10-mil polyethylene liners when not in use. Liners shall be properly anchored to prevent uplift due to wind conditions and shall be installed to minimize the ponding of precipitation.

   c. Based on site conditions, the Owner may elect to limit the maximum allowable stockpile size. Limitations to stockpile size shall not result in any additional cost to the Owner.

d. Stockpiles shall be inspected daily (at a minimum) and any noted deficiencies shall be immediately corrected by the Contractor to the satisfaction of the Owner/Remediation Engineer.

3.02 FIELD TESTING AND QUALITY CONTROL

A. In-place density tests for granular fill shall be performed (in accordance with ASTM D6938) by an independent testing laboratory at the Remediation Contractor's expense and at the frequency specified in Section 02201.

B. If a defect (e.g., insufficient layer thickness, materials that exceed particle size requirements, etc.) is discovered in a finished fill material layer, the Remediation Engineer will determine the extent and nature of the defect by additional testing, observation, a review of records, or other means the Remediation Engineer deems appropriate. The Remediation Contractor is responsible for correcting all deficiencies to the satisfaction of Owner/Remediation Engineer and at no additional cost to the Owner.

C. CLSM

1. Provide materials, labor, and services for sampling and testing of four cylinders of CLSM. Each cylinder shall be tested at 28 days for verification that strength is a minimum of 50 psi. Cylinders to be collected at random intervals as determined by the Remediation Engineer.

2. Provide curing and protection of cylinders until such time that they are ready to be transported to testing laboratory, as coordinated by the Remediation Contractor. Cylinders to be held by the testing laboratory until the required break date.

- END OF SECTION -

SECTION 02208

RESTORATION OF SURFACES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Specified

1. All types of surfaces, sidewalks, curbs, gutters, culverts, and other features disturbed, damaged, or destroyed during the performance of the Project, shall be restored and maintained as specified herein and as shown on the Design Drawings.

2. The quality of materials and the performance of work used in the restoration shall produce a surface or feature equal to or better than the condition of each before the Project began, as reviewed by the Remediation Engineer.

B. Related Work Specified Elsewhere

1. Section 02201 – Earthwork

2. Section 02206 – Selected Fill

3. Section 02210 – Topsoil and Seeding

1.02 APPLICABLE CODES, STANDARDS, AND SPECIFICATIONS

A. New York State Department of Transportation (NYSDOT) Standard Specifications.

1.03 SUBMITTALS

A. If surfaces are damaged during the remedial construction activities, the Remediation Contractor shall provide all details (e.g., materials list, shop drawings) for proposed restorations of concrete (i.e., sidewalks) and asphalt pavement (i.e., roadways) prior to restoring surfaces. Concrete and asphalt pavement surface restorations within local and state right-of-ways shall be approved by the City of Geneva Department of Public Works and/or New York Start Department of Transportation, as appropriate, prior to conducting surface restoration activities.

1.04 SCHEDULE OF RESTORATION

A. After an accepted schedule has been agreed upon, the schedule shall be adhered to unless otherwise revised and reviewed by the Remediation Engineer.

B. The replacement of surfaces at any time, as scheduled or as directed, shall not relieve the Remediation Contractor of responsibility to repair damages by settlement or other failures.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 STONE OR GRAVEL PAVEMENT

A. All pavement and other areas surfaced with stone or gravel shall be replaced with material to match the existing surface unless otherwise specified.

1. The depth of the stone or gravel shall be at least equal to the existing.

2. After compaction, the surface shall conform to the slope and grade of the area being replaced.

3.02 LAWNS AND IMPROVED AREAS

A. If topsoil has been removed from the area to be restored, the area shall be graded to a minimum depth of 6 inches below the proposed finish surface prior to placement of 6 inches of new topsoil.

B. If topsoil has not been removed from the area to be restored, the existing topsoil surface shall be loosened to a depth of 2 to 4 inches prior to reseeding.

C. The furnishing and placing of topsoil, seed, and mulch shall be in accordance with Section 02210.

D. When required to obtain germination, the seeded areas shall be watered in such a manner as to prevent washing out of the seed.

E. Any washout or damage which occurs shall be regraded and reseeded until a good sod is established.

F. The Remediation Contractor shall maintain the newly seeded areas, including regrading, reseeding, watering, and mowing, in good condition in accordance with Section 02210.

3.03 OTHER TYPES OF RESTORATION

A. Trees, shrubs, and landscape items damaged or destroyed as a result of the construction operations shall be replaced in like species and based on discussions with the property owner, unless otherwise directed by the Remediation Engineer.

B. Fences destroyed or removed as a result of the construction operations shall be replaced in like size and material and shall be replaced at the original or new location, as shown on the Design Drawings, or as directed by the Remediation Engineer.

C. Other site features removed or damaged as a result of the construction operations (e.g., sidewalks, curbs) shall be restored in-kind to their original location and condition unless otherwise indicated in the Remedial Design, or as directed by the Remediation Engineer, the City of Geneva Department of Public Works, or the New York State Department of Transportation.

3.04 MAINTENANCE

A. The finished products of restoration shall be maintained in an acceptable condition for and during a period of one year following the date of substantial completion or other such date as set forth elsewhere in the Remedial Action Design.

- END OF SECTION -

SECTION 02210

TOPSOIL AND SEEDING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Specified

1. The furnishing of topsoil, fertilizer, seed, and mulch; the preparation of the sub-grade and the placing of the topsoil, fertilizer, seed, and mulch.

2. The maintenance required until acceptance.

B. Related Work Specified Elsewhere

1. Section 01110 – Environmental Protection Procedures

2. Section 02201 – Earthwork

3. Section 02206 – Selected Fill

4. Section 02208 – Restoration of Surfaces

1.02 APPLICABLE REGULATIONS

A. New York State Standards and Specifications for Sediment and Erosion Control (latest edition).

1.03 SUBMITTALS

A. The Remediation Contractor shall submit the source location and associated data (including pH and organic content) for off-site topsoil.

B. Analytical results for the proposed topsoil material. Refer to Section 02206 for laboratory and analytical testing requirements.

C. Certificates: Submit certificates from seed vendors for each seed mixture or type of seed required. The certificates shall include the following: the botanical name and common name, date of production, date of packaging and name and address of supplier. Submit at least 2 weeks prior to time of planting.

D. Maintenance Data: Include maintenance instructions, application frequency and dosage of fertilizer, if necessary. Methods to control undesirable plant species and grazing by herbivores, such as Canada goose, whitetail deer, beaver, and muskrat shall be included in this submittal.

E. For chemical analysis requirements for topsoil, refer to Section 02206.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Topsoil shall meet the requirements of Section 02206 for Imported Soil Fill. Topsoil shall free from clay lumps, stones, roots, sticks, stumps, brush, and foreign objects. The topsoil shall have a pH ranging between 5.0 and 7.5 and an organic content between 5 and 20 percent, as determined by laboratory testing of representative samples.

B. Deliver fertilizers in waterproof bags showing weight, chemical analysis, and the name of the manufacturer. Application of fertilizers will be dictated by the results of soil testing prescribed in Section 02206 and is subject to approval by the Remediation Engineer. All nitrogen based fertilizer shall be a minimum of 50% water insoluble nitrogen (WIN).

C. Seed mixtures

1. Permanent seed mixture shall consist of the following (or an approved equivalent):

Type	**Variety**	**Application Rate (lbs. per 1,000 sq. ft.)**
Birdsfoot trefoil[3] OR Common white clover[3]	Empire/Pardee Common	0.2[4] 0.2
Tall fescue	KY-31/Rebel	0.45
Redtop OR Ryegrass (perennial)	Common Pennfine/Linn	0.05 0.10

Notes:
1. lbs. = Pounds.
2. sq. ft. = Square feet.
3. Add inoculants immediately prior to seeding.
4. Mix 0.1lbs. each of Empire and Pardee or 0.1 lbs. of Birdsfoot (of any mixture of Empire and Pardee) and 0.1 lbs. of white clover per 1,000 sq. ft.

2. Adherence to the presented seed mixes is recommended; however, species substitutions based on availability at the time of seeding may be allowed with prior approval of the Remediation Engineer.

3. Seed mixtures should be delivered in original sealed containers. Seeds in damaged packaging are not acceptable. Label containers with the following information:

   a. Analysis of seed mixture
   b. Year of production
   c. Net weight
   d. Date when tagged and location
   e. Name and address of distributor.
   f. Seeds shall be stored in weatherproof and rodent-proof enclosures

D. The Remediation Contractor shall select, supply, and install mulch material in accordance with this Section, the New York State Standards and Specifications for Erosion and Sediment Control, and/or as directed by the Remediation Engineer.

PART 3 - EXECUTION

3.01 INSTALLATION

A. The area to receive topsoil shall be graded to a depth of not less than six inches below the proposed finished grades shown on the Design Drawings or as directed by the Remediation Engineer.

1. All debris and inorganic material shall be removed and the surface loosened for a depth of two inches prior to the placing of the topsoil.

2. The topsoil shall not be placed until the sub-grade is in suitable condition and shall be free of excessive moisture and frost.

B. Apply fertilizer of the type and rate prescribed by the Agricultural laboratory, based on the results of site-specific soil testing for nutrients required in Section 02206.

C. After the topsoil surface has been fine graded, the seed mixture shall be uniformly applied upon the prepared surface with a mechanical spreader at a rate of not less than 1 pound per 1,000 square feet.

1. Seeding and mulching shall not be done during windy weather.

2. The seed shall be raked lightly into the surface and rolled with a light lawn roller to incorporate seed into the uppermost ½-inch of soil.

D. The mulch shall be hand or machine spread to form a continuous blanket over the seed bed, approximately two inches uniform thickness at loose measurement. Excessive amounts or bunching of mulch will not be permitted.

1. Mulch shall be anchored by an acceptable method.

2. Unless otherwise specified, mulch shall be left in place and allowed to disintegrate.

3. Any anchorage or mulch that has not disintegrated at time of first mowing shall be removed. Anchors may be removed or driven flush with ground surface.

E. Seeded areas shall be watered as often as required to obtain germination and to obtain and maintain a satisfactory sod growth. Watering shall be in such a manner as to prevent washing out of seed.

F. Hydroseeding may be accepted as an alternative method of applying fertilizer, seed, and mulch. If hydroseeding is the selected method of planting, the following shall also apply:

1. Mulch materials shall be free of weeds and other foreign materials; free of growth or germination inhibiting ingredients; manufactured in such a manner that after

addition and agitation in slurry tanks with water, the fibers in the material will become uniformly suspended to form a homogeneous slurry; dyed a suitable color to facilitate inspection of the placement of the material; and capable of forming an absorptive mat, which will allow moisture to percolate into the underlying soil.

2. Seeding and mulching shall be a one-step process in which seed, fertilizer, hydraulic mulch, and mulch adhesive are applied simultaneously in a homogeneous water slurry via hydraulic seeder/mulcher.

3. Hydraulic Seeder/Mulcher: The hydraulic seeder/mulcher shall be equipped with mechanical agitation equipment capable of mixing the materials into a homogeneous water slurry and maintaining the slurry in a homogeneous state until it is applied. The discharge pumps and gun nozzles shall be capable of applying the materials uniformly.

4. Volume Certification: Hydraulic seeding/mulching equipment shall have the tank volume certified by a plate affixed by the manufacturer and confirmed by the Remediation Engineer by means of measurements or tests prior to the commencement of work. This plate shall be affixed in plain view on the hydraulic seeder/mulcher and shall not be removed or altered. The plate shall certify tank volume only, and shall imply equipment conformance to other requirements of this Section.

5. Application of Materials: Measure the quantity of each material to be charged into the hydraulic seeder/mulcher tank either by mass or by a system of mass-calibrated volume measurements acceptable to the Remediation Engineer. Add the materials to the tank while it is being loaded with water. Thoroughly mix the materials into a homogeneous water slurry and distribute uniformly over the designated surface area via the hydraulic seeder/mulcher. Apply seed, fertilizer, and where applicable, hydraulic mulch adhesive within 2 hours of being charged into the hydraulic seeder/mulcher tank. During loading of the hydraulic seeder/mulcher tank, add materials in the following sequence: seed, then fertilizer, then, where applicable, hydraulic mulch, and adhesive.

6. Blend into existing adjacent grass areas to bond new growth to existing adjacent areas or to previous applications to form uniform surfaces.

7. Seed mixture shall be applied in accordance with the manufacturer’s written instructions and Part 2.01 of this Section.

3.02 MAINTENANCE

A. Remediation Contractor shall maintain the newly seeded areas in good condition until seeded areas have established a minimum uniform 80 percent density of perennial vegetation and until acceptance by the Remediation Engineer. The Remediation Contractor shall be required to repair any areas of erosion or failed vegetative growth and reseed as necessary until complete coverage and satisfactory sod growth is achieved.

- END OF SECTION -

SECTION 02270

GEOTEXTILE FABRIC

PART 1 - GENERAL

1.01 DESCRIPTION

A. Furnishing and installing geotextiles as specified in this section and in accordance with the manufacturer’s recommendations/specifications.

B. Quality assurance (QA)/quality control (QC) testing of geotextiles as specified in this section and in accordance with the manufacturer’s recommendations/specifications

1.02 APPLICABLE CODES, STANDARDS, AND SPECIFICATIONS

A. American Association of State Highway and Transportation Officials (AASHTO). The following AASHTO specification is referenced in this section and is to be considered part of this section Remediation Engineer.

M 288 Standard Specification for Geotextile Specification for Highway Applications

B. ASTM International (ASTM). The following ASTM specifications are referenced in this section and are to be considered part of this section:

D3786 Standard Test Method for Bursting Strength of Textile Fabrics (Diaphragm Bursting Strength Tester Method)

D4355 Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture, and Heat in a Xenon Arc Type Apparatus

D4491 Standard Test Methods for Water Permeability of Geotextiles by Permittivity

D4533 Standard Test Method for Trapezoid Tearing Strength of Geotextiles

D4632 Standard Test Method for Grab Breaking Load and Elongation of Geotextiles

D4751 Standard Test Method for Determining Apparent Opening Size of a Geotextile

D4833 Standard Test Method for Index Puncture Resistance of Geomembranes and Related Products

D5261 Standard Test Method for Measuring Mass per Unit Area of Geotextiles

C. Geosynthetics Research Institute (GRI). The following GRI test method is referenced in this section and is to be considered part of this section:

GT12 Test Methods and Properties for Non-Woven Geotextiles Used as Protection (or Cushioning) Materials

D. Where reference is made to one of the above codes, standards, specifications, or publications, the revisions in effect at the time of bid shall apply.

1.03 SUBMITTALS

A. Non-Woven Geotextile

1. Written certification that the minimum average roll values (MARVs) specified in this section are guaranteed by the manufacturer.

2. Manufacturer's standard warranty provided for the non-woven geotextile fabric.

3. Results of QC tests conducted by the manufacturer. QC test results shall include lot and roll identification numbers representative of the field-delivered material. At a minimum, results shall be submitted for:

    a. Unit weight.
    b. Grab tensile strength.
    c. Grab tensile elongation.
    d. Trapezoidal tear strength.
    e. Puncture strength.
    f. Ultraviolet (UV) resistance.

4. Remediation Contractor's written certification that the field-delivered material meets the manufacturer's specifications.

5. Geotextile lot and roll number.

B. Remediation Contractor's written certification (provided prior to installation) that the field-delivered geotextiles have not been damaged due to improper transportation, handling, or storage.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. SKAPS Industries.

B. TenCate Mirafi.

C. U.S. Fabrics.

D. Hanes Geo Components

E. Approved equal.

2.02 MATERIALS

A. Non-woven geotextile shall be of needle-punched construction and consist of long-chain polymeric fibers or filaments composed of polypropylene. The non-woven geotextile shall be chemically inert to naturally encountered chemicals, acids, and bases and resist biological degradation.

B. Non-woven geotextile shall be used as a cushioning layer above and below the high-density polyethylene (HDPE) geomembrane liner in the decontamination area and as a demarcation layer.

C. The non-woven geotextile shall meet GRI GT12 specifications and have the following MARVs:

Property	ASTM Test Method	Units	MARV
Unit Weight	D5261	oz/yd^2	12
Grab Tensile Strength	D4632	lb	300
Grab Tensile Elongation	D4632	%	50
Trapezoidal Tear Strength	D4533	lb	115
Puncture Strength	D4833	lb	140
UV Resistance (at 500 hours)	D4355	% strength retained	70

2.03 DELIVERY, STORAGE, AND HANDLING

A. Geotextiles shall be furnished in a protective wrapping that shall be labeled with the manufacturer's name, product identification, lot number, roll number, and dimensions.

B. Geotextile shall be protected from ultraviolet light, precipitation, mud, soil, excessive dust, puncture, cutting, and/or other damaging conditions prior to and during delivery and on-site storage.

C. Geotextiles shall be shipped and stored in relatively opaque and watertight wrappings.

D. Geotextiles shall be stored on-site in locations approved by the Owner/Remediation Engineer.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Prior to installing the geotextile, placement surfaces shall be leveled and uniformly compacted, as necessary and as required by Section 02201, to provide a stable interface for the geotextile that is as smooth as possible.

B. The sub-grade shall be cleared of all sharp objects, tree stumps, and large stones.

C. Geotextiles shall be placed (rolled out) in the direction of most frequent vehicular travel.

D. Adjoining edges shall have a 2- to 3-foot overlap and shingled in a manner that prevents material rollup during aggregate placement.

E. Placement of the geotextile shall not be conducted during adverse weather conditions. The geotextile shall be kept dry during storage and up to the time of deployment. During windy conditions, all geotextiles shall be secured with sandbags or an equivalent approved anchoring system. Removal of the sandbags or approved anchoring system shall only occur upon placement of an overlying bedding layer.

F. Proper cutting tools shall be used to cut and size the geotextiles. Care shall be exercised while cutting geotextiles.

G. During the placement of geotextiles, all dirt, dust, sand, and mud shall be kept off to prevent clogging.

H. Geotextiles shall be covered within the time period recommended by the manufacturer, and in no case later than two weeks after its placement.

I. In all cases, seams on slopes shall be parallel to the line of slope. No horizontal seams shall be allowed on slopes.

J. Aggregates shall be placed in a manner which prevents damage to or dislodgement of underlying geosynthetics.

- END OF SECTION -

SECTION 02272

GEOMEMBRANE – HDPE LINER

PART 1 - GENERAL

1.01 DESCRIPTION

A. Furnishing and installing 40 mil textured high-density polyethylene (HDPE) geomembrane liner for the decontamination area as specified in this section and in accordance with the manufacturer's recommendations/specifications.

B. Quality assurance (QA)/quality control (QC) testing of HDPE geomembrane liner as specified in this section and in accordance with the manufacturer's recommendations/ specifications.

1.02 APPLICABLE CODES, STANDARDS, AND SPECIFICATIONS

A. ASTM International (ASTM). The following ASTM specifications are referenced in this section and are to be considered part of this section:

D792	Standard Test Methods for Density and Specific Gravity (Relative Gravity) of Plastics by Displacement
D1004	Standard Test Method for Tear Resistance (Graves Tear) of Plastic Film and Sheeting
D1505	Standard Test Method for Density of Plastics by the Density-Gradient Technique
D1603	Standard Test Method for Carbon Black Content in Olefin Plastics
D3895	Standard Test Method for Oxidative Induction Time of Polyolefins by Differential Scanning Calorimetry
D4218	Standard Test Method for Determination of Carbon Black Content in Polyethylene Compounds by the Muffle-Furnace Technique
D4437	Standard Practice for Non-destructive Testing (NDT) for Determining the Integrity of Seams Used in Joining Flexible Polymeric Sheet Geomembranes
D4833	Standard Test Method for Index Puncture Resistance of Geomembranes and Related Products
D5397	Standard Test Method for Evaluation of Stress Crack Resistance of Polyolefin Geomembranes Using Notched Constant Tensile Load Test
D5596	Standard Test Method for Microscopic Evaluation of the Dispersion of Carbon Black in Polyolefin Geosynthetics
D5721	Standard Practice for Air-Oven Aging of Polyolefin Geomembranes

D5885	Standard Test Method for Oxidative Induction Time of Polyolefin Geosynthetics by High-Pressure Differential Scanning Calorimetry
D5994	Standard Test Method for Measuring Core Thickness of Textured Geomembrane
D6693	Standard Test Method for Determining Tensile Properties of Nonreinforced Polyethylene and Nonreinforced Flexible Polypropylene Geomembranes
D7466	Standard Test Method for Measuring the Asperity Height of Textured Geomembrane

B. Geosynthetics Research Institute (GRI). The following GRI test methods are referenced in this section and are to be considered part of this section:

GM11	Accelerated Weathering of Geomembranes using a Fluorescent UVA-Condensation Exposure Device
GM13	Test Methods, Test Properties, and Testing Frequencies for High-Density Polyethylene (HDPE) Smooth and Textured Geomembranes

C. Where reference is made to one of the above codes, standards, specifications, or publications, the revisions in effect at the time of bid shall apply.

1.03 SUBMITTALS

A. Written certification that the minimum test values provided in Part 2.02 of this section are guaranteed by the manufacturer.

B. Manufacturer’s standard warranty for the geomembrane.

C. Results of QC tests conducted by the manufacturer. QC test results shall include lot and roll identification numbers representative of the field-delivered material. At a minimum, results shall be submitted for:

1. Thickness (ASTM D5994).
2. Asperity Height (ASTM D7466).
3. Density (ASTM D1505).
4. Tensile Properties (ASTM D6693).
5. Tear Resistance (ASTM D1004).
6. Puncture Resistance (ASTM D4833).
7. Stress Crack Resistance (ASTM D5397).
8. Carbon Black Content (ASTM D1603).
9. Carbon Black Dispersion (ASTM D5596).

10. Oxidative Induction Time (OIT) (ASTM D3895 or D5885).

11. Oven Aging at 85°C (ASTM D5721).

12. Ultraviolet (UV) Resistance (GRI GM11).

D. Remediation Contractor’s written certification (provided prior to the installation of the geomembrane) that the field-delivered material has not been damaged due to improper transportation, handling, or storage.

E. FML lot and roll number.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Solmax Geosynthetics.
B. GSE Lining Technology, Inc.
C. Poly-Flex, Inc.
D. Approved equal.

2.02 MATERIALS

A. HDPE Geomembrane.

1. HDPE geomembrane liner shall meet the following minimum test values:

Property	Test Method	Test Value
Thickness (min. avg.) • Lowest individual for 8 out of 10 values • Lowest individual for any of the 10 values	ASTM D5994	38 mil 36 mil 34 mil
Asperity Height (min. avg.) (See Note 1)	ASTM D7466	10 mil
Density (min. avg.)	ASTM D1505/D792	0.940 g/cm^3
Tensile Properties (min. avg.) (See Note 2) • Yield Strength • Break Strength • Yield Elongation • Break Elongation	ASTM D6693 (Type IV)	84 lb/in 60 lb/in 12% 100%
Tear Resistance (min. avg.)	ASTM D1004	28 lb
Puncture Resistance (min. avg.)	ASTM D4833	60 lb
Stress Crack Resistance (See Note 3)	ASTM D5397	300 hrs
Carbon Black Content (range)	ASTM D1603 (See Note 4)	2.0 – 3.0%
Carbon Black Dispersion	ASTM D5596	See Note 5
OIT (min. avg.) (See Note 6) • Standard OIT or • High Pressure OIT	ASTM D3895 ASTM D5885	100 min. 400 min.

Property	Test Method	Test Value
Oven Aging at 85°C (% retained after 90 days) (See Notes 6 and 7)	ASTM D5721	
• Standard OIT (min. avg.) or	ASTM D3895	55%
• High Pressure OIT (min. avg.)	ASTM D5885	80%
UV Resistance (See Note 8)	GRI GM11	
• Standard OIT (min. avg.) or	ASTM D3895	See Note 9
• High Pressure OIT (min. avg.) – % retained after 1,600 hours (See Note 10)	ASTM D5885	50%

Notes:

1. Of 10 readings; 8 out of 10 must be ≥ 5 mils (see also Note 6).
2. Machine direction (MD) and cross machine direction (XMD) average values should be on the basis of 5 test specimens each direction.
   Yield elongation is calculated using a gage length of 1.3 inches
   Break elongation is calculated using a gage length of 2.0 inches
3. The notched constant tensile load (NCTL) test is not appropriate for testing geomembranes with textured or irregular rough surfaces. Test should be conducted on smooth edges of textured rolls or on smooth sheets made from the same formulation as being used for the textured sheet materials. The yield stress used to calculate the applied load for the NCTL test should be the manufacturer’s mean value via manufacturer quality control testing.
4. Other test methods, such as ASTM D4218 or microwave methods, are acceptable if an appropriate correlation to ASTM D1603 can be established.
5. Carbon black dispersion (only near spherical agglomerates) for 10 different views:
   9 in Categories 1 or 2 and 1 in Category 3
6. The manufacturer has the option to select either one of the OIT methods listed to evaluate the antioxidant content of the geomembrane.
7. It is also recommended to evaluate samples at 30 and 60 days to compare with the 90 day response.
8. The condition of the test should be 20-hour UV cycle at 75°C followed by 4-hour condensation at 60°C.
9. Not recommended since the high temperature of the Standard OIT test produces an unrealistic result for some of the antioxidants in the UV exposed samples.
10. UV resistance is based on percent retained value regardless of the original High Pressure OIT value.

2. The geomembrane shall be free of defects, such as holes or blisters, or any contamination by foreign matter.

B. Welding Material

1. The resin used in the welding material must be identical to the liner material.

2. All welding materials shall be of a type recommended and supplied by the manufacturer and shall be delivered in the original sealed containers, each with an indelible label bearing the brand name, Manufacturer's mark number, and complete directions as to proper storage.

2.03 DELIVERY, HANDLING, AND STORAGE

A. The Remediation Contractor shall be liable for any damage incurred by the liner material prior to and during transportation to the site.

B. The handling, storage, and care of the liner material prior to and following installation at the site are the responsibility of the Remediation Contractor.

C. Any damage caused to the liner material during delivery, handling, and storage shall be repaired at the Remediation Contractor’s expense.

2.04 WARRANTY

A. The Remediation Contractor shall provide a written warranty stating that the materials and workmanship provided are free from defects for the duration of the project.

B. The written warranty shall provide for the complete repair or replacement of the liner material, including all incidental costs associated with the defect, at no cost to the Owner.

C. All repairs or replacements shall be performed within a reasonable period of time, as determined by the Owner/Remediation Engineer.

PART 3 - EXECUTION

3.01 INSTALLATION

A. General Requirements

1. The liner shall be placed, seamed, and tested in accordance with the manufacturer's recommendations/specifications.

2. The installation of geomembrane liner shall be performed on geotextile-covered surfaces free from stones or other protruding objects.

3. No liner shall be placed onto an area that has become softened by precipitation. Appropriate methods of moisture control are the responsibility of the Remediation Contractor.

4. The liner shall not be installed on frozen soil material. Such material shall be removed and replaced with acceptable material.

5. All surfaces on which the liner is to be installed shall be acceptable to the Remediation Engineer at the time of installation.

B. Placement

1. The placement of geomembrane panels shall follow all instructions on the boxes or wrapping containing the material that describe the proper methods of unrolling the panels.

2. Liner deployment shall not be undertaken if weather conditions will preclude material seaming following deployment.

3. During placement, geomembrane shall be visually inspected for uniformity, tears, punctures, blisters, or other damage or imperfections. Any such damage or imperfections shall be immediately repaired and reinspected at the Remediation Contractor's expense.

4. No equipment used shall damage the liner by handling, trafficking, leakage of hydrocarbons, or other means.

5. No personnel working on the liner shall smoke, wear damaging shoes, or engage in other activities that could damage the liner.

6. The prepared surface underlying the liner shall not be allowed to deteriorate after acceptance, and shall remain acceptable up to the time of liner installation and until completion of the project.

7. Adequate temporary loading and/or anchoring (e.g., sand bags), not likely to damage the liner, shall be placed to prevent uplift by wind (in case of high winds, continuous loading is recommended along edges of panels to minimize risk of wind flow under the panels).

8. Direct contact with the liner shall be minimized. In high-traffic areas, the liner shall be protected by geotextiles, extra geomembrane, or other suitable materials.

9. The method used to unroll or adjust the panels shall not cause excessive scratches or crimps in the liner and shall not damage the supporting soil or underlying geotextile (where applicable).

10. The method used to place the panels shall minimize the potential for wrinkles (especially differential wrinkles between adjacent panels).

11. Any damage to the geomembrane panels or portions of the panels as a result of placement shall be replaced or repaired at the Remediation Contractor’s expense. The decision to replace or repair any panel or portions of panels shall be made by the Remediation Engineer.

3.02 SEAMING

A. All personnel performing seaming operations shall be qualified by experience or by successfully passing seaming tests.

B. Generally, all seams whether field or factory, shall be oriented parallel to the line of slope, not across slope. At liner penetrations and corners, the number of seams shall be minimized.

C. The area of the liner to be seamed shall be cleaned and prepared in accordance with the manufacturer’s specified procedures. Any abrading of the liner shall not extend more than 0.5 inch on either side of the weld. Care shall be taken to eliminate or minimize the number of wrinkles and "fishmouths" resulting from seam orientation.

D. Field seaming is prohibited when either the air or sheet temperature is below 32ºF, when the sheet temperature exceeds 122ºF, or when the air temperature is above 104ºF. At air or sheet temperatures between 32ºF and 40ºF, seaming shall be conducted directly behind a preheating device. In addition, seaming shall not be conducted when the liner material is wet from precipitation, dew, fog, etc., or when winds are in excess of 20 miles per hour.

E. Seaming shall not be performed on frozen or excessively wet underlying surfaces.

F. Seams shall have an overlap beyond the weld large enough to perform destructive peel tests, but shall not exceed 5 inches.

G. The Remediation Contractor shall perform trial seams on excess liner material. A 1-foot by 3-foot seamed liner sample shall be fabricated with the seam running down the 3-foot length in the center of the sample. Such trial seaming shall be conducted prior to the start of each seaming succession for each seaming crew, every 4 hours, after any significant change in weather conditions or liner temperature, or after any change in seaming equipment. From each trial seam, four field test specimens shall be taken. The test specimens shall be 1-inch by 12-inch strips cut perpendicular to the trial seam. Two of these specimens shall be shear tested and two shall be peel tested using a field tensiometer, and recorded as pass (failure of liner material) or fail (failure of seam). Upon initial failure, a second trial seam shall be made; if both trial seams fail, then the seaming device and its operator shall not perform any seaming operations until the deficiencies are corrected and two successive passing trial seams are produced. Completed trial seam samples cannot be used as portions of a second sample and must be discarded.

H. Where “fish-mouths” occur, the material shall be cut, overlapped, and an overlap weld shall be applied. Where necessary, patching using the same liner material shall be welded to the geomembrane.

I. Acceptable seaming methods include:

    1. Extrusion welding using extrudate with identical physical, chemical, and environmental properties.

    2. Hot-wedge welding using a proven fusion welder and master seamer.

J. The seaming device shall not have any sharp edges that might damage the liner. Where self-propelled seaming devices are used, it shall be necessary to prevent "bulldozing" of the device into the underlying soil.

K. The Remediation Contractor shall perform non-destructive seam testing on all field seams.

    1. Non-destructive seam testing shall be conducted under the direct observation of the Remediation Engineer.

    2. Air pressure testing may be used if double-track hot-wedge welding has been used to seam the liner. Using approved pressure testing equipment, the following procedures shall be followed:

        a. Seal both ends of the air channel separating the double-track hot-wedge welds.

        b. Insert pressure needle into air channel and pressurize the air channel to 27 psi.

        c. Monitor pressure gauge for 3 minutes and determine whether pressure is maintained without a loss of more than 2 psi.

        d. If the pressure test fails, then localize the leak and mark the area for repair.

    3. Vacuum testing shall be used on all seams not tested using air pressure testing. Using an approved vacuum box, the following procedures shall be followed:

        a. Apply a soapy water mixture over the seam.

        b. Place vacuum box over soapy seam and form a tight seal.

        c. Create a vacuum by reducing the vacuum box pressure to 5 psi for 10 seconds.

        d. Observe through the vacuum box window any bubbles.

        e. Where bubbles are observed, mark seam for repair.

        f. Move vacuum box further down seam, overlapping tested seam by 3 inches.

        g. Where hot-wedge seaming has been performed, the overlap shall be cut back to the weld.

3.03 LINER REPAIR

A. All imperfections, flaws, construction damage, and seam failures shall be repaired by the Remediation Contractor at no additional cost to the Owner.

B. Acceptable repair methods include:

    1. Patching, used to repair holes, tears, undispersed raw materials, and contamination by foreign matter.

    2. Grinding and re-welding, used to repair small sections of extruded seams.

    3. Spot Welding or Seaming, used to repair pinholes or other minor, localized flaws.

    4. Capping, used to repair large lengths of failed seams.

    5. Topping, used to repair areas of inadequate seams which have an exposed edge.

    6. Removing bad seams and replacing with a strip of new material welded into place.

- END OF SECTION -

SECTION 02399

FORMER PIPE ABANDONMENT

PART 1 – GENERAL

1.01 DESCRIPTION

A. This Section specifies the abandonment of former piping where such piping or structures will be removed (i.e., above the top of the former tank where a 4-inch diameter metal pipe was encountered) to facilitate former tank removal. Such piping will be cut, capped, and abandoned in place at the limits of the excavation areas.

1.02 Related Work Specified Elsewhere

A. Section 01046 – Control of Work

B. Section 02206 – Selected Fill

C. Section 02208 – Restoration of Surfaces

D. Section 02415 – Impacted Material Handling and Excavation Procedures

PART 2 - PRODUCTS\EXECUTION (NOT USED)

PART 3 – EXECUTION

3.01 PIPE ABANDONMENT

A. The Remediation Contractor shall remove all former piping within the excavation area by saw cutting all former piping at the limits of the excavation area. If the piping contains a significant quantity of source material (as determined by NYSDEC or the Remediation Engineer), the Remediation Contractor shall remove the pipe to the extent practicable taking into account existing subsurface utilities, buildings, infrastructure, and property access (i.e., pipe removal shall be conduct provided that removal activities can be completed without disrupting utility services, the surrounding community, or jeopardizing the integrity of nearby buildings).

If encountered during excavation activities, piping associated with former manufactured gas plant (MGP) structures (i.e., not including piping associated with existing/former infrastructure) shall be either 1) cleaned of non-aqueous phase liquid (if present), excavated/removed (if feasible), and handled/managed in accordance with Section 02415 and the WMP, or 2) cleaned (i.e., allowed to gravity drain), capped, and abandoned in place. The ends of the abandoned piping shall be filled with a pneumatic plug and non-shrink grout or foam to eliminate the pipe’s ability to collect, convey, or store stormwater and/or groundwater.

B. For pipes at and shallower than 6 feet below grade, the Remediation Contractor shall collect liquids within the inactive piping to the extent possible and manage them in accordance with the requirements presented in Section 02415.

C. For pipes deeper than 6 feet below grade, the Remediation Contractor shall consult with the Owner/Remediation Engineer regarding the proposed means to clear the obstruction prior to proceeding with installation of excavation support systems.

D. All excavated/disturbed earth areas shall be restored as specified in Section 02208.

- END OF SECTION -

SECTION 02415

IMPACTED MATERIAL HANDLING AND EXCAVATION PROCEDURES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Specified

1. The Remediation Contractor shall furnish all labor, materials, tools, and equipment and perform all operations necessary for the excavation of soil and debris to the limits identified in the Remedial Design. Excavation activities will encounter manufactured gas plant- (MGP-) impacted soil and debris containing volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), inorganics, and non-aqueous phase liquid (NAPL). Excavated materials will be transported to an appropriate offsite facility. The Remediation Engineer shall be responsible for scheduling and coordinating the off-site transportation of all Project-related solid waste for treatment/disposal at an Owner-selected facility.

2. The Remediation Contractor shall furnish all labor, materials, tools, and equipment and perform all operations necessary to collect, extract, convey, and containerize, all water generated during the Project (e.g., groundwater and precipitation that is extracted from and/or accumulated within the excavation area; equipment/personnel decontamination water). Such water could contain suspended and dissolved solids, VOCs, semi-volatile organic compounds (SVOCs), inorganics, and NAPL. The Remediation Engineer shall be responsible for scheduling and coordinating the off-site transportation of all Project-related water for treatment/disposal at an Owner-selected facility.

B. Related Work Specified Elsewhere

1. Section 01112 – Decontamination Procedures
2. Section 02201 – Earthwork
3. Section 02202 – Rock and Debris Removal
4. Section 02206 – Selected Fill
5. Section 02272 – Geomembrane – HDPE Liner
6. Section 2507 – Odor, Vapor, and Dust Control
7. Community Air Monitoring Plan (CAMP)
8. Waste Management Plan (WMP)
9. Community and Environmental Response Plan (CERP)

1.02 APPLICABLE CODES, STANDARDS, AND SPECIFICATIONS

A. Occupational Safety and Health Administration (OSHA) rules and regulations, including Title 29 of the Code of Federal Regulations (CFR) Parts 1910 and 1926.

B. United States Environmental Protection Agency (USEPA) rules and regulations, including 40 CFR.

C. United States Department of Transportation (USDOT) rules and regulations, including 49 CFR Parts 171 and 172.

D. National Institute of Occupational Safety and Health (NIOSH) recommendations.

E. New York Codes, Rules, and Regulations (NYCRR):

1. Title 6, Environmental Conservation:
    a. Part 360, Solid Waste Management Facilities.
    b. Part 364, Waste Transporter Permits.
    c. Part 370, Hazardous Waste Management System – General.
    d. Part 371, Identification and Listing of Hazardous Wastes.
    e. Part 372, Hazardous Waste Manifest System and Related Standards for Generators, Transporters, and Facilities.
    f. Part 373, Hazardous Waste Management Facilities.
    g. Part 374, Management of Specific Hazardous Waste.
    h. Part 376, Land Disposal Restrictions.

F. New York State Department of Environmental Conservation (NYSDEC):

1. DER-4, Management of Coal Tar Waste and Coal Tar Contaminated Soils and Sediment from Former Manufactured Gas Plants (MGPs).

2. DER-10, Technical Guidance for Site Investigation and Remediation.

G. New York State Department of Labor (NYSDOL) rules and regulations, including 12 NYCRR Part 56.

H. New York State Department of Transportation (NYSDOT) rules and regulations.

I. New York State Department of Health (NYSDOH) rules and regulations.

J. Applicable rules and regulations of any other states or municipalities receiving waste materials generated during the remedial construction activities.

K. Whenever there is a conflict or overlap of the above-referenced documents, the most stringent provision shall be applicable.

L. In the event that any requirement of this section contradicts any such regulatory requirement, the Remediation Contractor shall immediately notify the Owner of such conflict or contradiction.

1.03 SUBMITTALS

A. The Remediation Engineer shall maintain copies of the items listed below as they relate to the transport and off-site treatment/disposal of waste materials. The items shall be provided to the Owner in a timely manner following the last shipment of waste materials from the site:

1. Uniform Hazardous Waste Manifests or Bills of Lading.
2. Waste Profiles.
3. Chain of custody records.
4. Trucking logs.
5. Counter-signed waste manifests and facility disposal receipts for waste material transported off-site for treatment/disposal.

B. New York State Waste Transporter Permits for each transporter hauling waste materials.

C. Product data for soil drying agent.

PART 2 - PRODUCTS

2.01 INFLUENT HOLDING TANK (FRAC TANK)

A. The Remediation Contractor shall provide one (1) 21,000-gallon steel water storage tank for the temporary storage of water to be generated during the remedial construction activities. The tank shall be equipped with valving, piping, as needed to receive extracted groundwater (and other liquids generated during the Project) and to transfer collected water to a tanker truck for transport to an off-site treatment/disposal facility.

B. The Remediation Contractor shall provide portable, pre-fabricated spill containment berms for the frac tank.

PART 3 – EXECUTION

3.01 WASTE CHARACTERIZATION

A. Waste characterization sampling will be conducted by the Design Engineer prior to the remedial construction activities (or by the Remediation Engineer during the remedial construction activities) to characterize soils in-place for off-site treatment/disposal at an Owner-selected low temperature thermal desorption (LTTD) facility and for non-hazardous solid waste landfill (if necessary). The overall characterization approach for those soils (e.g., frequencies, analyses, etc.) will be based on the acceptance criteria of the Owner’s chosen facilities.

B. If necessary based on requests from treatment/disposal facilities, the Remediation Engineer may be required to collect additional waste characterization samples of excavated material. The Remediation Engineer is responsible for the following:

1. Identifying treatment/disposal facility additional characterization requirements (e.g., number of samples, analyses, etc.).

2. Collecting and analyzing characterization samples in accordance with treatment/disposal facility requirements.

3. Preparing additional waste profiles.

C. Waste profiles will be prepared by the Design Engineer (or the Remediation Engineer) based on the results of the pre-remediation waste characterization sampling and signed by the Owner (or the Remediation Engineer acting as an authorized agent for the Owner). Completed waste profiles shall be maintained on-site by the Remediation Engineer in the project file.

3.02 EXCAVATION

A. Excavation activities shall be conducted using excavation equipment (e.g., excavator, backhoe) and methods determined by the Remediation Contractor.

B. The Remediation Contractor shall excavate soil and debris (e.g., brick, concrete, abandoned piping, former MGP structures, tree stumps/root balls) to the horizontal and vertical limits identified in the Design Drawings or as directed by the Remediation Engineer.

C. The Remediation Engineer shall coordinate with NYSDEC to register the tank under the NYSDEC's Bulk Storage Program.

3.03 DEWATERING/STABILIZATION OF EXCAVATED MATERIALS

A. The Remediation Contractor shall dewater/stabilize excavated soils as necessary to (at a minimum) pass Paint Filter testing procedures (SW-846 Method 9095A) and be to the satisfaction of the Remediation Engineer prior to leaving the site. Based on the requirements of the treatment/disposal facility, the Remediation Contractor may be required to meet moisture content requirements.

B. The Remediation Contractor's means and methods of dewatering/stabilization may include one or more of the following:

1. Active dewatering of the excavation area prior to excavating materials.

2. Use of drier materials excavated from above the water table to augment wet materials excavated from below the water table.

3. Stockpiling excavated materials within the removal area on a temporary basis to allow for gravity dewatering.

4. Use of approved drying agent(s) to amend wet excavated materials.

C. The use of quick lime, lime kiln dust, or other lime-based stabilizing agents containing more than 50% calcium and/or magnesium oxide is prohibited.

D. If used, approved drying agents shall only be mobilized to and stored at the site in 1-ton totes. Bulk shipments are prohibited.

3.04 DEBRIS PROCESSING/MATERIAL SEGREGATION

A. The Remediation Contractor is responsible for segregating soil from brick, concrete, metal, and other debris not suitable for off-site LTTD (for material being sent off-site for thermal treatment).

B. Brick, concrete, and other debris shall be crushed/downsized in accordance with Section 02202 to render the materials suitable for off-site treatment/disposal/recycling or re-use on-site or off-site (as appropriate).

C. Debris and excavated soil determined (through analytical and visual confirmation) to be potentially suitable for re-use as on-site backfill and approved by NYSDEC for such use shall be segregated from other materials and separately stockpiled in a properly constructed material staging area.

D. Any free-phase NAPL generated during the work (e.g., from excavation/material dewatering, demolition of former MGP structures, etc.) shall be collected and stored in new USDOT-compliant containers for characterization by the Remediation Engineer to determine off-site treatment/disposal requirements in accordance with applicable regulations. Containers shall be compatible with chemical characteristics of coal tar-based NAPL.

3.05 TEMPORARY STORAGE OF WASTE MATERIALS

A. General

1. Visually impacted material shall be directed loaded for off-site treatment/disposal.

2. If on-site staging is necessary, waste materials shall be stored in locations approved by the Owner so as not to endanger the work, and so that easy access may be had at all times to all parts of the work area. Stored materials shall be kept neatly piled and trimmed, so as to cause as little inconvenience as possible to public travelers or adjoining property holders. Visually-impacted material shall be stored within the limits of the active excavations or alternate locations approved by the Owner/Remediation Engineer and/or NYSDEC.

3. Stock piles shall be covered at all times (i.e., during both work and non-work hours) with a minimum 10 mil thick vapor suppressing foam, except when materials are actively being placed or removed. The cover shall be properly anchored to prevent uplift due to wind conditions and shall be maintained for the duration of excavation activities.

4. The Remediation Contractor shall not be permitted to dispose of any debris off-site prior to Remediation Engineer approval.

5. The Remediation Contractor is responsible for providing safe and adequate vehicle/equipment access to and egress from excavations. The Remediation Contractor shall adhere to the access restrictions specified in the Contract Documents relating to excavation support structures. The Remediation Contractor

shall not drive, load, or store any equipment or materials within such restricted areas.

6. Special precautions shall be taken to permit access at all times to fire hydrants, fire alarm boxes, driveways, and other points where access may involve the safety and welfare of the general public.

7. Stored waste materials (if any) shall be inspected daily and any noted deficiencies shall be immediately corrected by the Remediation Contractor.

B. Materials for Recycling/Reclamation

1. The Remediation Contractor shall recover steel for recycling by the Owner. The Remediation Contractor shall remove concrete (if present) from steel to the extent practicable and stock pile steel on-site.

2. The Remediation Engineer is responsible for coordinating with the Owner to recycle recovered steel.

C. NAPL

1. While accumulating NAPL, containers shall be stored in a secure storage area equipped with secondary containment (generally consisting of an impermeable liner and run-on/run-off control). The storage area shall include appropriate signage to identify it as a satellite accumulation area for hazardous waste.

2. Hazardous waste labels (with generator information, accumulation start date, and other required information) will be completed by the Owner/Remediation Engineer and affixed to each container.

3. The total volume of NAPL in the satellite accumulation area shall not exceed 55 gallons at any time without prior notification to and approval by the Owner.

4. Once full, containers will be marked with an accumulation end date by the Owner/Remediation Engineer and shall be re-located by the Remediation Contractor to a separate, demarcated storage area equipped with secondary containment. The storage area shall include appropriate signage to identify it as a hazardous waste storage area.

5. The Remediation Engineer shall coordinate the transportation of containers for off-site for treatment/disposal at an Owner-selected facility within 90 days of the end accumulation date.

3.06 LOADING, TRANSPORTATION, AND TREATMENT/DISPOSAL

A. Waste materials shall be transported off-site for treatment/disposal/recycling at Owner-selected facilities in accordance with the WMP and in consideration of waste characterization results.

B. The Owner/Remediation Engineer shall be responsible for the transportation of waste material (e.g., soil, NAPL, debris) generated during excavation activities to an Owner-selected off-site treatment/disposal/recycling facility(ies), as determined based on the matrix of the waste material and the results of characterization sampling.

C. The Owner/Remediation Engineer shall be responsible for the treatment/disposal of waste material generated during the excavation activities at an Owner-selected off-site treatment/ disposal/recycling facility(ies).

D. The Remediation Contractor shall direct-load excavated soil/debris into lined dump trucks for transportation to an appropriate off-site facility for treatment/disposal. The loading activities shall be conducted in accordance with the Remedial Design. Based on the results of the waste characterization activities to be conducted by the Remediation Engineer, the excavated soil/debris deemed appropriate for off-site LTTD treatment/disposal will be treated/disposed in a manner consistent with NYSDEC DER-4 (*Management of Coal Tar Waste and Coal Tar Contaminated Soils and Sediment from Former Manufactured Gas Plants*). The policy outlines criteria wherein materials that have been contaminated with coal tar waste from MGPs exhibiting only the hazardous waste toxicity characteristic for benzene (D018) may be excluded from the requirements of 6 NYCRR Parts 370 - 374 and 376 when they are destined for permanent thermal treatment. Accordingly, the off-site LTTD facility identified by the Owner shall be permitted to accept such waste material. Other materials generated during the remedial activities will be transported offsite for treatment/disposal based on the results of characterization sampling.

E. Waste materials shall be transported in vehicles with valid (current) Waste Transporter Permits for New York State (pursuant to 6 NYCRR Part 364) and other required permits/licenses from any other states as applicable (based on the final destination of the waste material). Waste Transporter Permits shall be submitted to the Owner/Remediation Engineer prior to mobilizing to the site and copies of those permits shall be maintained on-site by the Remediation Contractor in the project file.

F. All vehicles transporting excavated materials off-site for treatment/disposal shall be fully lined with 10-mil polyethylene sheeting, an equivalent material, or otherwise water-tight and equipped with functioning tailgate locks (i.e., turnbuckles) and non-mesh (solid), waterproof tarpaulins.

G. Vehicles shall be loaded in such a manner as to avoid contamination of their exteriors, including tires (e.g., loaded with 10-mil polyethylene sheeting draped over the side of the truck).

H. A manifest (hazardous or non-hazardous as appropriate) shall be prepared by the Remediation Engineer for each load waste material to be transported off-site for treatment/disposal. Each manifest will be signed by the Owner (as the Generator) or an authorized agent. Counter-signed waste manifests and facility disposal receipts (indicating the actual quantity of waste received at the treatment/disposal facility) shall be maintained by the Remediation Engineer on-site in the project file.

I. The Remediation Engineer shall be responsible for the preparation of a log for each disposal facility that indicates, at a minimum, the following information regarding each truck load:

1. Load number (sequential).
2. Uniform Hazardous Waste Manifest Number or Bill of Lading Number.
3. Transporters name
4. Truck ID number (tractor or trailer number).
5. Estimated tare weight.

6. Material type (nonhazardous, hazardous, debris).
7. Destination.

J. Prior to leaving the site, all vehicles shall be inspected by the Remediation Engineer and cleaned (within a properly constructed decontamination area) of any visible soil or debris in accordance with Section 01112.

K. The Remediation Contractor shall keep all streets, sidewalks, and pavements clean and free from dirt, mud, stone, and other hauled materials.

L. Vehicles transporting waste materials off-site for treatment/disposal shall follow the approved truck route provided in the CERP.

3.07 DUST, VAPOR, AND ODOR CONTROL

A. Dust, vapor, and odor control activities shall be performed within the Project Work Limits in accordance with the Community Air Monitoring Plan (CAMP).

B. The Remediation Contractor shall control dust within the Project Work Limits. The need to implement dust controls shall be based on the results of airborne particulate monitoring and/or visual observations. Dust monitoring activities shall be conducted within the work/breathing zone by the Remediation Contractor and at the site perimeter by the Remediation Engineer in accordance with the Remediation Contractor's Health and Safety Plan (HASP) and the Remedial Design, respectively.

C. The Remediation Contractor may also be required to implement vapor suppression activities based on the results of organic vapor monitoring and/or the presence of nuisance odors. Vapor monitoring activities shall be conducted within the work/breathing zone by the Remediation Contractor and at the site perimeter by the Remediation Engineer in accordance with the Remediation Contractor's HASP and the Remedial Design, respectively.

- END OF SECTION -

SECTION 02507

ODOR, VAPOR, AND DUST CONTROL

PART 1 – GENERAL

1.01 DESCRIPTION

A. Work Specified

1. The control and suppression of odors, vapors, and dust generated during remedial construction activities.

2. Furnishing all materials, equipment, and labor necessary to control/suppress odors, vapors, and dust generated during remedial construction activities.

B. Related Work Specified Elsewhere

1. Community Air Monitoring Plan (CAMP)

C. Definitions:

1. Dust-Generating Work: Any work with the potential to generate dust. Examples of dust-generating work include, but are not limited to, the following:

   a. Ground intrusive Work.

   b. Amending or stabilizing excavated materials for off-site treatment/disposal.

   c. Crushing/downsizing excavated rock and debris.

   d. Loading or unloading excavated materials and imported fill materials.

2. Ground Intrusive Work: Any work performed below the existing level of the ground, or that involves the disturbance of existing earth, regardless of quantity. Examples of ground intrusive work include, but are not limited to, the following:

   a. Grubbing.

   b. Excavation, trenching, and test pitting, and handling of excavated materials.

   c. Backfilling.

   d. Grading.

3. Perimeter of Work Area: The limits of work, or half the distance to the nearest potential receptor or occupied residential/commercial structure, whichever is less, but in no case less than 20 feet.

4. Work Area: The area where ground intrusive or dust-generating work is being performed.

1.02 APPLICABLE CODES, STANDARDS, AND SPECIFICATIONS

A. New York State Department of Environmental Conservation (NYSDEC) DER-10 Technical Guidance for Site Investigation and Remediation (DER-10).

Appendix 1A	New York State Department of Health (NYSDOH) Generic Community Air Monitoring Program
Appendix 1B	Fugitive Dust and Particulate Monitoring

B. Other applicable federal, state, and local air monitoring requirements.

1.03 SUBMITTALS

A. Material Safety Data Sheets (MSDS) for BioSolve® concentrate and vapor-suppressant foams.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Water: Provide clean, potable water from an approved source. The use of treated construction wastewater is prohibited.

B. Hydrocarbon Mitigation Agent: Provide BioSolve® PinkWater® concentrate and combine on-site with clean water to create a minimum 3% solution (1 part BioSolve® PinkWater® concentrate to 33 parts water). A stronger concentration (up to 6%) may be required based on conditions encountered during the work.

C. Vapor-Suppressant Foams: Provide the following vapor-suppressant foams by Rusmar, Inc.

1. AC-645 Foam: Effective for a period of up to 17 hours and appropriate for general daily use, daily work breaks, and nightly cover (Monday through Thursday).

2. AC-667SE Foam: Effective for a period of up to 72 hours and appropriate for weekend cover (applied Friday afternoons/evenings before leaving the Site for the weekend).

2.02 AIR MONITORING EQUIPMENT

A. Community Air Monitoring Stations

1. Environmental Enclosures and Mounting Tripods: Provide a portable, weather-tight enclosure and compatible mounting (survey) tripod for each monitoring station. Environmental enclosures shall provide proper operating conditions for monitoring equipment.

2. Monitoring Equipment: Provide the following for each monitoring station:

   a. Data-logging photoionization detector (PID) with 10.6 eV lamp (RAE MiniRAE 3000, or equivalent).

   b. Real-time aerosol monitor meeting the minimum requirements of Appendix 1B of DER-10 (TSI 8530 DustTrak II, or equivalent).

   c. External battery packs or alternate power source to allow for continuous monitoring and data-logging for a period of not less than 12 hours.

   d. Provide and maintain on-site spare PIDs and real-time aerosol monitors to allow for uninterrupted monitoring in the event of equipment damage or malfunction.

3. Alarms: Provide audible and visual alarms for each monitoring station and means of notifying field personnel in real-time (via radio telemetry or similar) if total VOC and PM_{10} notification or action levels are exceeded.

4. Accessories: Provide equipment calibration kits, sampling inlets, data management software, and other accessories recommended by the equipment manufacturers for the intended application.

B. Meteorological Monitoring System: Provide a portable meteorological monitoring system capable of measuring wind speed, wind direction, relative humidity, dry bulb temperature, and barometric pressure, and recording and storing weather data (Lufft WS500, or equivalent).

2.03 APPLICATION AND ANCILLARY EQUIPMENT

A. Pressure washers (minimum of one) and spray wands operating to the satisfaction to the Owner/Remediation Engineer.

B. One portable polyethylene water storage tank with a minimum capacity of 150 gallons.

C. Pneumatic Foam Unit 400/25, as manufactured by Rusmar, Inc.

D. Approved equals.

PART 3 – EXECUTION

3.01 GENERAL REQUIREMENTS

A. Community air monitoring for volatile organic compounds (VOCs) and particulate matter less than 10 microns in diameter (PM_{10}) will be performed by the Remediation Engineer on a continuous basis during the remedial construction activities. The Remediation Contractor shall ensure that community air monitoring is being performed prior to initiating intrusive and/or potential dust-generating activities each day.

B. Real-time work zone air monitoring shall be performed by the Remediation Contractor on a continuous basis during all intrusive and/or potential dust-generating activities.

C. Odors shall be controlled to the satisfaction of the Owner/Remediation Engineer and New York State Department of Environmental Conservation (NYSDEC). Vapors and dust shall be controlled as necessary to meet the 1) community air monitoring action levels set forth in the CAMP and 2) work zone air monitoring action levels set forth in the Remediation Contractor's Health and Safety Plan.

D. The Remediation Contractor shall ensure that community air monitoring and real-time work zone air monitoring are being performed before initiating ground intrusive or dust-generating work each day

E. The Remediation Contractor shall provide and maintain sufficient materials, equipment, and personnel on-site to control odors, vapors, and dust generated during the work. BioSolve® PinkWater®, vapor-suppressant foams (AC-645 and AC-667SE), and appropriate application and storage equipment shall be mobilized to the site prior to initiating any intrusive activities.

F. When not in use, odor, vapor, and dust control measures shall be properly stored at the site in locations approved by the Owner/Remediation Engineer and in accordance with manufacturer's recommendations.

3.02 CONTROL MEASURES

A. Community air monitoring and real-time work zone air monitoring shall be performed on a continuous basis during all ground intrusive or dust-generating work.

1. Community air monitoring for total volatile organic compounds (VOCs), particulate matter less than 10 microns in diameter (PM_{10}), and manufactured gas plant (MGP)-related odors shall be performed by the Remediation Engineer in accordance with the CAMP.

2. Real-time work zone air monitoring shall be performed by the Remediation Contractor's Site Safety Officer in accordance with the requirements set forth in the Remediation Contractor's Health and Safety Plan.

B. Provide and maintain on-site sufficient materials, equipment, and personnel to control MGP-related odors, vapors, and dust generated during the Work.

C. Proactively employ odor, vapor, and dust controls during the work, and evaluate and modify construction techniques, as necessary and appropriate, to:

1. Mitigate MGP-related odor emissions to the extent practicable, and to the satisfaction of the Owner/Remediation Engineer and NYSDEC.

2. Prevent exceedances of the total VOC and PM_{10} action levels specified in the CAMP.

3. Prevent exceedances of the work zone air monitoring action levels specified in the Remediation Contractor's Health and Safety Plan.

D. Maintain all excavations, stockpiles, access roads, and other work areas to minimize the generation of dust.

1. Excavate, load, handle, and backfill materials in a manner that minimizes the generation of dust.

2. Remove soil and debris from temporary access roads and active haul routes.

3. Spray water on access roads and active haul routes.

4. Haul excavated materials and clean backfill materials in properly tarped/covered transport vehicles.

5. Restrict vehicle speeds on temporary access roads and active haul routes.

6. Cover excavations and material stockpiles with 10-mil polyethylene liners (anchored appropriately to resist wind forces) before extended work breaks and at the end of each work day.

7. Control the size of the open excavation by backfilling as excavations reach target depths.

E. Mobilize BioSolve® PinkWater® concentrate, vapor-suppressant foams (AC-645 and AC-667SE), and appropriate application and storage equipment to the site before initiating any ground intrusive or dust-generating work.

F. Maintain, in the immediate vicinity of the work, a supply of clean water and means of storage/dispersion (e.g., portable tanks/totes, pressure washers, sprayers, etc.) such that water and/or BioSolve® PinkWater® solution may be immediately used for odor, vapor, and dust control.

G. As required by the Owner/Remediation Engineer, spray BioSolve® PinkWater® solution on excavation faces, stockpiles of excavated materials, and excavated soils when loading transport vehicles for off-site disposal.

H. Apply vapor-suppressant foam (AC-645 or AC-667SE, as appropriate) to excavation faces and stockpiles of excavated materials before extended work breaks (greater than 30 minutes in duration) at the end of each work day, and as required by the Owner/ Remediation Engineer. Foam shall be applied at a uniform rate to completely cover surfaces to a minimum thickness of 3 inches at loose measurement.

I. When not in use, odor, vapor, and dust controls shall be properly stored at the Site in locations approved by the Owner/Remediation Engineer and in accordance with manufacturer's specifications.

J. If the Remediation Contractor's methods are unsuccessful in controlling MGP-related odors, vapors, and dust as specified in this Section, based on visual observations, the results of community air monitoring, or the results of real-time work zone air monitoring, work shall be suspended until appropriate corrective actions are taken to remedy the situation to the satisfaction of the Owner/Remediation Engineer. The Owner/Remediation Engineer will not be liable for any expense and/or delay resulting from the Remediation Contractor's failure to adequately control MGP-related odors, vapors, and dust.

- END OF SECTION -

ARCADIS

Appendix C

Community Air Monitoring Plan

ARCADIS
Infrastructure, environment, buildings

NYSEG

Community Air Monitoring Plan

Wadsworth Street Former Manufactured Gas Plant Site
Site No. 8-35-015
Geneva, New York

February 2014

ARCADIS

Community Air Monitoring Plan

Wadsworth Street Former Manufactured Gas Plant Site
Site No. 8-35-015

Prepared for:
NYSEG

Prepared by:
ARCADIS
6723 Towpath Road
P.O. Box 66
Syracuse
New York 13214-0066
Tel 315.446.9120
Fax 315.449.0017

Our Ref.:
B0013104

Date:
February 2014

Table of Contents

Attachments

1. Introduction

This *Community Air Monitoring Plan* (CAMP) has been prepared to support the implementation of remedial activities at the NYSEG Wadsworth Street Former Manufactured Gas Plant (MGP) Site (the site) located in Geneva, New York (Site No. 8-35-015). Details related to the remedial activities are presented in the *Final (100%) Remedial Design* (Remedial Design) (ARCADIS, 2014).

The purpose of this CAMP is to describe the monitoring activities that will be conducted by the Remediation Engineer to monitor for potential airborne releases of constituents of concern (COCs) during the implementation of remedial activities. This CAMP specifies the air emission action levels, air monitoring procedures, monitoring schedule and data collection and reporting to be performed during the implementation of remedial activities.

As indicated in Specification 02507 – Vapor, Odor and Dust Control, the Remediation Engineer is responsible for providing all labor, materials and equipment necessary to implement the community air monitoring program specified herein. The Remediation Contractor is ultimately responsible for confirming that all corrective measures associated with the community air monitoring program (including the control of dust, vapors and odors) in accordance with this CAMP.

1.1 Site Location and Description

The site is located in the City of Geneva, near the northwestern shore of Seneca Lake in eastern Ontario County, New York. The former MGP site is comprised of a rectangular piece of land that is now located in a mixed commercial and residential area in the east-central part of Geneva, New York. Seneca Lake is located approximately 900 feet southeast of the site. The site is bordered by Wadsworth Street to the east, a railroad (Finger Lakes Railway) to the south, a restaurant to the west and residential properties to the north. A dry cleaner is located northeast of the site, on the east side of Wadsworth Street. Railroad Place intersects Wadsworth Street and bisects the site. A gas holder (Gas Holder 1) and coal shed where formerly located in Railroad Place. The portion of the former MGP site located north of Railroad Place is currently owned by NYSEG, while the area south of Railroad Place is owned by the City of Geneva. The area owned by NYSEG includes a grass-covered area in the eastern portion of the property and an asphalt parking lot comprises the western portion of the property. A restaurant on Railroad Place leases the parking area from NYSEG. A gravel parking area is located in the northeast portion of NYSEG’s property and is used by residential property owners. A NYSEG gas regulator shed is located near the intersection of Railroad Place and Wadsworth Street.

Several MGP structures formerly existed at the current location of the City of Geneva's Public Safety Building (PSB) south of Railroad Place. The PSB consists of office space and an attached pole barn structure. A parking lot used by PSB employees is located west of the PSB.

1.2 Summary of Remedial Activities

In general, the remedial activities to be performed at the site consist of:

- Removal of the top 12-inches of existing surface material (i.e., topsoil and gravel) to facilitate installation of a new soil cover.

- Removal of the former tank and source material in the immediate vicinity of the tank.

- Placement of backfill materials within the excavation area.

- Visual Inspection of Gas Holder 3 foundation (and removal of dense non-aqueous phase liquids [DNAPLs] if encountered).

- Installation of a demarcation layer and placement of a minimum of 1-foot clean fill materials.

Additional details regarding the remedial activities are provided in the Remedial Design.

1.3 Potential Air Emissions Related to Remedial Activities

As defined in the New York State Department of Health (NYSDOH) Generic CAMP (included as Attachment 1), intrusive remedial activities to be performed at the site have the potential to generate localized impacts to air quality. Remedial components that have the potential to generate air emissions include, but may not be limited to, the following:

- Installation of excavation support systems.

- Excavation to the limits shown in the Remedial Design.

- Material handling (e.g., separation of large debris from soils, manipulation of excavated materials to render them suitable for off-site treatment/disposal, stockpiling materials, loading materials for transport to the off-site treatment/ disposal facility).

- Backfilling.

- Other ancillary intrusive activities.

1.4 Emission Control Measures

Air emissions control and fugitive dust suppression measures will be implemented by the Remediation Contractor concurrently with the activities identified above (as needed) to limit the potential for organic vapor and dust emissions from the site. Air emissions associated with excavation/removal, backfilling, material handling and stockpiling, other intrusive activities, and certain non-intrusive activities, such as mobilization, transportation and restoration activities, will be controlled as described below. The following vapor and dust control measures may be used during these activities, depending upon specific circumstances, visual observations, and air monitoring results:

- Water spray
- BioSolve® PinkWater®
- Polyethylene sheeting (e.g., for covering excavation faces, material stockpiles)
- Minimizing excavation surface area to be exposed at any given time
- Vapor suppression foam (e.g., Rusmar foam)

The Remediation Contractor is required to mobilize BioSolve® PinkWater® (or approved equivalent) and vapor-suppressant foam (including application equipment) to the site prior to initiating intrusive activities. The Remediation Contractor shall maintain an adequate supply of such materials for the duration of intrusive activities.

2. Air Monitoring Procedures

The community air monitoring program is intended to be a discrete program that will be operated in conjunction with the Exclusion Zone (i.e., work zone) air monitoring program (conducted by the Remediation Contractor). The Remediation Engineer will conduct real-time community air monitoring throughout the remedial construction. Monitoring will be conducted at representative locations at the perimeter of the exclusion zone for VOCs and total suspended particulates (particulates). However, particulate monitoring will not be performed during precipitation events. Additional information regarding the monitoring locations, equipment, and action levels is presented below.

2.1 Monitoring Location Selection and Deployment

VOCs and particulate monitoring station locations will be determined daily based on data from the on-site meteorological monitoring station and the nature of the anticipated remediation activities. An upwind location for both VOCs and particulate monitoring will be selected at the start of each workday. Two downwind locations (based on predominant wind direction) for both VOCs and particulate monitoring will also be selected. The VOCs and particulate monitoring stations will be deployed each day before the start of work activities. If wind direction shifts radically during the workday and for an extended period of time, such that the upwind location and downwind locations no longer fall within acceptable guidelines (+/- 60° compass change from the original wind direction), the monitoring stations will be relocated so that the upwind and downwind locations are maintained. Air monitoring location changes will be documented in a field logbook.

2.2 Volatile Organic Compounds Monitoring

Real-time monitoring for VOCs will be conducted at the site during remedial activities. As required by the NYSDOH Generic CAMP, VOCs will be monitored continuously during all intrusive and/or potential dust-generating activities (e.g., installation of erosion and sediment control measures, excavation support installation, excavation, backfilling, material handling activities) using instrumentation equipped with electronic data-logging capabilities. A real-time VOC monitor (RAE MiniRAE 3000 or equivalent), equipped with either a photoionization detector, or flame ionization detector, calibrated to 100 parts per million (ppm) isobutylene, will be used to monitor for VOCs. All average concentrations (calculated for continuous 15-minute increments [e.g., 08:00 to 08:15, 08:15 to 08:30]) and any instantaneous readings taken to facilitate activity decisions will be recorded by using an electronic data logger and/or in the field logbook.

2.3 Total Suspended Particulate Monitoring

Real-time monitoring for particulates will be conducted during remedial activities at the former MGP site. As required by the NYSDOH Generic CAMP, real-time airborne particulate monitoring will be conducted continuously during all intrusive and/or potential dust generating activities (e.g., installation of erosion and sediment control measures, excavation support installation, excavation, backfilling, and material handling activities) using instrumentation equipped with electronic data-logging capabilities. A real-time particulate monitor (TSI 8530 DustTrak II or equivalent) will be used for particulate monitoring. All average concentrations (calculated for continuous 15-minute increments [e.g., 08:00 to 08:15, 08:15 to 08:30]) and any instantaneous readings taken to assess appropriate course of action will be recorded using an electronic data logger and/or in the field logbook.

Fugitive dust migration will be visually assessed during all work activities, and reasonable dust suppression techniques will be used during any site activities that may generate fugitive dust (Section 1.3).

2.4 Action Levels

The action levels provided below are to be used to initiate corrective actions, if necessary, based on real-time monitoring. Each piece of monitoring equipment will have alarm capabilities (audible and/or visual) to indicate exceedances of the action levels specified below.

2.4.1 Action Levels for VOCs

As outlined in the NYSDOH Generic CAMP (as well as the Vapor Emission Response Plan included as Attachment 2), if the ambient air concentration for total VOCs exceeds 5 parts per million (ppm) above background (i.e., upwind location) for the 15-minute average, work activities will be temporarily halted while monitoring continues. If the total VOCs concentrations readily decrease (through observation of instantaneous readings) below 5 ppm above background, then work activities can resume with continuous monitoring.

If the ambient air concentrations for total VOCs persist at levels in excess of 5 ppm above background but less than 25 ppm above background, work activities will be halted, the source of the elevated VOCs concentrations identified, corrective actions undertaken to reduce or abate the emissions, and air monitoring will be continued. Once these actions have been implemented, work activities can resume provided that one of the following two conditions are met:

- The 15-minute average VOCs concentrations remain below 5 ppm above background.

- The VOCs level 200 feet downwind of the monitoring location or half the distance to the nearest potential receptor or residential/commercial structure (whichever is less but in no case less than 20 feet) is below 5 ppm over background for the 15-minute average.

If the ambient air concentrations for total VOCs exceed 25 ppm above background, the work activities must cease, and emissions control measures must be implemented.

2.4.2 Action Levels for Particulates

As required by NYSDOH Generic CAMP, if the average ambient air particulate concentration (calculated for continuous 15-minute increments as specified above) at any one (or more) of the downwind perimeter locations exceeds 100 micrograms per cubic meter ($\mu g/m^3$) above the average background concentration (calculated for continuous 15-minute increments as specified above), or if airborne dust is visually observed leaving the work area, then dust suppression measures will be implemented, and air monitoring will continue. Work activities may continue following the implementation of dust suppression measures provided that the average ambient air particulate concentration does not exceed 150 $\mu g/m^3$ above the average background concentration.

If, after implementation of dust suppression measures, the downwind average ambient air particulate concentration is greater than 150 $\mu g/m^3$ above the average background concentration, work activities must be stopped and re-evaluated. Work activities may resume only if dust suppression measures and other corrective actions are successful in reducing the downwind average ambient air particulate concentration to less than 150 $\mu g/m^3$ above the average background concentration and if no visible dust is observed leaving the site. The particulate concentrations will be recorded in accordance with Section 2.3 above.

2.5 MGP-Related Odor Monitoring

During working hours, the Remediation Engineer shall perform periodic walks around the perimeter of the work area to monitor for MGP-related odors. These perimeter checks will be performed more frequently, as necessary, depending on the work being performed and meteorological factors such as change in wind direction. Meteorological factors that can influence odor generation and dissemination generally include: temperature, humidity, precipitation, atmospheric pressure, wind direction and wind speed. These factors can work synergistically with a positive or negative impact on MGP-related odor generation and transport/dispersion. For example, MGP-related odors generally tend to be less prevalent with lower temperatures, precipitation or high humidity. Additionally, MGP-related odor dissemination is greatly influenced by wind direction and wind speed. Meteorological factors, including wind direction, will be monitored during the remedial construction activities, as further described in Section 2.6.

If MGP-related odors are noticed along the perimeter of the work area, work will continue and odor, vapor, and dust suppression techniques employed to abate emissions. Additionally, construction techniques will be evaluated and modified, if necessary and appropriate, and more frequent checks of the work area perimeter for MGP-related odors will be performed.

In the case of odor complaints (if any), all odor complaints will be directed to the on-site NYSDEC contact, if present, or will otherwise be directed to the NYSDEC project manager. The legitimacy of the complaint will be verified based on the work activities being performed, the predominant wind direction, and other meteorological factors. In response to verified odor complaints, perimeter monitoring will continue and additional odor, vapor, and dust controls will be employed to abate emissions. Additionally, construction techniques will be evaluated and modified, if necessary and appropriate.

If MGP-related odors continue to be noticed at the perimeter of the work area, work will be stopped while activities are re-evaluated. The source or cause of the MGP-related odors will be identified and additional modifications of construction techniques or additional methods to abate emissions will be implemented. Work will resume provided the measures are successful at abating the odors noticed along the work area perimeter.

2.6 Meteorological Monitoring

Meteorological monitoring will be conducted continuously at the site using a portable meteorological monitoring system. The meteorological monitoring system will be deployed at a location in accordance with siting criteria established by the United States Environmental Protection Agency and the NYSDEC for meteorological monitoring systems *(Quality Assurance Handbook for Air Pollution Measurement Systems, Volume IV - Meteorological Measurements*, as revised August 1989; and New York State Air Guide-19 – “Oversight of Private Air Monitoring Networks,” dated June 1989). Use of these guidelines enables the meteorological monitoring system to provide representative observations of the local meteorological conditions. A digital meteorological monitoring system (Lufft WS 500 or equivalent) will be used to collect the meteorological data. At a minimum, the meteorological monitoring system will monitor wind speed, wind direction, relative humidity and ambient temperature. The meteorological monitoring system will be equipped with electronic data-logging capabilities.

2.7 Instrument Calibration

Calibration of the VOCs, particulate, and meteorological monitoring instrumentation will be conducted in accordance with each of the equipment manufacturer’s calibration and quality assurance requirements. The VOC and particulate monitors will be calibrated daily (at a minimum), and calibrations will be recorded in the field logbook.

3. Monitoring Schedule and Reporting

The following subsections identify the monitoring schedule and data collection/ reporting requirements.

3.1 Monitoring Schedule

Air monitoring will be conducted prior to initiating the remedial action to establish adequate baseline data and until such time that significant material handling activities are complete (i.e., removal of stockpiled impacted materials for offsite transportation and treatment/disposal). As previously indicated, real-time VOC and particulate monitoring will be performed during all intrusive and/or potential dust-generating activities (e.g., installation of erosion and sediment control measures, excavation support installation, excavation, backfilling, and material handling activities, etc.).

The frequency of air monitoring will be relative to the level of site work activities being conducted and may be adjusted as the work proceeds and in consideration of the monitoring results. Air monitoring for VOCs and dust may be discontinued during periods of heavy precipitation that would otherwise result in unreliable data or damage to the monitoring equipment. Meteorological monitoring will be performed continuously during work activities.

3.2 Reporting

The Remediation Engineer shall prepare a weekly (or more frequent If requested by NYSDEC and/or NYSDOH) summary of the 15-minute average community air monitoring results (for VOCs and particulates). The summary shall also include, but not be limited to, a description of community air monitoring exceedances (if any), work activities associated with the exceedances, and corrective actions implemented to address the exceedance.

The time and outcome of each MGP-related odor perimeter check will be documented in a daily log, specifically noting the presence or absence of MGP-related odors and identifying the general location(s) along the perimeter where MGP-related odors (if any) are noticed. These daily logs, as well as documentation of any odor complaints received from the public, will be included in the aforementioned weekly CAMP reports to be submitted NYSDEC/NYSDOH.

The weekly summary will be submitted in an electronic format to the following:

Table 3.1 Wadsworth Street CAMP Contact List

Name	Affiliation	Contact Information
Douglas MacNeal, P.E.	NYSDEC	T: 518.402.9662 dkmacnea@gw.dec.state.ny.us
Anthony Perretta	NYSDOH	T: 518.402.7880 acp06@health.state.ny.us
John J. Ruspantini	NYSEG	T: 607.762.8787 jjruspantini@nyseg.com

A hard copy of the data will be maintained at the Remediation Engineer field office trailer.

ARCADIS

Attachment 1

Generic Community Air Monitoring Plan

APPENDIX 1A

New York State Department of Health
Generic Community Air Monitoring Plan

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for volatile organic compounds (VOCs) and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate NYSDEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. “Periodic” monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

All 15-minute readings must be recorded and be available for State (DEC and DOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

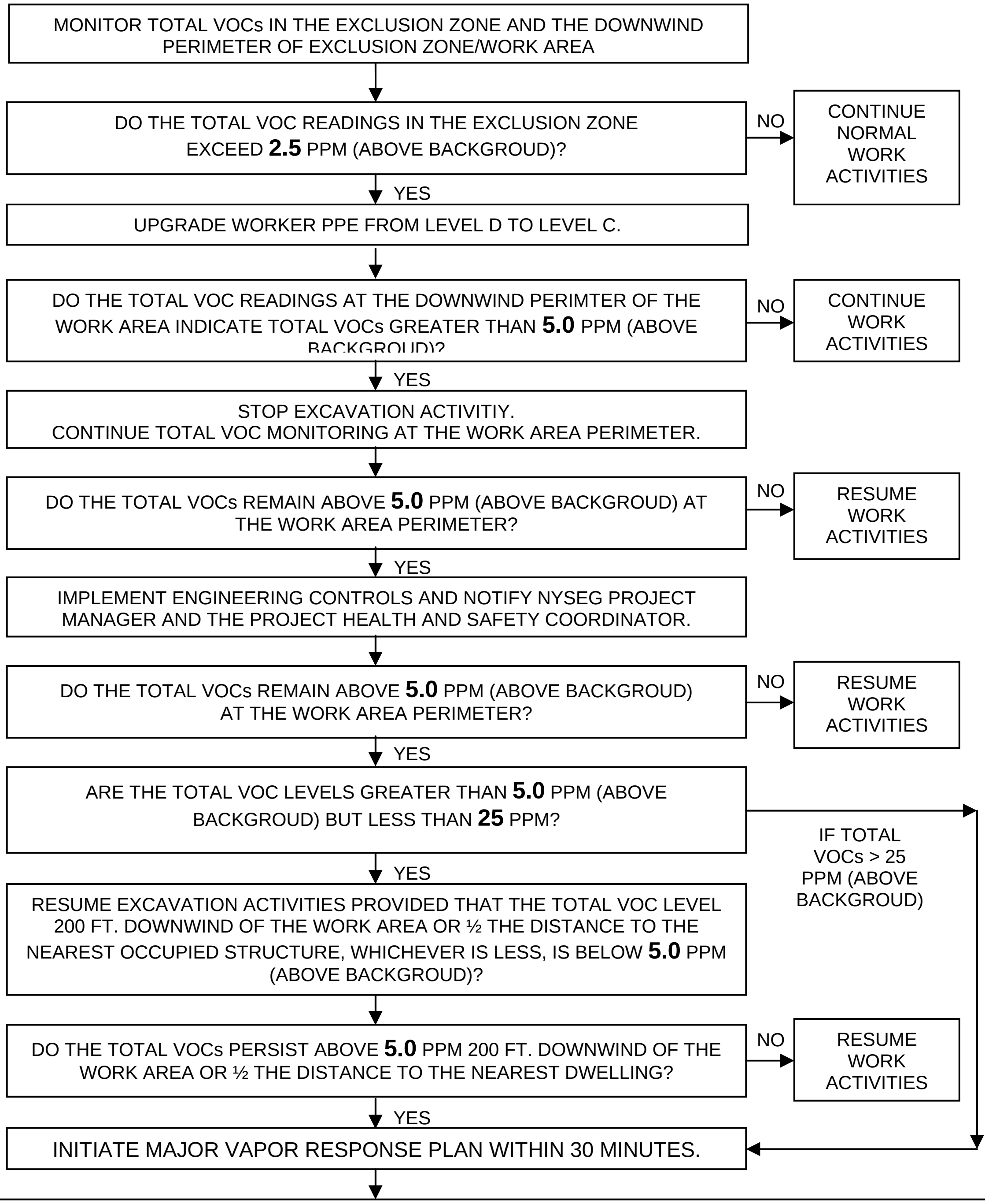
All readings must be recorded and be available for State (DEC and DOH) personnel to review.

ARCADIS

Attachment 2

Vapor Emission Response Plan

Attachment 2 – Vapor Emission Response Plan
NYSEG – Wadsworth Street Former MGP Site – Geneva, New York



1. Cover the excavation area with polyethylene sheeting.
2. Notify NYSEG - John Ruspantini at 607.762.8787; City of Geneva Police Department at 315.789.1111 or 911; NYSDEC - Douglas MacNeal at 518.402.9662; and NYSDOH - Anthony Perretta at 518.402.7880.
3. Total VOC levels will be monitored within 20 feet of the nearest downwind residential or commercial structure. (20-foot zone).
4. Continue air monitoring 15-minute intervals in the 20- foot zone. If two successive readings below action levels are measured, air monitoring intervals may be halted or modified by the Remediation Engineer, with approval of the NYSDEC and NYSDOH.
5. If the Total VOC levels persist above 5.0 PPM within the 20-foot zone, NYSEG and the Remediation Engineer will consult with the Emergency Response Agencies to determine appropriate actions to be implemented. NYSEG has the ultimate authority during major vapor emission emergencies.

Appendix D

Waste Management Plan

ARCADIS
Infrastructure · Water · Environment · Buildings

Imagine the result

NYSEG

Waste Management Plan

Wadsworth Street Former Manufactured Gas Plant Site
Site No. 8-35-015
Geneva, New York

February 2014

Waste Management Plan

Wadsworth Street Former Manufactured Gas Plant Site Site No. 8-35-015

Prepared for:

NYSEG

Prepared by:

ARCADIS of New York, Inc.
6723 Towpath Road
P.O. Box 66
Syracuse
New York 13214-0066
Tel 315.446.9120
Fax 315.449.0017

Our Ref.:

B0013104

Date:

February 2014

Table of Contents

1. Introduction

This *Waste Management Plan* (WMP) has been prepared to support the implementation of remedial activities at the NYSEG Wadsworth Street Former Manufactured Gas Plant (MGP) Site (the site) located in Geneva, New York (Site No. 8-35-015). This WMP describes the characterization, handling, treatment, and disposal requirements for various waste materials that are anticipated to be generated as a result of the remedial activities described in the *Final (100%) Remedial Design* (Remedial Design) (ARCADIS, 2014).

The on-site management requirements for the anticipated waste streams to be generated during remedial construction activities are described in Section 2 of this WMP. Requirements for waste loading and off-site transportation are presented in Section 3.

1.1 Applicable Codes, Standards, and Specifications

All waste management activities shall be conducted in accordance with all local, state and federal rules, laws and regulations, including:

- United States Environmental Protection Agency (USEPA), including Title 40, Code of Federal Regulations (CFR).
- Occupational Safety and Health Administration (OSHA), including Title 29 CFR, and Parts 1910 and 1926, OSHA, U.S. Department of Labor.
- State of New York Rules and Regulations, including Title 6 of the Official Compilation of Codes, Rules and Regulations (6 NYCRR) Parts 360, 364, 370, and 372 regarding treatment/disposal, transportation, and management of hazardous waste.
- New York State Department of Environmental Conservation (NYSDEC) DER-4 – *Management of Coal Tar Wastes and Coal Tar Contaminated Soil and Sediment from Former Manufactured Gas Plants.*
- OSHA regulations contained in 29 CFR Part 1910.120 “Hazardous Waste Operations and Emergency Response”.
- Applicable guidelines of the New York State Department of Health (NYSDOH).

- Transportation regulations, including United States Department of Transportation (USDOT) regulations, including Title 29 Parts 171 and 172 and New York State Department of Transportation (NYSDOT) rules and regulations.

- Applicable federal, state, and local government regulations (including local flow control regulations).

- NYSEG waste management and recycling procedures for conducting work at company facilities.

Whenever there is a conflict or overlap of regulatory criteria, the most stringent provision shall apply.

1.2 Waste Management Responsibilities

The Design Engineer will be responsible for the following:

- Conducting pre-remediation in-situ waste characterization sampling.

- Preparing waste profiles for the NYSEG-selected disposal/treatment/recycling facilities.

NYSEG will have the following waste management responsibilities:

- Contracting with a laboratory for the analysis of soil, water and other waste samples, as appropriate.

- Acting as the “Generator” for material resulting from the remedial activities for off-site treatment and/or disposal of the waste.

- Contracting with waste haulers and waste disposal vendors.

- Providing bills of lading/manifests for the off-site shipment of waste materials from the site. These shipping documents may be provided to the Remediation Engineer to sign as an agent for NYSEG.

The Remediation Engineer will be responsible for the following:

- Providing a sampling technician to collect waste characterization samples and coordinate with laboratory contracted by NYSEG (as needed).
- Providing assistance to NYSEG with preparation of additional waste profiles for off-site treatment/disposal of wastes to be generated as part of the remedial activities (if required).
- Coordinating with waste haulers and waste disposal vendors contracted by NYSEG to facilitate off-site transportation of waste streams.
- Reviewing and signing (as an authorized agent for NYSEG) waste manifests/bills of lading for shipments of waste materials generated by the remedial activities.

2. Material Handling and Treatment/Disposal

Materials that are anticipated to be generated during the remedial activities include:

- Excavated soil
- Debris
- Remediation Water
- Non-aqueous phase liquid (NAPL)
- Materials potentially suitable for recycling/reclamation
- Miscellaneous Waste

The following subsections describe the material handling activities specific to each of the above-listed material type.

2.1 Excavated Soil

Final off-site treatment/disposal options will be evaluated as part of a pre-remediation sampling program. Following receipt of analytical data, the Design Engineer will prepare a *Pre-Remediation In-Situ Sampling and Analysis Report*. The report will include a brief description of work performed, tabulated summaries of sample analytical results and a plan view of sample locations/ excavation areas so that the information can be used by the waste disposal facilities to approve and accept the material for disposal.

All excavated material generated during the remedial activities is anticipated to be considered not suitable for reuse as on-site backfill and will be transported off-site for treatment/disposal. The Remediation Contractor shall stage excavated materials within the limits of the excavation area prior to direct-loading the material for transportation for off-site treatment/disposal.

Excavated soil that contains visual impacts and odors (or elevated concentrations of benzene, based on waste characterization sampling conducted by the Remediation Engineer) will be disposed of off-site at a low temperature thermal desorption (LTTD) facility (i.e., ESMI’s Fort Edward Facility). This waste stream shall be treated/disposed in a manner consistent with DER-4 (NYSDEC, 2002). The policy outlines criteria wherein soils and sediments that have been contaminated with coal tar waste from MGPs exhibiting only the hazardous waste toxicity characteristic for benzene (D018) may be excluded from the requirements of 6NYCRR Parts 370 through 374 and 376 when they are destined for permanent thermal treatment. If additional sampling and analysis is request by ESMI (i.e., the anticipated thermal treatment facility), the Remediation Engineer shall coordinate with ESMI to review site-specific sampling analytical and frequency requirements. In general, soil to be disposed at ESMI Fort Edward shall be analyzed for the following:

- TPH (GRO and DRO) using USEPA Method 8015
- Total VOCs using USEPA Method 8260B
- Total SVOCs using USEPA Method 8270C
- Total PCBs using USEPA Method 8080
- Total Metals using USEPA Method 6010B
- Total Mercury using USEPA Method 7471B
- Total Cyanide using USEPA Method 9010
- Percent Sulfur using USEPA Method D129-64
- BTU using ASTM D240-87

In the event that any characterization results or field observations indicate that certain soils are unsuitable for LTTD treatment/disposal, as determined by NYSEG and the Remediation Engineer, in consultation with the treatment facility, NYSEG shall arrange for off-site incineration and/or disposal at a facility in accordance with applicable rules and regulations (including local flow control regulations).

Excavated surface material will be transported off-site for disposal as a non-hazardous waste at a NYSEG-selected non-hazardous waste disposal facility (i.e., anticipated to be Seneca Meadows Landfill). In general, soil to be disposed of at Seneca Meadows Landfill shall be analyzed for the following:

- TCLP VOCs using USEPA Method 8260
- TCLP SVOCs using USEPA Method 8270
- TCLP Metals using USEPA Method 6010B
- TCLP Mercury using USEPA Method 7471
- Pesticides/Herbicides using USEPA Method 8081/8151A
- PCBs (total) using USEPA Method 8082
- Corrosivity (pH) using USEPA Method 9040C
- Reactivity (Cyanide) using USEPA Method 9012
- Reactivity (Sulfide) using USEPA Method 9030A
- Ignitibility using USEPA Method 9010

If additional waste characterization is required following the pre-remediation sampling program, the Remediation Engineer shall be responsible for collecting waste characterization samples and submitting the samples for laboratory analysis required by the NYSEG-selected waste disposal facility. Note that the Remediation Engineer shall coordinate with potential disposal facilities to verify waste characterization analytical requirements prior to the collection of waste characterization samples.

Excavated soil will be direct-loaded (or staged within the excavation limits until loaded) and transported to the appropriate off-site treatment/disposal/recycling facility. The Remediation Contractor shall be responsible for all stabilization and dewatering activities associated with excavated soils prior to the transportation of such materials to the selected off-site treatment/disposal facility. The Remediation Contractor shall appropriately containerize (including completely lining and covering bulk waste hauling vehicles) the soils to the off-site treatment/disposal facility in accordance with applicable rules and regulations. The Remediation Engineer shall coordinate the scheduling of off-site transportation/disposal facilities, as well as waste haulers contracted by NYSEG.

2.2 Debris

Debris generated during the remedial activities is anticipated to include asphalt, the former building foundations, concrete, vegetation, stumps/root balls, and/or stone. Such materials will be segregated as appropriate from other excavated materials, downsized (as required by disposal facilities), and handled separately, where practicable. The Remediation Contractor shall mobilize debris crushing/downsizing equipment prior to initiating excavation activities to minimize potential work delays once/if materials requiring downsizing are encountered.

Debris will be stockpiled on-site by the Remediation Contractor within a fully lined roll-off container for characterization (by the Remediation Engineer) prior to off-site disposal. Following characterization by the Remediation Engineer, the Remediation Contractor will downsize (as required by the waste transportation and disposition vendors), and appropriately containerize (i.e., completely line and cover waste hauling vehicles) the debris to facilitate transportation to the off-site disposal facility based on the characterization results and in accordance with applicable rules and regulations (including local flow control regulations).

2.3 Remediation Water

Water generated during the remedial activities is anticipated to include surface water and groundwater that is extracted from and/or accumulated within the removal area and equipment/personnel decontamination water. All water generated during the remedial activities shall be collected and stored in a 21,000-gallon frac tank provided by the Remediation Contractor and staged on-site. A pre-fabricated spill containment berm shall be placed beneath the tank.

The Remediation Engineer shall coordinate with NYSEG-selected waste transportation vendors and disposal facilities to manage and remove the containerized water from the work area. Waste transportation and disposal activities shall be conducted in accordance with all applicable state and federal requirements, as well as the requirements set forth by the disposal facility.

2.4 NAPL

NAPL collected during excavation/material dewatering activities will be collected (by the Remediation Contractor, if present in sufficient quantities to be recovered) and placed in appropriate containers (e.g., 55-gallon drums) and staged on-site for characterization by the Remediation Engineer prior to off-site disposal. Following characterization, the Remediation Engineer shall coordinate with the NYSEG-selected off-site disposal facility for the transportation and disposal of the containerized NAPL.

2.5 Material Potentially Suitable for Recycling/Reclamation

Material potentially suitable for recycling/reclamation includes, but is not limited to the steel tank and associated piping, valves, fittings, etc. All metals potentially suitable for recycling/reclamation shall be the property of NYSEG. The Remediation Contractor shall stockpile the potentially recyclable/reclaimable steel on-site within a fully lined roll-off container. The Remediation Engineer will coordinate with NYSEG to arrange for the transportation of the potentially recyclable/reclaimable steel to an NYSEG-selected recycling/reclamation facility. The Remediation Contractor will be responsible for the decontamination of (i.e., to the satisfaction of the Remediation Engineer and/or NYSDEC) and the on-site loading of potentially recyclable/reclaimable steel. Any credit/profit from the recycling/reclamation facility will be provided directly to NYSEG.

2.6 Miscellaneous Wastes

Miscellaneous wastes generated during the remedial activities may be classified as general refuse or remediation-related waste material. General refuse (that has not contacted any MGP-related waste materials) may be managed as a non-hazardous waste and disposed of off-site at a non-hazardous solid waste disposal facility.

Remediation-related waste materials that are either in, or come in contact with, materials that contain MGP-related impacts during the remedial activities will be considered potentially impacted. These waste materials may include, but are not limited to, the following:

- Ancillary wastes generated as a result of the remedial activities, including, but not limited to, materials used to construct the decontamination area
- Temporary erosion and sediment control measures (e.g., silt fencing, straw bales)
- Scrap geotextile
- Used disposable equipment
- Used personal protective equipment (PPE)
- Used sampling equipment

The Remediation Contractor shall containerize the miscellaneous wastes (e.g., in 55-gallon drums) to facilitate waste characterization sampling (as appropriate) by the Remediation Engineer. The Remediation Engineer shall arrange for the transportation and disposal of the collected and containerized miscellaneous waste based on the characterization results and in accordance with applicable rules and regulations (including local flow control regulations). The Remediation Engineer shall determine if the miscellaneous waste can be transported/disposed under the existing waste profiles or if a new waste profile(s) is required. If a new waste profile(s) is required, NYSEG (or the Remediation Engineer) will be responsible for preparing new waste profiles and manifest forms.

3. Waste Loading and Off-Site Transportation

This section presents minimum transporter requirements during loading and transportation of solid and liquid non-hazardous and hazardous wastes generated by the remedial activities at the site. In addition to the vehicle and driver requirements presented below, additional routing requirements are presented in the *Community and Environmental Response Plan* (CERP) included as part of the Remedial Design.

The use of the term “transporter” shall mean the transporter and the Contractor if/when the transporter is subcontracted to the Contractor.

The transporter shall provide all necessary supervision, labor, training, permits, hazardous waste manifests (when required), PPE, tools, equipment, materials, and all things incidental and necessary to transport solid and liquid waste from the site to the permitted disposal facilities.

The transporter shall comply with the following minimum requirements:

- Any truck found unacceptable by NYSEG (or the Remediation Engineer) will be rejected, and the cost for any rejected truck shall be incurred by the transporter. If NYSDEC on-site personnel find any trucks unacceptable, NYSDEC should notify NYSEG (or the Remediation Engineer) who, in turn, shall notify the truck driver.

- The transporter shall adhere to the following rules while at the site, in transit from the site to the waste disposal facility, and at the waste disposal facility:

  - Prior to entry to the site, truck drivers shall stage trucks only in areas designated by NYSEG (or the Remediation Engineer). While staged, truck engines shall be shut off. Trucks shall not idle for more than 5 minutes.

  - Truck drivers shall announce their arrival at the site to NYSEG (or the Remediation Engineer).

  - Truck drivers are generally restricted to their trucks and designated waiting areas. Drivers are not permitted access to the site without permission from the NYSEG (or the Remediation Engineer).

- Truck drivers must supply and wear HARD HATS, SAFETY GLASSES, SAFETY SHOES, and GLOVES, as a minimum, at all times when outside the truck cab for personal protection.

- Truck drivers shall line the entire waste transport container (dump truck box, dump trailer, roll-off waste container, etc.) that will be used to haul hazardous solid waste, conditionally exempt MGP site remediation waste, or non-hazardous waste (e.g., to top of the side boards) with 6-mil thick polyethylene sheeting. Certain waste transport containers used to haul construction and demolition (C&D) debris may also need to be lined as indicated above. All waste transport containers shall have a watertight tailgate with a gasket between the box and tailgate and tailgates shall be secured with locking turnbuckles. If free liquids are observed leaking from the container of the truck once loaded, the truck cannot leave the loading area.

- All trucks shall be subject to inspection by the Remediation Engineer upon arrival at the site. If trucks are not clean (as determined by the Remediation Engineer), trucks will be rejected. Cleaning of trucks is not permitted at the site.

- All trucks shall be equipped with working audible and visual backup signals.

- When waste transport containers are being loaded, and when directed by the NYSEG, the truck engine shall be shut off. The truck engine may be restarted and the truck driven away only after the “all clear” direction is provided to the driver by the loading equipment operator or by a site representative.

- No waste transport container shall be loaded above the sideboards and no waste shall be permitted to spill out of the waste transport container. Before trucks leave the loading areas, the exterior of the waste hauling portion of the vehicle and tires shall be cleaned (by the Remediation Contractor’s site workers) to remove any residual waste.

- The Remediation Contractor’s site workers shall reposition the cover bars over the waste material. DRIVERS SHALL NOT WALK OVER WASTE MATERIAL.

- Drivers shall cover loads before leaving the loading area with a solid fabric (i.e., vinyl, reinforced polyethylene) that extends over the entire load and is secured to resist wind forces at highway speeds.

- Drivers shall obey all traffic signs and notices (obey the posted speed limit) and comply with weight restrictions.

- Drivers shall obey rules posted on the site and contained in any of the site-specific HASPs used at the site by the Remediation Contractor and the Remediation Engineer.

- Drivers shall report any accidents to the NYSEG project coordinator and cooperate with any subsequent accident investigation.

- No children under 16 years of age shall be allowed at the site.

- No passengers are allowed in the Contamination Reduction Zone (i.e., loading area).

- Drivers shall slow down and use extra caution during inclement weather (i.e., rain, fog, snow).

- Drivers shall use extra caution around blind corners (watch for pedestrians and construction equipment).

- Smoking, eating, and/or drinking is not permitted within the Contamination Reduction Zone, but may be permitted in designated areas of the Support Zone.

- After disposal of waste, the transporter shall be responsible for properly decontaminating the waste hauling portion of the vehicle.

Appendix E

Construction Quality Assurance Plan

ARCADIS
Infrastructure · Water · Environment · Buildings

Imagine the result

NYSEG

Construction Quality Assurance Plan

Wadsworth Street Former Manufactured Gas Plant Site
Site No. 8-35-015
Geneva, New York

February 2014

Construction Quality Assurance Plan

Wadsworth Street Former Manufactured Gas Plant Site
Site No. 8-35-015

Prepared for:
NYSEG

Prepared by:
ARCADIS of New York, Inc.
6723 Towpath Road
P O Box 66
Syracuse
New York 13214-0066
Tel 315 446 9120
Fax 315 449 0017

Our Ref.:
B0013104

Date:
February 2014

Table of Contents

1. Introduction

This *Construction Quality Assurance Plan* (CQAP) has been prepared to support the implementation of remedial activities at the NYSEG Wadsworth Street Former Manufactured Gas Plant (MGP) Site (the site) located in Geneva, New York (Site No. 8-35-015).

1.1 Purpose

This CQAP describes the materials, procedures, and testing necessary for proper construction, evaluation and documentation during remedial activities. Details related to the remedial activities are presented in the *Final (100%) Remedial Design* (Remedial Design) (ARCADIS, 2014).

1.2 Definitions and Terms

The following terms and abbreviations are used throughout this CQAP. The definition of each term or abbreviation is consistent throughout this CQAP:

- *ASTM* – American Society for Testing and Materials.
- *Remediation Contractor* – The person, persons or firm designated by NYSEG to perform the remedial activities, including the person or persons hired by the Remediation Contractor to install the components of the remedial work and the person or persons designated by the Remediation Contractor to perform work associated with the remedial activities.
- *CQA* – Construction quality assurance.
- *CQC* – Construction quality control.
- *Design Engineer* – The Design Engineer (ARCADIS) is responsible for preparing the Remedial Design.
- *Remediation Engineer* – For purpose of this CQAP, the Remediation Engineer is the person or persons responsible for verifying that the Remediation Contractor completes the remedial construction activities in accordance with the Remedial Design. The Remediation Engineer’s duties include reviewing proposed modifications to the Remedial Design. In addition, the Remediation Engineer will

be responsible for the quality assurance/quality control (QA/QC) aspects of the project. Duties will include CQA sampling, testing, determination of work limits and measurement of work for payment and final acceptance.

- *Manufacturer* – The person or persons designated by the Remediation Contractor to provide construction materials.

2. Required Personnel and Qualification

This section identifies the general CQA roles, qualifications and responsibilities of Remediation Engineer and Remediation Contractor personnel, as well as NYSEG's role in the CQA process.

2.1 NYSEG

NYSEG will have the final authority on all aspects of the remedial construction activities. NYSEG is empowered to determine the amount, quality, acceptability and fitness of all remedial construction completed in accordance with the Remedial Design.

The NYSEG Project Manager is knowledgeable of the project requirements and objectives and is familiar with the Remedial Design. The NYSEG Project Manager will be on-site, as required, during construction activities. The responsibility of the NYSEG Project Manager is to review the quality of construction that meets or exceeds that defined by the Remedial Design and identified in this CQAP.

The NYSEG Project Manager will have the following responsibilities in the implementation of the procedures in the CQAP:

- Attend the pre-mobilization site meeting.
- Attend project coordination meetings, as required.
- Evaluate the construction activities and the Remediation Engineer's CQA efforts.

2.2 Remediation Engineer

The Remediation Engineer will provide on-site and office-based assistance to NYSEG throughout the duration of remedial activities. The Remediation Engineer will observe construction activities and document that the materials and workmanship delivered by the Remediation Contractor comply with the requirements of the Remedial Design and are of sufficient quality to permit the development of construction completion certifications as may be required by the New York State Department of Environmental Conservation (NYSDEC). The observation, sampling, and/or documentation of construction activities and associated procedures will be performed by a person or persons familiar with construction procedures and materials. In general, observation, sampling, testing and/or documentation of the installation of construction materials and associated procedures will be performed by a person or persons familiar with contemporary construction procedures, materials and the project requirements. The project personnel will be under the direct supervision of a Professional Engineer licensed in the State of New York. The CQA Personnel will be familiar with the use of equipment and methodology needed to sample and test soil, water, and other materials.

The Remediation Engineer will have experience in a position of significant responsibility for construction projects similar in magnitude and complexity to the project being undertaken. The Remediation Engineer must be knowledgeable of the project requirements and objectives and must be familiar with the Remedial Design. The Remediation Engineer’s on-site personnel must demonstrate knowledge of construction, excavation support system installation/removal, excavation, and applicable test methods through a combination of formal education, training and experience.

The Remediation Engineer will have the following responsibilities during the implementation of the procedures in the CQAP:

- Coordinate the pre-construction site meeting.
- Schedule and coordinate CQA inspection activities.
- Coordinate periodic project meetings.
- Attend to routine daily topics related to the overall performance of the construction activities.
- Maintain responsibility for the implementation of the procedures in this CQAP.
- Provide the appropriate technical review (i.e., by qualified representatives of the Remediation Engineer) of the Remedial Design.
- Maintain contact with NYSEG, Remediation Contractor and subcontractors regarding conformance with the requirements in this CQAP.
- Provide overall coordination of the remedial activities.

- As an agent for NYSEG prepare transportation manifests for the transportation of non-hazardous waste, hazardous waste and conditionally exempt materials (i.e., soil, water, debris).

- Provide analytical results for imported fill materials (provided by the Remediation Contractor) to NYSDEC for review and approval prior to material being brought on-site.

- Document that field and laboratory testing is conducted at the frequency established in this CQAP, review field and laboratory QA/QC testing results for conformance with the Remedial Design, and provide assistance in the review and interpretation of field and laboratory testing results.

- Provide assistance in the review of shop drawings, product data and other submittals from the Remediation Contractor.

- Review the progress of the remedial activities and prepare Daily Field Construction Reports.

- Review the installed portion of work to permit further construction.

- Identify noted deficiencies during construction activities (based on QC testing results) so corrective actions can be taken.

- Prepare and certify the *Final Engineering Report*.

- Prepare a *Site Management Plan* to detail the post-remedial construction activities.

The Remediation Engineer’s on-site personnel will also have the following responsibilities in the implementation of the procedures in the CQAP:

- Oversee and coordinate the QA/QC sampling and testing.

- Record on-site activities that could result in damage to the site and report these activities to the Remediation Contractor and NYSEG.

- Review shop drawings, product data and other submittals from the Remediation Contractor.

- Identify/determine areas that require rework and/or repair.
- Coordinate activities to establish proper sampling procedures.
- Perform regular site walkthroughs to review progress and QA/QC procedures.
- Perform community air monitoring in accordance with Remedial Design.
- Provide community air monitoring results to NYSDEC and New York State Department of Health (NYSDOH) on a weekly basis.
- Identify areas of non-conformance based upon the results of field and laboratory testing.
- Perform and document field sampling for QA/QC testing.
- Prepare weekly erosion and sediment control inspection reports.
- Observe construction materials, such as steel, soils, piping and geosynthetics, delivered to the site, to determine general conformance with material specifications.
- Observe and record the procedures used for the following:
    - Pre-construction activities/mobilization.
    - Excavation support/bracing system installation, monitoring and removal.
    - Excavation activities.
    - Noise, vapor/odor suppression and dust control.
    - Decontamination of equipment and personnel.
    - Waste handling, treatment and disposal.
    - Backfilling/restoration of excavated and disturbed areas.
    - Installation of the surface cover materials.

  - Site restoration/demobilization.

2.3 Remediation Contractor Qualifications and Responsibilities

The Remediation Contractor will be trained and experienced, and demonstrate that the superintendent, field crew foreman and subcontractors have similar experience in the construction, installation and performance of the various components outlined in the Remedial Design including excavation support and bracing system installation/removal, excavation, and water handling/management.

The Remediation Contractor will have the following responsibilities for implementing the procedures presented in the CQAP:

- Review and be completely familiar with the Remedial Design.
- Maintain lines of communication with NYSEG and the Remediation Engineer to identify and discuss field issues as they arise.
- Coordinate with all equipment suppliers to document compliance with CQAP requirements.
- Provide NYSEG and/or the Remediation Engineer with at least 5 days written notice of any tests or inspections required by the Remedial Design; timely notice of all other tests and inspections and an additional 48 hours notice prior to the actual performance of any test or inspection.
- Prepare and submit to the Remediation Engineer all shop drawings and other required submittals specified in the Remedial Design.
- Identify any potential design and/or construction issues as early as possible to allow resolution in a manner that will not impact the quality of the construction or the schedule of construction activities.
- Maintain a continuous record of any approved changes or modifications to the Remedial Design.

- Contract with surveyor; all surveys necessary for the implementation of the remedial activities and for the collection of as-built information will be carried out by personnel practiced in land survey techniques and under the direction of a New York State-licensed Land Surveyor.

3. Documentation Requirements

The documentation of CQA activities will support a determination of whether construction activities have been carried out in general accordance with the Remedial Design.

3.1 Documentation

The documentation process includes recognition of construction tasks that will be observed and documented; assignment of responsibilities for the observation, testing and documentation of these tasks; and the completion of the required reports, data sheets, forms and checklists to provide an accurate record of the work performed during the remedial activities.

3.1.1 Daily Field Construction Reports

The Remediation Engineer will complete a Daily Field Construction Report (DFCR) of each day's construction activities. The DFCRs will be submitted at the end of the week in an electronic format to NYSEG's Project Manager. The DFCR report will contain, at a minimum, the following information:

- Date, project name, location and the number of workers on site for the Remediation Contractor.
- Time that work starts and ends, in addition to the time of work stoppages related to inclement weather, or insufficient equipment or personnel or other reasons.
- Data on weather conditions, including temperature, cloud cover and precipitation.
- Remediation Contractor's workforce, equipment and materials delivered to or removed from the job site.
- Chronological description of work in progress, including notices to or requests from the Remediation Contractor and/or installer.
- A description of any health and safety issues.
- Results of testing performed by on site personnel.

- Problem/deficiency identification and documentation describing corrective actions taken for field problems and non-conformance with this CQAP.

- A record of pertinent communications with other on-site parties, outside companies, regulatory agencies or consultants regarding the day’s construction activities.

- Erosion and sediment control inspection results, including date and time of inspection, a description of the weather and soil conditions at the time of inspection, a description of the condition of the runoff at all points of discharge from the construction site and identification of all erosion and sediment control measures that need repair or maintenance and/or are not functioning as designed and need corrective action(s).

- Documentation of problems and/or deficiencies noted during construction (e.g., when construction material or activity is observed or tested that does not meet the requirements set forth in the Remedial Design), and corrective action employed by the Remediation Contractor to address the problems or deficiencies.

3.1.2 Community Air Monitoring Reports

The Remediation Engineer shall prepare a weekly (or more frequent If requested by NYSDEC and/or NYSDOH) summary of the 15-minute average community air monitoring results (for VOCs and particulates). The summary shall also include, but not be limited to, a description of community air monitoring exceedances (if any), work activities associated with the exceedances, and corrective actions implemented to address the exceedance.

The time and outcome of each MGP-related odor perimeter check will be documented in a daily log, specifically noting the presence or absence of MGP-related odors and identifying the general location(s) along the perimeter where MGP-related odors (if any) are noticed. These daily logs, as well as documentation of any odor complaints received from the public, will be included in the aforementioned weekly CAMP reports to be submitted NYSDEC/NYSDOH.

3.1.3 Health and Safety Accident Reports

In the event of any accident occurring on-site during the remedial project, NYSEG’s *Public Liability Accident Report,* NYSEG’s *Report of Employee Injury,* and/or NYSEG’s

Incident Report will be completed by affected personnel. The Remediation Engineer's Project Manager, CQA Engineer and NYSEG Project Manager will be contacted in the event of an accident. NYSEG's accident report sheets will be attached to the Health and Safety Plan and will be located in the field project trailer.

3.1.4 Transportation Log

The Remediation Engineer will prepare a transportation log to record all loads of solid or liquid waste that are transported off-site. The transportation log will remain in the field office during remedial construction activities.

3.1.5 Photographic Documentation

The Remediation Engineer will document observations, problems, deficiencies and work in progress. Photographs will be in color print format and will be filed in chronological order in a permanent protective file and computer storage system.

The following information will be documented in the daily report or a logbook for each photograph:

- Date and time.
- Location where photograph was taken.
- Description of the subject matter.

3.1.6 Final Engineering Report

A *Final Engineering Report* will be prepared by the Remediation Engineer. The report will meet the requirements of NYSDEC DER-10, and at a minimum, contain the following information:

- Record Drawings showing the installation of each construction material as it relates to the plan views and individual details.

- Correspondence with the NYSDEC and others, as deemed relevant to the remedial activities.

- A summary of field observations and tests performed, laboratory samples collected and test results reported.

- A summary of problems and deficiencies encountered during construction, including recurring problems and/or deficiencies discovered.
- Documentation indicating that acceptance criteria were met, including a comparison of documented procedure data with the Remedial Design.
- A summary of soil and liquid waste characterization and disposal documentation.
- A summary of all imported material and associated material documentation.
- Air monitoring data results.
- Weekly reports.
- A photo log documenting the remedial activities conducted during the remedial construction phase.
- Remediation-related permits pertinent to the phase of remedial construction activities.
- A copy of the tank application/registration with the NYSDEC database.
- Information related to the sub-slab depressurization system installed at the Public Service Building.
- The institutional controls established for the site after the remedial activities have been completed.

3.1.7 Construction Submittals

The Remediation Contractor shall prepare and submit, to the Remediation Engineer, all submittals required in the Remedial Design, in accordance with Specification 01300 – Submittals. Information contained in the Remediation Contractor’s submittals that is not applicable to the specification furnished should be clearly lined out or deleted. The Remediation Contractor’s submittals must be easily legible, clean, and clearly reproduced.

All required submittals shall be reviewed by the Remediation Engineer for conformance with the requirements presented in the Remedial Design. The Remediation Contractor will not be permitted to perform any activity that directly or indirectly involves the item or items covered by a submittal until a “reviewed” or “reviewed and noted” stamp is provided by the Remediation Engineer.

The Remediation Engineer’s review shall in no way be construed as permitting departure from the Remedial Design, except where the written request by the Remediation Contractor and written acceptance by the Remediation Engineer and NYSEG for such departure is provided. The Remediation Engineer’s review does not relieve the Remediation Contractor of any responsibility to comply with applicable laws, rules, regulations or agreements.

3.2 Project Meetings

Daily and/or weekly project safety inspections and/or progress and coordination meetings will be conducted for the duration of the construction activities in accordance with Specification 01200 – Project Meetings. A brief description of the project meetings and inspections/reviews to be conducted is provided below.

3.2.1 Pre-Construction Meeting

Following award of the contract and prior to Remediation Contractor mobilization, a pre-construction meeting will be held at the site to introduce project team members representing (at a minimum) the Remediation Contractor, NYSEG, the Remediation Engineer and the NYSDEC. The meeting will be scheduled by NYSEG shortly after the award of the Contract. The meeting will be conducted to review Contract requirements, establish a detailed schedule of operations and resolve issues (if any) raised by the attending parties.

The Remediation Engineer will prepare a summary of the pre-construction meeting. A copy of this summary will be provided to each of the parties in attendance. Failure by the Remediation Contractor to inform NYSEG, within seven days of receiving this summary, of any discrepancies or inaccuracies contained therein indicates that the Remediation Contractor concurs with the Remediation Engineer’s summary of the meeting.

3.2.2 Daily Site Safety and Coordination Meetings

Daily meetings will be attended by the Remediation Contractor’s representative(s), the Remediation Engineer’s representative(s), NYSEG (as necessary) and other parties to be on site during the day to discuss day-to-day operations, daily schedule, health and safety issues, Remediation Contractor coordination issues and general project status.

3.2.3 Periodic Progress and Coordination Meetings

Periodic progress and coordination meetings will be held on site weekly or as required for the duration of the project. Participants in these meetings will include on-site representatives of the Remediation Contractor and the Remediation Engineer. NYSEG and the NYSDEC may also attend some or all of the weekly progress and coordination meetings. Progress and coordination meetings will be held to discuss issues, including, but not limited to, project status, schedule, scope of work and overall project implementation.

Site inspections/reviews will be conducted by NYSEG and/or Remediation Engineer as part of the periodic progress and coordination meetings prior to, during and at the completion of the remedial activities. The weekly progress and coordination meetings will be scheduled by the Remediation Engineer.

3.2.4 Project Close-Out Meeting

A project close-out meeting will be held at the end of the remedial construction activities. Participants in the meeting will include the Remediation Contractor, NYSEG, the Remediation Engineer and the NYSDEC. The meeting will be scheduled by the Remediation Engineer. As part of the meeting, a final site inspection will be conducted by NYSEG, the Remediation Engineer and NYSDEC.

4. Pre-Construction Activities/Mobilization

This section describes the construction and testing procedures for the activities that will take place prior to the start of the remedial activities.

4.1 Pre-Construction Surveys

An initial site survey will be performed by the Remediation Contractor’s surveyor to document existing (pre-construction) site conditions. During these activities, the surveyor will also establish survey control for the proper construction, documentation and testing of subsequent work activities (e.g., excavation support system, excavation). The Remediation Engineer will document, through visual observation, that survey activities are performed in accordance with Specification 01160 – Survey Control and survey documentation conforms to the requirements of Specification 01720 – Project Record Documents. The Remediation Engineer will also obtain photographic documentation of pre-construction conditions prior to the initiation of construction activities.

4.2 Erosion and Sediment Control Measures

Prior to the start of the remedial activities, erosion and sediment control measures will be constructed/installed/placed by the Remediation Contractor in general accordance with the Design Drawings and Specification 01110 – Environmental Protection Procedures. The Remediation Engineer will document, through visual observations, that erosion and sediment control measures are constructed and maintained in accordance with the Design Drawings and Specification 01110 – Environmental Protection Procedures. Any damage to erosion and sediment controls shall be immediately brought to the attention of and repaired by the Remediation Contractor.

4.3 Temporary Site Security Measures

Temporary site features and site security measures (e.g., fencing, signage) will be installed by the Remediation Contractor. Note that there is an existing chain link fence equipped with a locking vehicle access gate at the site. The Remediation Engineer will document, through visual observation, that temporary site security measures are installed, inspected and maintained by the Remediation Contractor in accordance with the Remedial Design.

4.4 Remedial Support Areas

Prior to the start of the remedial activities, the Remediation Contractor will construct remedial support areas (e.g., equipment/personnel decontamination area, field office trailer, etc.). The Remediation Contractor will be responsible for submitting to the Remediation Engineer a figure indicating the proposed locations of such areas for approval prior to mobilization, in accordance with Specification 01901 – Temporary Facilities and Office Support.

The Remediation Engineer will observe that the decontamination area is constructed in accordance with Remedial Design and is sloped and equipped with a sump to collect liquids. Note that material staging areas will not be required for the completion of the constructions activities. Excavated material will be direct-loaded to transportation trucks. The Remediation Engineer will also observe that the remedial support areas are constructed in approved locations within the Remedial Design.

4.5 Utility Identification

Prior to remedial construction activities, the Remediation Engineer will document, through visual observation, the following:

- Dig Safely New York is contacted by the Remediation Contractor and the utility clearance is completed prior to the initiation of any intrusive activities.
- Utility locations/alignments are marked-out on the ground.

The locations, alignments, and construction of utilities shown on the Design Drawings are approximate and based on information available to NYSEG and the Design Engineer. Any differences identified by the Remediation Contractor between the utilities shown on the Design Drawings and those encountered in the field will be brought to the immediate attention of NYSEG and the Remediation Engineer.

5. Excavation Support

Temporary excavation support will consist of a pre-fabricated steel slide rail system. Components of the slide rail system will consist of, but not be limited to steel panels, posts, that when assembled form a temporary steel sheeting system. The slide rail system consists of a bay, which is typically formed by four posts with either panels and/or bracing to form its four sides.

5.1 Manufacturing and Delivery

All components of the slide rail system shall be free of warps, local deformations, or unauthorized bends. Holes and other provisions for field connections shall be accurate, so that proper fit will result when the slide rail components are assembled in the field.

<u>CQA Observations</u>

The Remediation Engineer will observe and document that the components of the slide rail system are acceptable and free of warps, local deformation, or unauthorized bends. The Remediation Engineer will confirm that the delivered slide rail components meet the size and requirement of the Remediation Contractor’s shop drawings.

5.2 Handling and Storage

Components of the slide rail system shall be inspected by the Remediation Contractor, cleaned of rust and/or dirt, as necessary, covered and protected from weathering. Components shall be stored to adequately protect them from equipment damage.

<u>CQA Observations</u>

The Remediation Engineer will observe and document, throughout the pre-installation, installation and post-installation periods, that the Remediation Contractor is providing adequate handling equipment for moving slide rail components and that the equipment and the handling methods used do not pose unnecessary risk of damage.

5.3 Pre-Installation

Prior to installation of the slide rail system, the Remediation Engineer will check the following and note observations in the Daily Construction Field Report:

- Line and grade of slide rail system.
- Condition of slide rail components, if required.
- Slide rail installation method to be utilized will not damage the slide rail components or any nearby structures.
- The locations of obstructions (or potential obstructions) have been verified by the Remediation Contractor and adequate removal has occurred to facilitate installation of slide rail components.

5.4 Slide Rail System Installation

The slide rail system is installed using a top-down method and is advanced into the excavation as soil is removed. The system will be installed vertically to the elevations indicated in the Remedial Design. Care should be taken to establish that the slide rail components do not deviate from location, or undergo excessive bending or twisting during installation.

CQA Observations

During installation of the slide rail components, the Remediation Engineer will monitor for irregularities and indications that the components are installed out of plumb or experiencing excessive bending and/or twisting. Such instances will be reported to the Remediation Contractor. If deficiencies cannot be corrected, the components will be pulled and either replaced or re-installed as needed.

Daily installation records will also be maintained by the Remediation Engineer during the installation of the slide rail system. The installation log will include the slide rail components, method for installation and removal of obstructions, depth of component, and depth of excavation.

As the excavation proceeds and the slide rail components are installed, the Remediation Engineer will also inspect the alignment of the components and the condition of the ground surface (up to 20 feet) around the supported excavation. Observations will be noted on the daily logs and will include at a minimum observations of:

- Movement/settlement of the ground surface behind the slide rail system.

- Visually observed deflection of the slide rail system.

The Remediation Engineer will also monitor the seepage of water through the slide rail components during excavation activities. These observations will be documented in the Daily Field Construction Report, and the Remediation Contractor will be notified immediately if excessive leakage is occurring.

5.5 Post-Installation

Following installation of the slide rail components and excavation to the target removal depth, monitoring of the slide rail system and ground surface will continue as the excavation is backfilled and the slide rail components are removed. Monitoring activities will be similar to those during installation and will include:

- Movement/settlement of the ground surface behind the slide rail system.
- Visually observed deflection of the slide rail system.

Decontamination of slide rail components is required as discussed in Section 7.2 of this CQAP.

6. Excavation

Excavation activities will be performed by the Remediation Contractor in accordance with the Remedial Design. All removed soil, non-aqueous phase liquid (NAPL) (if any), debris and water will be handled in accordance with the *Waste Management Plan*.

6.1 Soil and Tank Removal

Excavation activities will be performed in general accordance with the following Specifications:

- 01160 – Survey Control
- 02201 – Earthwork
- 02205 – Excavation Support and Protection
- 02415 – Impacted Material Handling and Excavation Procedures

The excavation area and excavation support systems are shown in the Design Drawings. The Remediation Engineer shall conduct community air monitoring (in accordance with the CAMP) during all intrusive activities. The Remediation Contractor shall confirm that community air monitoring is being conducted prior to the start of any intrusive activities.

The Remediation Engineer shall be responsible for coordinating with the NYSDEC to register the former tank under the NSYDEC’s Bulk Storage Program. Additionally, the Remediation Engineer shall be responsible for collecting a documentation soil sample from the bottom of the tank removal area.

CQA Observations

The Remediation Engineer will observe excavation activities to: 1) document that they are being performed in accordance with the Remedial Design and; 2) report non-conformances to the Remediation Contractor.

Throughout excavation activities, the surveyor (contracted by the Remediation Contractor) will measure the excavation elevations, and the Remediation Engineer will document that the appropriate removal elevation has been achieved. The Remediation Engineer shall collect one documentation sample from the bottom of the excavation.

6.2 Excavation and Material Dewatering

Excavation and material dewatering will be completed in general accordance with the following Specifications:

- 02201 – Earthwork
- 02202 – Rock and Debris Removal
- 02415 – Impacted Material Handling and Excavation Procedures

<u>CQA Observations</u>

The Remediation Engineer will observe and document that the dewatering system is functioning properly and that water generated during construction activities is being handled in accordance with the WMP and Specification Section 02415 – Impacted Material Handling and Excavation Procedures. During excavation activities, the Remediation Engineer will also observe and document the effectiveness of dewatering activities.

6.3 Solid Waste Handling and Disposal

The Remediation Engineer shall arrange for proper handling, treatment and disposal of waste materials, including, but not limited to, soil, water, NAPL, debris and miscellaneous wastes generated during the remedial activities in accordance with the WMP, Specification 02415 – Impacted Material Handling and Excavation Procedures, and all applicable federal, state and local regulations. NYSEG will contract directly with waste haulers and treatment/disposal facilities.

Materials will be direct-loaded with an excavator into dump trucks for transportation to permitted disposal facilities. To retain any spilled materials, polyethylene sheeting will be placed between dump truck and excavations or stockpiles. Following completion of loading, any spilled material will be placed into the truck or excavation. Vapor suppression will be conducted in accordance with the Remedial Design (e.g., BioSolve® PinkWater®, polyethylene sheeting, foam). The Remediation Contractor may temporarily stage excavated debris on-site in a fully lined roll off.

<u>CQA Observations</u>

The Remediation Engineer will observe the implementation of the remedial activities at the site to document that waste materials are being handled/managed in accordance with the WMP, Specification 02415 – Impacted Material Handling and Excavation Procedures, and all applicable federal, state, and local regulations. The Remediation Engineer will visually inspect the loading area to confirm that impacted material that collects on the polyethylene sheeting is either placed in the truck of back into the excavation.

The Remediation Engineer will maintain the following documentation for waste handling, treatment and disposal activities:

- Bills of Lading/Hazardous Waste Manifests.
- Chain of Custody records.
- Trucking logs.
- Waste profiles
- Counter-signed waste manifests and facility disposal receipts for waste material transported off-site.

6.4 Liquid Waste Handling, and Disposal

The Remediation Contractor shall use appropriate means and methods to dewater/stabilize materials prior to excavation and transportation to the Owner-selected off-site treatment/disposal facility. All water generated during the remedial activities shall be collected and stored in a 21,000 gallon frac tank (to be provided by the Remediation Contractor) to be staged as shown on Design Drawing 3 (Appendix A). A pre-fabricated spill containment berm shall be placed beneath the tank.

CQA Observations

The Remediation Engineer shall coordinate with NYSEG-selected waste transportation vendors and disposal facilities to manage and remove the containerized water from the work area. The Remediation Engineer will observe and document that the waste transportation and disposal activities are being conducted in accordance with all applicable state and federal requirements, as well as the requirements set forth by the disposal facility.

7. Decontamination

The Remediation Contractor will decontaminate (as necessary) all personnel and equipment that has come into contact with excavated materials at the site in accordance with the Remedial Design. The Remediation Contractor will conduct decontamination of personnel and equipment within constructed decontamination area(s).

7.1 General Decontamination Activities

As part of everyday activities, the Remediation Contractor will provide a personnel decontamination area. The personnel decontamination area (within the contamination reduction zone) will include those facilities necessary to decontaminate personnel upon exit of the work area (exclusion zone), in accordance with the Remediation Contractor's HASP, and in accordance with local, state and federal laws and regulations.

The Remediation Contractor will establish procedures for the decontamination of all vehicles and equipment used for construction activities in general accordance with Specification 01112 – Decontamination Procedures. Visual observation of the equipment will be performed by the Remediation Contractor. This observation will occur while the equipment is positioned in the Equipment Decontamination Area. Any visible soils or other debris will be promptly removed and disposed in a manner consistent with materials excavated.

Unless otherwise directed by NYSEG/Remediation Engineer, any equipment to be taken off-site (including vehicles transporting clean fill materials to the site) will be subject to final visual inspection and decontamination (if necessary) at a designated Equipment Decontamination Area. In general, this area will consist of an impermeable barrier, which shall be sloped to a collection sump. The Equipment Decontamination Area will be constructed in accordance with the Design Drawings. Precautions shall be taken to limit contact between the equipment, personnel performing the decontamination activities, and any decontamination liquids that may accumulate in the decontamination area. The Remediation Contractor shall be responsible for constructing and maintaining the decontamination area to accommodate all loads, equipment and migration scenarios. The Remediation Contractor will dismantle and properly dispose of all materials associated with the decontamination area and will restore the area to its original (pre-construction) condition.

The extent and method of decontamination will be at the discretion of the Remediation Contractor; however, equipment and materials will be observed by the Remediation Engineer prior to its departure from the Equipment Decontamination Area. In addition, NYSEG and/or the Remediation Engineer reserves the right to require additional decontamination if deemed necessary.

Wash water, solids and other materials generated during equipment cleaning shall not contact native soils and existing facilities, and shall be collected by the Remediation Contractor and placed into designated containers. Disposal of collected wash water, solids and other materials shall be in accordance with the WMP and Specification 02415 – Impacted Material Handling and Excavation Procedures.

Personnel engaged in vehicle decontamination will use personal protective equipment, including disposable clothing in accordance with the Remediation Contractor’s HASP.

Should vehicles be required to transport materials over site roadways or roadways traversed by local traffic, it is imperative that these roads be kept free of any potentially impacted, as well as non-impacted, soils due to Remediation Contractor’s operations. All Remediation Contractor vehicles will be carefully loaded to avoid potential contamination of areas beyond the limits of excavation.

CQA Observations

The Remediation Engineer will observe decontamination activities to document that the following activities (at a minimum) are completed in accordance with the Remedial Design and Remediation Contractor’s HASP:

- Project equipment (including, but not limited to, excavation equipment, excavation support components, trucks, pumps, hand tools) that comes in contact with excavated materials is decontaminated prior to demobilization from the site and prior to handling non-impacted material.

- No visible soil, sediment, debris or stains are present on the equipment surfaces entering or leaving the site (to the satisfaction of the Remediation Engineer).

- Equipment, such as pumps, are flushed using clean water and appropriate cleaning agents, as necessary (to the satisfaction of the Remediation Engineer).

- Solids and other materials generated during equipment decontamination requiring off-site treatment/disposal are collected and placed into appropriate waste containers for characterization (as appropriate) and off-site treatment/disposal in accordance with the WMP and Specification 02415 – Impacted Material Handling and Excavation Procedures.

7.2 Decontamination of Excavation Support Systems

Following completion of excavation and backfilling activities and removal of the slide rail components, the Remediation Contractor will decontaminate the slide rail system components at the equipment decontamination area prior to demobilization from the site.

<u>CQA Observations</u>

The Remediation Engineer will observe and document decontamination procedures of the excavation equipment and support structures.

8. Site Restoration/Demobilization

Following completion of excavation activities, the Remediation Contractor shall backfill and restore the excavation area (and other disturbed areas); place materials for the site cover system; and demobilize labor, equipment and materials from the site in accordance with the Remedial Design. Site restoration activities shall include site cover system installation; repairing/replacing disturbed sidewalks (if any), pavement and curbs, vegetated surfaces, permanent site fencing; and completing final grading of disturbed areas. Site restoration and demobilization activities shall be completed and tested as indicated below.

8.1 Backfilling

The excavation area will be backfilled in accordance with the Remedial Design. The Remediation Contractor will select an appropriate off-site backfill source and provide the analytical data for that source to the Remediation Engineer at least three weeks prior to bringing the selected material on site. If sample results show that the material does not meet the requirements of the Specification 02206 – Selected Fill, the Remediation Contractor must identify a new source for the material and provide the required data report for the new source of material prior to the use of such material on site.

Remediation Contractor Submittals

Remediation Contractor submittal requirements for backfilling activities and proposed fill materials are presented in Specifications 02201 – Earthwork and 02206 – Selected Fill, respectively. Such submittal requirements include, but are not limited to, the following:

- Name and location of the source of each proposed fill material.
- Laboratory test report for each proposed fill material indicating the grain-size profile (determined by ASTM D422).
- Results of in-place density tests performed on fill materials (determined by ASTM D1556 or ASTM D2922).
- For any off-site material proposed for use on-site as General Fill, Select Fill or topsoil, the Remediation Contractor must provide the following information (for each material) at least three weeks prior to bringing such material on-site:
    - Certification that the proposed fill material is from a New York State Department of Transportation-(NYSDOT-) certified source.

  - Results of analytical testing for volatile organic compounds, semi-volatile organic compounds, polychlorinated biphenyls, pesticides/herbicides and inorganics to demonstrate that the proposed fill material meets the commercial soil cleanup objectives outlined in 6NYCRR Part 375 (Environmental Remediation Programs) and in accordance with Specification 02206 – Selected Fill.

  - Certification that the laboratory used to analyze the proposed fill material is certified by the New York State Department of Health Environmental Laboratory Approval Program for the parameters being analyzed.

- For Controlled Low Strength Material (CLSM) provide the following observations:

  - Description of Remediation Contractor’s proposed CLSM mixture design, including sources and proportions of CLSM ingredients.

  - CLSM producer’s certification that the mixture design will achieve the strength specified in this section.

  - Remediation Contractor’s proposed method of placement for CLSM.

  - Certified batch reports for CLSM delivered to the site providing documentation that the CLSM was prepared in accordance with the approved mixture design.

  - Submit test reports of compressive strength testing of CLSM. Sampling shall consist of collection of four cylinders for every 50 cubic-yards of material placed. Two cylinders shall be tested at 28 days for verification that strength is a minimum of 50 psi. The remaining two cylinders shall be kept for testing as necessary. Cylinders to be collected at random intervals as determined by the Remediation Engineer.

CQA Observations

The Remediation Engineer will observe backfilling activities to document that the following activities (at a minimum) are completed in accordance with the Remedial Action Design:

- Backfilling is conducted in accordance with Specification 02201 – Earthwork.

- Material is placed and compacted in accordance with Specification 02201 – Earthwork.

- Compacted surface of material is smooth and free of any loose stones, protrusions and other sharp objects or foreign matter.

- Any depressions from settlement of fill material is refilled and compacted.
- Any holes remaining after the removal of slide rail components are filled with sand.
- CLSM batched and delivered in accordance with AASTHO M 157.
- CLSM is placed within 30 minutes of the end of mixing if transported in open haul units. Verification that a rotating drum unit capable of 2 to 6 rotations per minute shall is used to transport CLSM that is not placed within 30 minutes after the end of mixing.
- CLSM is placed at a uniform rate using methods identified by the Remediation Contractor and approved by the Remediation Engineer.
- CLSM is not be placed on frozen ground. The minimum ambient temperature at the time of placement shall be 35°F.

8.2 Surface Restoration

Following backfilling activities, the Remediation Contractor shall install the site cover materials in accordance with the Remedial Design. The Remediation Contractor shall be responsible for the repair and/or replacement of any sidewalks or roadways (damaged during the remedial construction activities) in accordance with the City of Geneva.

CQA Observations

Prior to the start of construction, the Remediation Engineer will obtain photographic documentation of pre-construction conditions in all areas that will or may be disturbed during remedial activities.

The Remediation Engineer will observe surface restoration activities to document that: 1) restoration is completed in accordance with latest edition of NYSDOT Standard Specifications and/or the NYS Standards and Specifications for Erosion and Sediment Control (NYS E&SC Manual), as applicable, and 2) the following activities (at a minimum) are completed in accordance with the Remedial Design:

Gravel Surface Cover:

- The sub-grade is shaped to line and grade and compacted in accordance with the Remedial Design.
- All depressions that develop in the sub-grade under rolling are filled with acceptable material and re-rolled.

- Soft areas of the sub-grade are removed and filled with acceptable material and re-rolled.
- Should the sub-grade become rutted or displaced prior to placing geotextile, it is re-worked to bring to line and grade.
- Compaction is conducted throughout the sub-grade, as required by the Remedial Design.
- The final surface material is placed to the minimum required thickness, in accordance with the Remedial Design.
- The final surface material is shaped to line and grade and compacted in accordance with the Remedial Design.

Vegetative Surface Cover:

- The sub-grade is shaped to line and grade and compacted in accordance with the Remedial Design.
- All depressions that develop in the sub-grade under rolling are filled with acceptable material and re-rolled.
- Soft areas of the sub-grade are removed and filled with acceptable material and re-rolled.
- Should the sub-grade become rutted or displaced prior to placing geotextile, it is re-worked to bring to line and grade.
- Compaction is conducted throughout the sub-grade, as required by the Remedial Design.
- The sub-base material is placed to the minimum required thickness, in accordance with the Remedial Design.
- The sub-base is shaped to line and grade and lightly compacted in accordance with the Remedial Design.
- All depressions that develop in the sub-base during grading/compacting are filled with acceptable material and re-graded/re-compacted.
- Should the sub-base become rutted or displaced prior to placing surface material, it is re-worked to bring to line and grade.

- A minimum of 6 inches of topsoil is placed to the lines and grades indicated in the Remedial Design, and lightly compacted.

- Prior to placement of seed and mulch, the topsoil surface is lightly loosened, roughened or tracked (i.e., in accordance with the tracking procedures outlined in the NYS E&SC Manual).

- Seed and mulch are placed at the minimum required application rates specified in the Remedial Design, and uniformly distributed over the entire area to be re-vegetated.

- Following seeding and mulching, the Remediation Contractor continues to maintain the vegetated areas (including reseeding, if necessary) until a minimum 80 percent density of perennial vegetation is established in the vegetative surface cover area.

8.3 Demobilization

The Remediation Contractor will demobilize from the site following completion of all remedial activities. Demobilization activities will include, at a minimum, the following:

- Cleaning/decontaminating equipment and construction-related materials prior to removal from the site.

- Dismantling the work area(s), equipment/personnel decontamination area(s) and other remedial support areas.

- Disposing of decontamination area construction materials in accordance with the WMP and Specification 02415 – Impacted Material Handling and Excavation Procedures.

- Removing from the site, all materials, equipment, and support structures.

CQA Observations

The Remediation Engineer will observe the Remediation Contractor demobilization activities to document that the following activities were completed in accordance with the Remedial Design:

- Equipment and construction-related materials have been cleaned/decontaminated prior to demobilization from the site.

- Work area(s), equipment/personnel decontamination area(s) and other remedial support areas have been dismantled.

- All Remediation Contractor materials, equipment and support systems have been removed from the site.

ARCADIS

Appendix F

Community and Environmental Response Plan

ARCADIS
Infrastructure · Water · Environment · Buildings

Imagine the result

NYSEG

Community and Environmental Response Plan

Wadsworth Street Former Manufactured Gas Plant Site

Site No. 8-35-015

Geneva, New York

February 2014

Community and Environmental Response Plan

Wadsworth Street Former Manufactured Gas Plant Site
Site No. 8-35-015

Prepared for:
NYSEG

Prepared by:
ARCADIS of New York, Inc.
6723 Towpath Road
P O Box 66
Syracuse
New York 13214-0066
Tel 315 446 9120
Fax 315 449 0017

Our Ref.:
B0013104

Date:
February 2014

Table of Contents

1. Introduction

This *Community and Environmental Response Plan* (CERP) has been prepared to support the implementation of remedial activities at the NYSEG Wadsworth Street Former Manufactured Gas Plant (MGP) Site (the site) located in Geneva, New York (Site No. 8-35-015). Details related to the remedial activities are presented in the *Final (100%) Remedial Design* (Remedial Design) (ARCADIS, 2014).

This CERP has been prepared in accordance with New York State Department of Environmental Conservation (NYSDEC) *DER-10: Technical Guidance for Site Investigation and Remediation* (DER-10) (NYSDEC, 2010). The purpose of this CERP is to present a summary of the site monitoring and work practices that will be completed to address potential short-term impacts to the surrounding community and/or environmental resources. Additional details regarding site monitoring and work practices are presented in the Remedial Design and the associated Remedial Design appendices including, but not limited to:

- Design Drawings (Appendix A)
- Technical Specifications (Appendix B)
- Community Air Monitoring Plan (CAMP) (Appendix C)
- Waste Management Plan (WMP) (Appendix D)
- Construction Quality Assurance Plan (CQAP) (Appendix E)
- Contingency Play (Appendix H)

Section 2 of this CERP includes a summary of the monitoring to be conducted during remedial construction activities and Section 3 describes site management and controls.

1.1 Site Location and Description

The site is located in the City of Geneva, near the northwestern shore of Seneca Lake in eastern Ontario County, New York. The former MGP site is comprised of a rectangular piece of land that is now located in a mixed commercial and residential area in the east-central part of Geneva, New York. Seneca Lake is located approximately 900 feet southeast of the site. The site is bordered by Wadsworth Street to the east, a railroad (Finger Lakes Railway) to the south, a restaurant to the west and residential properties to the north. A dry cleaner is located northeast of the site, on the east side of Wadsworth Street. Railroad Place intersects Wadsworth Street and bisects the site. A gas holder (Gas Holder 1) and coal shed where formerly located in Railroad Place. The portion of the former MGP site located north of Railroad Place is currently owned by NYSEG, while the area south of Railroad Place is owned by the City of Geneva. The area owned by NYSEG includes a grass-covered area in the eastern portion of the property and an asphalt parking lot comprises the western portion of the property. A restaurant on Railroad Place leases the parking area from NYSEG. A gravel parking area is located in the northeast portion of NYSEG's property and is used by residential property owners. A NYSEG gas regulator shed is located near the intersection of Railroad Place and Wadsworth Street.

Several MGP structures formerly existed at the current location of the City of Geneva's Public Safety Building (PSB) south of Railroad Place. The PSB consists of office space and an attached pole barn structure. A parking lot used by PSB employees is located west of the PSB.

1.2 Summary of Remedial Construction Activities

In general, the remedial activities to be performed at the site consist of:

- Removal of the top 12-inches of existing surface material (i.e., topsoil and gravel) to facilitate installation of a new soil cover.

- Removal of the former tank and source material in the immediate vicinity of the tank.

- Placement of backfill materials within the excavation area.

- Visual Inspection of Gas Holder 3 foundation (and removal of dense non-aqueous phase liquids [DNAPL] if encountered).

- Installation of a demarcation layer and placement of a minimum of 1-foot clean fill materials.

Additional details regarding the remedial activities are provided in the Remedial Design.

1.3 Project Responsibilities

Responsibilities of the Owner (NYSEG), the Remediation Engineer, and the Remediation Contractor, as they relate to the implementation of this CERP, are presented below.

- *NYSEG* – primary responsibility is to coordinate with the Remediation Contractor and Remediation Engineer (as necessary) to implement the required work activities in conformance with the Remedial Design. NYSEG will be responsible for contracting with a Remediation Engineer; Remediation Contractor; and necessary analytical laboratories, waste haulers, and waste disposal facilities.

- *Remediation Engineer* – responsibility is to provide project management/oversight to observe and monitor implementation of the remedial construction activities. The Remediation Engineer will be responsible for performing community air monitoring in accordance with the site-specific CAMP. Note that the Remediation Contractor will be responsible for implementing controls to address community air monitoring exceedances, if necessary. The Remediation Engineer is also responsible for collecting soil and groundwater samples and coordinating with the owner-selected laboratory to facilitate analysis of waste characterization samples, as necessary.

- *Remediation Contractor* – primary responsibility is to complete remedial construction activities as presented in the Remedial Design. The Remediation Contractor will be responsible for verifying that community air monitoring is in place prior to conducting intrusive site activities. The Remediation Contractor will also be responsible for conducting and implementing the general site management practices and controls described in Section 3.

2. Site Monitoring

This section presents a summary of the monitoring to be conducted during implementation of the remedial construction activities to evaluate potential short-term impacts to the surrounding community.

2.1 Community Air Monitoring

Community air monitoring will be conducted by the Remediation Engineer during all intrusive and material handling activities associated with the remedial construction activities (e.g., installation of excavation support systems, excavation, material loading, backfilling, etc.). Detailed requirements for air monitoring procedures are presented in the site-specific CAMP. Air monitoring procedures will be completed in accordance with the New York State Department of Health (NYSDOH) *Generic Community Air Monitoring Plan* (NYSDEC, 2002) and generally consist of monitoring for volatile organic compounds (VOCs) and particulates at one upwind location (to establish site background conditions) and two downwind locations (to evaluate air quality leaving the site).

As presented in the CAMP and Specification 02507 – Odor, Vapor, and Dust Control (included as part of Appendix B of the Remedial Design), exceedances of VOC and/or particulate action levels will require emission controls and dust suppression measures. Control measures to be implemented by the Remediation Contractor may potentially consist of:

- Water spray
- BioSolve® PinkWater®
- Polyethylene sheeting (e.g., for covering excavation faces, material stockpiles)
- Minimizing excavation surface area to be exposed at any given time
- Vapor suppression foam

Additionally, the CAMP also includes community notification procedures to be conducted if air monitoring action levels continue to be exceeded after implementation of emission controls.

As a preventative measure, upon completion of a shift and prior to leaving the site at the end of a day, any open excavations will be backfilled to minimize potential odors, to the extent practical, or covered with polyethylene. During the work day, exposed areas may be tarped, foamed or temporarily covered, as required, to control odors. An odor agent (e.g., BioSolve® PinkWater®, foam product) will be used as necessary.

2.2 Odor Monitoring

During working hours, the Remediation Engineer shall perform periodic walks around the perimeter of the work area to monitor for MGP-related odors. These perimeter checks will be performed more frequently, as necessary, depending on the work being performed. If MGP-related odors are noticed along the perimeter of the work area, work will continue and odor, vapor, and dust suppression techniques employed to abate emissions. Additionally, construction techniques will be evaluated and modified, if necessary and appropriate, and more frequent checks of the work area perimeter for MGP-related odors will be performed. If MGP-related odors continue to be noticed at the perimeter of the work area, work will be stopped while activities are re-evaluated. The source or cause of the MGP-related odors will be identified and additional modifications of construction techniques or additional methods to abate emissions will be implemented. Work will resume provided the measures are successful at abating the odors noticed along the work area perimeter.

2.3 Noise Monitoring

Prior to mobilization by the Remediation Contractor, the Remediation Engineer shall conduct background noise monitoring using a Quest Q-500 dosimeter, Larson Davis 820 Noise Meter, or equivalent. Background monitoring shall be conducted at potential receptor locations along Railroad Place and Wadsworth Street between 7:00 am and 5:00 pm over a three day period to establish ambient noise levels, including noise levels generated by local truck and railroad traffic.

The Remediation Engineer shall periodically (e.g., semi-weekly or more frequently based on potential noise complaints) monitor noise levels along Railroad Place and Wadsworth Street when remedial construction activities are being conducted. If noise complaints are received, NYSEG and the Remediation Engineer shall coordinate with NYSDEC to determine if noise levels are greater than background levels, and the Remediation Contractor may be required to employee additional noise reduction measures (e.g., noise dampening curtains, modified work sequence, etc.).

3. Site Management and Controls

This section presents a summary of the site management practices and controls that will be utilized to minimize potential short-term impacts to the surrounding community during remedial construction activities.

3.1 Site Security

Public access to the site is restricted by a chain link fence equipped with a locking vehicle access gate. The existing site fence will be maintained during the remedial activities to the extent practicable. Select portions of the existing site fencing will be removed to complete remedial construction activities. In areas where existing site fencing is removed, the Remedial Contractor will install temporary site fencing to maintain site security. Following completion of the remedial construction activities, the Remediation Contractor will remove the temporary fencing and install new permanent site fencing to match the pre-remediation site conditions.

Unauthorized personnel will not be permitted on the NYSEG property. The Remediation Contractor shall post “DANGER: CONSTRUCTION AREA, AUTHORIZED PERSONNEL ONLY” signs on the existing site fencing and a sign reading “All Site Visitors Must Sign-In Here” shall be affixed to the office trailer exterior. All vehicle traffic will enter the site from Wadsworth Street.

3.2 Street and Sidewalk Closure

Permanent or semi-permanent road/lane closures will be not be permitted in Railroad Place or Wadsworth Street (per March 2011 conversations with City of Geneva Department of Public Works). Additionally, sidewalks closures are not anticipated to be required to complete the remedial activities.

3.3 Erosion and Sediment Controls

Erosion and sediment control measures will be provided, installed, and maintained by the Remediation Contractor to prevent silting and muddying of existing drainage systems, streams, rivers, impoundments. Details regarding locations and type of controls are presented on the Remedial Design Design Drawings and in Specification 01110 – Environmental Protection Procedures.

Erosion and sediment control measures shall be installed and maintained in accordance with the latest edition of the *New York State Standards and Specifications for Erosion and Sediment Control* (NYSDEC, 2005) (or most recent). Erosion and sediment control measures will generally consist of silt fence and/or straw bale dikes installed around the project work limits. At a minimum, the Remediation Engineer shall inspect erosion and sediment control measures daily and after storm events. Inspection results shall be summarized in weekly inspection reports. Report requirements are provided in Specification 01110 – Environmental Protection Procedures.

In general, the Remediation Contractor shall take all precautions to prevent, or reduce to a minimum, any damage to surface water from pollution by debris, sediment, or other material, or from the manipulation of equipment and/or materials within or adjacent to existing and new drainage systems, creeks, streams, rivers, impoundments, or other water bodies. The Remediation Contractor is prohibited from the following:

- Dumping of spoil material into any drainage way, any surface waters, or at unspecified locations.

- Pumping of silt-laden water from trenches or other excavations into any drainage way, surface waters, or at unspecified locations.

- Damaging vegetation beyond the extent necessary for remedial construction.

- Disposal of trees, brush, and other debris in any stream corridors, any drainage way, or at unspecified locations.

Following the completion of the remedial construction activities, the Remediation Contractor shall restore disturbed surfaces as indicated in the Remedial Design, or as approved by the Remediation Engineer.

3.4 Waste Management

In general, waste materials generated during implementation of the remedial construction activities will be managed based on the results of the waste characterization sampling and in accordance with the WMP.

3.4.1 Solid Waste

Final off-site disposal and/or treatment of excavated material is anticipated to include treatment/disposal via low-temperature thermal desorption (LTTD) or disposal as a non-hazardous solid waste at facilities selected by NYSEG. Excavated debris will be disposed or recycled at an appropriate facility selected by NYSEG.

3.4.2 Liquid Waste

All construction related waters generated during the remedial construction activities (i.e., decontamination water, water removed excavation areas, water removed from material staging areas) will be collected, stored temporarily in a 21,000 gallon frac tank (to be provided by the Remediation Contractor), and transported for off-site disposal at a NYSEG-selected facility.

3.4.3 Non-Aqueous Phase Liquids

NAPL encountered during excavation/material dewatering activities will be collected (if in sufficient quantities to be recovered) and placed in appropriate containers (e.g., 55-gallon drums) and staged on-site for characterization by the Remediation Engineer prior to off-site disposal at a NYSEG-selected facility.

3.5 Transportation Controls

The use of the term “transporter” shall mean the transporter and the Remediation Contractor if/when the transporter is subcontracted to the Remediation Contractor. The following subsections present the preferred trucking route for the off-site transportation of solid and liquid non-hazardous and hazardous wastes generated by the remedial activities at the site. The preferred trucking route for waste transporters, as well as haulers transporting materials to the site, includes the following roadways:

- Traveling to the site
    - Enter Geneva on Route14 (Exchange Street)
    - Turn east onto Railroad Place
    - Turn north onto Wadsworth Street

- Leaving the site
    - Turn right (south) onto Wadsworth Street
    - Turn right (west) onto Railroad Place

- Proceed on Route 14 (Exchange Street)

Alternative trucking routes shall be approved by NYSEG and/or the Remediation Engineer prior to use.

3.6 Decontamination

The Remediation Contractor will decontaminate (as necessary) all personnel and equipment that comes into contact with excavated materials in accordance with Specification 01112 – Decontamination Procedures. At a minimum, the Remediation Contractor will decontaminate (to the satisfaction of NYSEG and/or the Remediation Engineer) the project equipment (including, but not limited to, excavation equipment, trucks, pumps, and hand tools) that comes in contact with excavated materials prior to handling clean material and/or leaving the site. Any visible soils or other debris shall be promptly removed and disposed of in a manner consistent with the materials excavated.

The Remediation Contractor will conduct decontamination of personnel and equipment within the constructed decontamination area. The Remediation Contractor will perform decontamination activities until no visible soil, debris, or stains are present on the equipment surfaces (to the satisfaction of NYSEG and/or the Remediation Engineer).

ARCADIS

Appendix G

Citizens Participation Plan

ARCADIS
Infrastructure · Water · Environment · Buildings

Imagine the result

NYSEG

Citizen Participation Plan

Wadsworth Street Former Manufactured Gas Plant Site
Site No. 8-35-015
Geneva, New York

February 2014

Citizen Participation Plan

Wadsworth Street Former Manufactured Gas Plant Site
Site No. 8-35-015

Prepared for:
NYSEG

Prepared by:
ARCADIS of New York, Inc.
6723 Towpath Road
P O Box 66
Syracuse
New York 13214-0066
Tel 315 446 9120
Fax 315 449 0017

Our Ref.:
B0013104

Date:
February 2014

Table of Contents

Figures

Attachment

1. Introduction

This *Citizen Participation Plan* (CPP) documents the planned project-specific public outreach activities and resources identified for the remedial program associated with the NYSEG Wadsworth Street Former Manufactured Gas Plant (MGP) Site (the site) located in Geneva, New York (Site No. 8-35-015).

1.1 Overview

Citizen participation is an integral component of remedial programs in New York State. Input from affected or interested individuals and organizations on the remedial program helps ensure outcomes that account for both technical and human concerns for protecting public health and the environment. A project-specific plan is a mechanism to inform and involve community residents, public and private leaders, and other stakeholders.

This CPP has been prepared in accordance with the New York State Department of Environmental Conservation (NYSDEC) guidance document entitled DER-23 *Citizen Participation Handbook for Remedial Programs* (DER-23) (NYSDEC, 2010). This CPP presents the planned communication and outreach activities, describes how interested individuals and groups can participate in the remedial program, and provides a variety of reference materials to facilitate gaining access to project-specific information and management personnel.

1.2 Purpose

The primary purpose of this CPP is to outline the citizen participation activities that, based on applicable New York State law and New York State Department of Environmental Conservation (NYSDEC) regulations and guidance, provide for constructive communication of program activities between the stakeholders and other interested parties. Citizen participation activities are designed to achieve the following objectives:

- Help the affected and interested public to understand the environmental impacts at the site, and the nature and progress of NYSEG’s remediation program to clean up the site.

- Describe the project phases and sequence of steps taken when investigating and remediating the site.

- Identify when citizen participation activities are issued.
- Ensure open communication between the public and project staff through the remedial program.
- Create opportunities for the public to contribute information, opinions, and perspectives that have the potential to influence decisions about the site-specific remedial program.

This document includes methods intended to inform interested parties of program developments, elicit responses and public involvement, and provide a central point of contact for inquiries regarding the remedial program for the Wadsworth Street Former MGP Site.

2. Manufactured Gas Plants

MGPs were operated between the 1800s and mid-1900s (before the development of natural gas systems) to convert coal and oil into gas for heating, lighting and cooking. Manufactured gas-production byproducts, typically dense non-aqueous phase liquid (DNAPL) (i.e., coal tar), often account for the majority of the impacts at former MGP sites. Principal components of coal tar routinely analyzed for at MGP sites consist of benzene, toluene, ethylbenzene, and xlyene (BTEX) compounds, which are volatile organic compounds (VOCs), and polycyclic aromatic hydrocarbons (PAHs), which are semi-volatile organic compounds (SVOCs). Inorganic compounds (i.e., metals) are also a common constituent of concern at MGP sites. Visual characterization of media and laboratory analysis of environmental samples for these classes of compounds is a useful way of identifying the nature and extent of environmental media affected by coal tar.

3. Project Steps

Remedial Investigation and Remedial Construction activities have been/will be completed at the site in accordance with the Administrative Order on Consent (Index No. D0-0002-9309) between NYSEG and NYSDEC. This section presents a description of the typical steps taken to investigate and, when necessary, remediate a site as part of the Order on Consent.

3.1 Investigation

Investigation activities are conducted to identify the nature and extent of environmental impacts.

- *Site Characterization* (SC) – initial investigation of the operational history and uses of the site and typically involves collection and laboratory analysis of soil and groundwater samples to evaluate the general nature and extent of site impacts.

- *Remedial Investigation* (RI) – performed to refine the understanding of the site's hydrogeologic conditions, location and depth of subsurface features, and the nature and extent of impacts in soil, groundwater, soil vapor, etc. Results of the RI serve as the basis for the Feasibility Study (discussed below).

3.2 Remedial Design

Remedial design activities are conducted to develop a plan for the remediation of the site and a plan to monitor and document the effectiveness of the remediation activities.

- *Feasibility Study* (FS) – conducted to evaluate and compare a variety of remedial alternatives to NYSDEC criteria.

- *Pre-Design Investigation* (PDI) – supplements the investigations already conducted at the site to obtain field data necessary to design site remediation components. This phase is conducted following the selection of the remedial action.

- *Final (100%) Remedial Design* (Remedial Design) – describes the selected remedial action for the site based on the results of site investigation (and potentially PDI) activities.

3.3 Remediation

Remediation activities are conducted in accordance with remedial design to address environmental impacts identified at the during the site investigation.

- *Remedial Action* – the implementation of site activities conducted to address environmental impacts, as described in the Remedial Design.

- *Post-Remedial Monitoring Plan* – describes the sampling activities (typically groundwater sampling) to be conducted following the implementation of the remedial action to document the effectiveness of the remedial action.

- *Operation, Monitoring & Maintenance (OM&M) Plan* – describes the operation, monitoring and maintenance activities to be completed for components of the site remedy as part of the remedial action (if applicable) and/or to assess the long-term influence of the remedial action on site conditions (also known as a *Site Management Plan* [SMP]).

- *Construction Completion Report (CCR)* and *Final Engineering Report* (FER) – documents the remedial action completed at the site.

4. Site Background and Environmental Activities

This section presents a summary of the site background information, as well as, the environmental investigation and remediation activities that have been completed at the site to date, and the currently planned remedial construction activities.

4.1 Site Background

This subsection presents a summary of site background information, including a description of the site location and physical setting, as well as a brief site history.

4.1.1 Site Location and Description

The site is located in the City of Geneva, near the northwestern shore of Seneca Lake in eastern Ontario County, New York (see Figure 1). The former MGP site is comprised of a rectangular piece of land that is now located in a mixed commercial and residential area in the east-central part of Geneva, New York. Seneca Lake is located approximately 900 feet southeast of the site. The site is bordered by Wadsworth Street to the east, a railroad (Finger Lakes Railway) to the south, a restaurant to the west and residential properties to the north. A dry cleaner is located northeast of the site, on the east side of Wadsworth Street. Railroad Place intersects Wadsworth Street and bisects the site. A gas holder (Gas Holder 1) and coal shed where formerly located in Railroad Place. The portion of the former MGP site located north of Railroad Place is currently owned by NYSEG, while the area south of Railroad Place is owned by the City of Geneva. The area owned by NYSEG includes a grass-covered area in the eastern portion of the property and an asphalt parking lot comprises the western portion of the property. A restaurant on Railroad Place leases the parking area from NYSEG. A gravel parking area is located in the northeast portion of NYSEG’s property and is used by residential property owners. A NYSEG gas regulator shed is located near the intersection of Railroad Place and Wadsworth Street.

Several MGP structures formerly existed at the current location of the City of Geneva’s Public Safety Building (PSB) south of Railroad Place. The PSB consists of office space and an attached pole barn structure. A parking lot used by PSB employees is located west of the PSB.

4.1.2 Site History

The gas plant was constructed in 1853 and included a retort and condenser house, purification building (including lime room, ammonia tank and cistern), coal shed, and one gas holder (Gas Holder 1). A second gas holder (Gas Holder 2) was constructed in approximately 1900 in the northwest portion of the site. The majority of the buildings/structures associated with the gas plant were demolished between 1903 and 1909. The only remaining structures were the second gas holder, tool house and meter house. The remaining holder was demolished between 1915 and 1925. Between 1925 and 1943, a 500,000-cubic-foot gas holder (Gas Holder 3) and a regulator house were constructed at the site to serve as a storage/distribution facility. This newer holder may have served as a remote distribution holder for the Border City MGP, which was constructed at approximately the same time that the Wadsworth MGP was decommissioned. Gas Holder 3 was demolished sometime after 1946. However, portions of the holder foundation still exist. Railroad Place was constructed through the center of the former MGP site, covering the location of Gas Holder 1.

4.2 Environmental Activities

Numerous investigations and remedial activities have been completed at the site since 1990.

- 1990 to 1991 – a site screening investigation performed by Atlantic Environmental Services, Inc. (AES) to determine whether site conditions posed an imminent threat to human health or the environment, and provide data necessary to prioritize the site for further investigation.

- 1999 – Excavations activities along Railroad Street conducted by JBM Construction Company to facilitate installation of a new waterline by the City of Geneva.

- 2005 to 2007 – RI completed by ARCADIS (formerly Blasland, Bouck, & Lee, Inc. [BBL]). RI activities and results were presented in the February 2008 *Remedial Investigation Report* (ARCADIS, 2008).

- 2009 – ARCADIS conducted an evaluation of the volatile organic compounds (VOCs) in sub-slab soil vapor, indoor air, and outdoor ambient air at the PSB to evaluate the effectiveness of a sub-slab depressurization system (SSDS) (installed in March 2009). Based on the results of the sampling, ARCADIS recommended modifications to the operation the PSB’s heating, ventilation, and air conditioning (HVAC) system to reduce negative pressure in the building (thereby reducing the potential for soil vapor intrusion). Results of the sampling and building HVAC modifications are detailed in the March 2010 *Post Sub-Slab Depressurization System Installation Vapor Intrusion Evaluation Summary Report* (ARCADIS, 2010c). Additionally, ARCADIS prepared a February 2011 *Sub-Slab Depressurization System Operation, Monitoring & Maintenance Plan* (ARCADIS, 2011a) (approved by NYSDEC in April 2012) to described the methods to be used to operate, maintain, and monitor the SSDS.

- 2010 – Based on the findings of the RI, a feasibility study was completed by ARCADIS. The February 2010 *Feasibility Study Report* (ARCADIS, 2010a) ultimately recommended a remedial action to achieve the site-specific cleanup goals.

- 2010 – An interim site management plan (ISMP) activities were conducted by ARCADIS. The ISMP activities were conducted to limit the potential surface soil exposure of SVOCs and metals to trespassers. The ISMP activities and results are presented in the July 2010 *Construction Completion Report Interim Site Management Plan* (ARCADIS, 2010d).

- 2011 – A pre-design investigation was completed in support of the remedial design. The PDI was completed in accordance with the October 2010 *Remedial Design Work Plan* (RDWP) (ARCADIS, 2010b) and PDI activities and results were presented in the March 25, 2011 PDI Summary Report letter (ARCADIS, 2011b).

4.3 Summary of Remedial Activities

In general, the remedial activities to be performed at the site consist of:

- Removal of the top 12 inches of existing surface material (i.e., topsoil and gravel) to facilitate installation of a new soil cover.

- Removal of the former tank and source material in the immediate vicinity of the tank.

- Placement of backfill materials within the excavation area.

- Visual Inspection of Gas Holder 3 foundation (and removal of DNAPL if encountered).

- Installation of a demarcation layer and placement of a minimum of 1-foot clean fill materials.

Additional details regarding the remedial activities are provided in the Remedial Design. The horizontal limits of the removal, inspection, and backfilling activities are shown on Figure 2.

5. Citizen Participation Activities

This section presents a summary of the citizen participation activities completed to date and the anticipated future citizen participation activities.

5.1 Completed Citizen Participation Activities

The following citizen participation activities have been completed for the NYSEG Wadsworth Street Former MGP Site:

- NYSDEC, NYSDOH and NYSEG project managers/representatives have been identified as points of contact for the public (as listed in Section 6).

- Document Repositories have been established for the site (see Section 7).

- The Site Contact List has been developed (see Section 8). Individuals and groups included on the Site Contact List have and will receive site-related mailings. The list will be updated as needed. NYSDEC encourages the development of an electronic contact list to minimize the use of paper resources. Therefore, for those contacts for which an email address is known, site-related mailings will be provided electronically. *In an effort to maintain the privacy of individual citizens, NYSEG will not publish the list of private citizen addresses. All other addresses will be identified on the Site Contact List.*

- A Fact Sheet, dated March 2010, announcing the selection of the proposed remedial action for the site and the start of a 30-day public comment period was distributed to the public contact list (Attachment 1).

- A public meeting was held on March 11, 2010 to present the *Proposed Remedial Action Plan* (PRAP), including the RI and FS, and to solicit public comments. The NYSDEC issued a Decision Document (i.e., a document that approves the selected remedy) that incorporated input (obtained during the public comment period) deemed relevant to achieve the goals and objectives of the cleanup.

5.2 Anticipated Future Citizen Participation Activities

In accordance with DER-23, the following future citizen participation activities are anticipated to be completed for the NYSEG Wadsworth Street Former MGP Site:

- Preparation and distribution of a fact sheet describing the upcoming remedial action will be distributed to the Site Contact List prior to the start of the remedial action.

- Preparation and distribution of a fact sheet announcing the issuance of a DER Closure Letter will be distributed to the Site Contact List within 10 days following DER issuing the Closure Letter.

6. Project Contacts

For additional information regarding the remedial program at the NYSEG Wadsworth Street Former MGP Site, the public is encouraged to contact the project staff listed below.

NYSDEC Project Manager (for project-related issues)

Douglas MacNeal, P.E.
625 Broadway
11th Floor
Albany, New York 12233-7014
T: 518.402.9662
dkmacnea@gw.dec.state.ny.us

NYSDOH Project Representative (for site-related health concerns)

Anthony Perretta
NYSDOH
Bureau of Environmental Exposure Investigation
Empire State Plaza – Corning Tower Rm 1787
Albany, New York 12237
T: 518.402.7880
acp06@health.state.ny.us

NYSEG Project Manager

John Ruspantini
Environmental Analyst
Site Investigation & Remediation
NYSEG
18 Link Drive
Binghamton, New York 13904
T: 607.762.8787
jjruspantini@nyseg.com

7. Document Repositories

Document repositories have been established to provide the public with convenient access to important project-related documents and information. The repositories listed below include reports, data, and other relevant information developed during the course of the NYSEG Wadsworth Street Former MGP Site remedial program.

Geneva Public Library
244 Main Street
Geneva, NY 14456
(585) 428-7300
www.genevapubliclibrary.net
Monday and Tuesday 9am-8pm; Wednesday and Thursday 9am-7pm; Friday 9am-6pm; Saturday 9pm-2pm

8. Interested Public

NYSDEC maintains a database to facilitate distribution of information to help keep the community informed about and involved in remedial program from the site. The database includes adjacent property owners; local, regional, and state officials; local media; civic, environmental, and other organizations. Fact sheets and meeting notices that update the public on the progress of the remedial program will be distributed to the public.

9. References

ARCADIS, 2008. *Remedial Investigation Report*, Wadsworth Street Site, prepared for NYSEG, February 2008.

ARCADIS, 2010a. *Feasibility Study Report*, Wadsworth Street Site, prepared for NYSEG, February 2010.

ARCADIS, 2010b. *Remedial Design Work Plan*, Wadsworth Street Site, prepared for NYSEG, February 2010.

ARCADIS, 2010c. *Post Sub-Slab Depressurization System Installation Vapor Intrusion Evaluation Summary Report*, Wadsworth Street Site, prepared for NYSEG, March 2010.

ARCADIS, 2010d. *Construction Completion Report Interim Site Management Plan,* Wadsworth Street Site, prepared for NYSEG, July 2010.

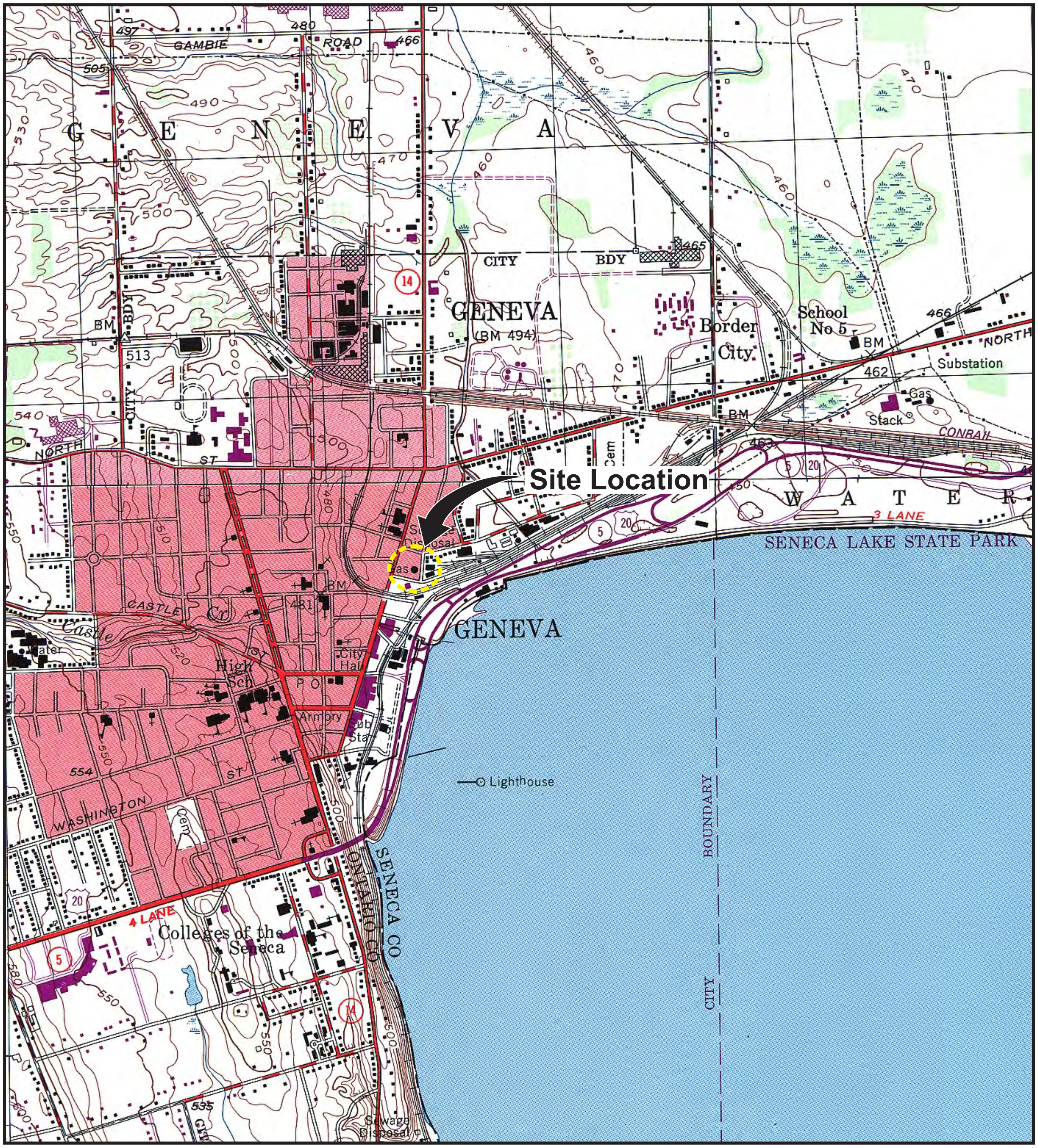
ARCADIS, 2011a. *Sub-Slab Depressurization System Operation, Monitoring & Maintenance Plan*, prepared for NYSEG, February 2011.

ARCADIS, 2011b. PDI Summary Report Letter to NYSDEC, Wadsworth Street Site, prepared for NYSEG, March 25, 2011.

NYSDEC, 2010a. *DER-23*, *Citizen Participation Handbook for Remedial Programs.* January, 2010.

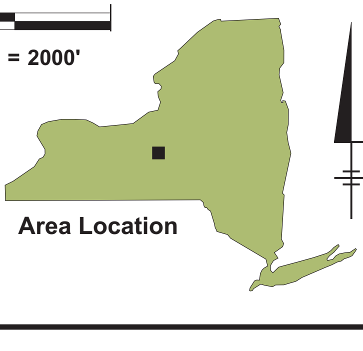
NYSDEC, 2010b. *DER-10, Technical Guidance for Site Investigation and Remediation*, May 2010.

Figures



REFERENCE: BASE MAP USGS 7.5 MIN. QUAD., GENEVA S. & GENEVA N., NY, 1953, PHOTOREVISED 1978.

Approximate Scale: 1" = 2000'



Area Location

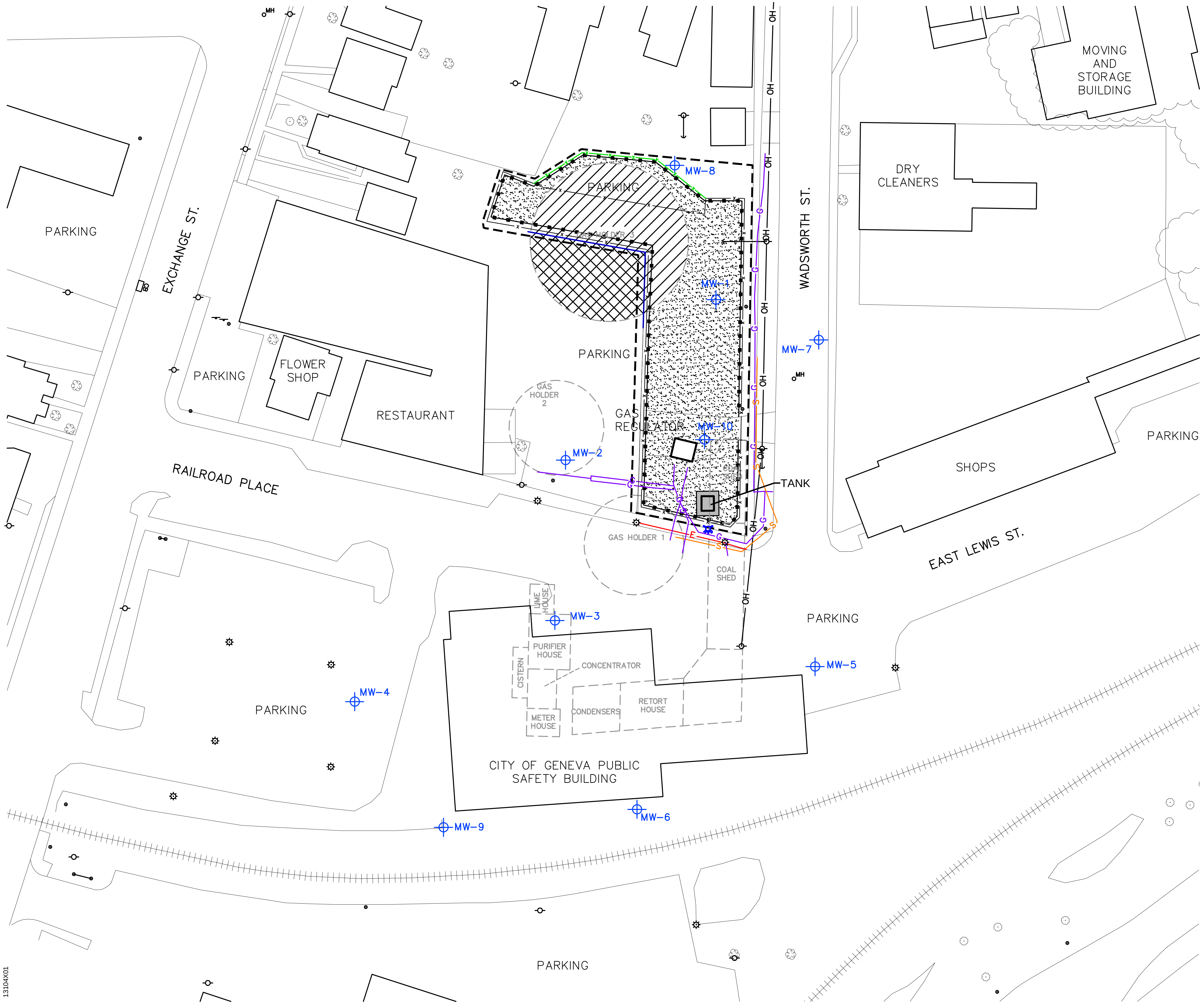
NYSEG
WADSWORTH STREET FORMER MGP SITE
GENEVA, NEW YORK
CITIZEN PARTICIPATION PLAN

SITE LOCATION MAP

ARCADIS

FIGURE
1

04/19/2013 SYRACUSE-141-DJHOWES
B0013104/0000/00014/CDR/13104n01.cdr



LEGEND:

⊕	RI MONITORING WELL LOCATION
—x—x—	FENCE
┼┼┼┼┼┼	RAILROAD
-○-	UTILITY POLE
☼	LIGHT POLE
←	GUY WIRE
● ●●	POST, SIGN
✻	HYDRANT
○MH	MANHOLE
—S—S—	SEWER LINE
—G—G—	GAS LINE
—E—E—	ELECTRIC LINE (SUBSURFACE)
—OH—	ELECTRIC LINE (OVERHEAD)
— — —	FORMER MGP STRUCTURE
▬ ▬ ▬	PROJECT WORK LIMITS
—x—x—	TEMPORARY SITE SECURITY FENCE
—■—■—	STRAW BALE DIKE OR SILT FENCE
▩	APPROXIMATE HORIZONTAL EXTENT OF TANK AND SOIL REMOVAL
░	APPROXIMATE HORIZONTAL EXTENT OF SURFACE MATERIAL REMOVAL
▨	APPROXIMATE HORIZONTAL EXTENT OF INITIAL GAS HOLDER 3 FOUNDATION SLAB VISUAL INSPECTION
▦	APPROXIMATE HORIZONTAL EXTENT OF FOUNDATION SLAB VISUAL INSPECTION IF FREE PRODUCT IS OBSERVED DURING INITIAL VISUAL INSPECTION

NOTES:

1. BASE MAP BASED ON SURVEYS COMPLETED BY NYSEG ON DECEMBER 14, 2005, OCTOBER 2006, AND BY PAUL J. OLSZEWSKI, PLS, PLLC ON MARCH 14 AND 23, 2011. ELEVATIONS IN REFERENCE TO NGVD 1929, HORIZONTAL DATUM IS NAD 83 STATE PLANE, NEW YORK CENTRAL.
2. ALL LOCATIONS ARE APPROXIMATE.

0 60' 120'
GRAPHIC SCALE

NYSEG
WADSWORTH STREET FORMER MGP SITE
GENEVA, NEW YORK
CITIZEN PARTICIPATION PLAN

SITE REMEDY

ARCADIS

FIGURE
2

CITY: SYRACUSE, NY DIV/GROUP: ENV/CADD DB: A. SCHILLING, W. JONES, P. LISTER PM/TM: J. BRIEN TR: L. ZURANSKI LYR: ON=*;OFF=REF, (FRZ)
G:\ENVCAD\SYRACUSE\ACT\B0013104\0000\00014\DWG\CPP\13103G02.DWG LAYOUT: 2 SAVED: 5/8/2013 2:51 PM ACADVER: 18.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 5/8/2013 2:51 PM BY: GETTS, BRIAN
XREFS: IMAGES: PROJECTNAME: ----
13104X05
13104X02
13104X01

Attachment 1

Fact Sheet

New York State Department of Environmental Conservation

FACT SHEET **Manufactured Gas Plant Program**

NYSEG – Wadsworth St. - Geneva Former Manufactured Gas Plant Site
Site #835015
Corner of Railroad Place and Wadsworth St
City of Geneva, NY March 2010

Remedy Proposed for Former Manufactured Gas Plant Site; Public Comment Period and Public Meeting Announced

Public Meeting
March 11, 2010
6:30 pm

Courtroom
Public Safety Building
255 Exchange St.
Geneva, NY

NYSDEC invites you to a public meeting to discuss the clean up remedy proposed to address contamination on this site. You are encouraged to provide comments at the meeting and during the 30-day comment period described in this fact sheet.

The public is invited to comment on the remedy proposed by the New York State Department of Environmental Conservation (NYSDEC) to address environmental impacts related to the New York State Electric and Gas (NYSEG) Wadsworth Street, Geneva, Former Manufactured Gas Plant (MGP) Site. The site is located at the corner of Railroad Place and Wadsworth Street in the City of Geneva, Ontario County. See the attached map for the site location. NYSEG, the partial site owner, has agreed to investigate and remediate the site to a level that is protective of public health and the environment. The investigation and remediation are being performed with the oversight of the NYSDEC and the New York State Department of Health (NYSDOH).

The Proposed Remedy

The cleanup remedy proposed for the site includes excavation and off-site disposal of contaminated soils, placement of a soil cover and land use restrictions on the site.

The proposed remedy is described in a draft cleanup plan called a “Proposed Remedial Action Plan” or PRAP, was developed under New York State’s Manufactured Gas Plant Program. The document is available for public review at the locations identified below under “Where to Find Information”.

How to Comment

NYSDEC is accepting written comments about the proposed remedy for 30 days, from **February 26, 2010** through **March 29, 2010**.

About the Manufactured Gas Plant Program:

NYSDEC has one of the most aggressive Manufactured Gas Plant (MGP) Programs site investigation and remediation programs in the country. Since the problems associated with the former MGP sites were identified, NYSDEC has been working with all the utilities on a state-wide basis to identify and address the issue of MGP sites for which they may have responsibility. This effort has resulted in approximately 253 sites identified for action by the eight utilities operating in New York State.

Currently we have multi-site orders or agreements with six utilities, including NYSEG, and several other individual site volunteers, to address 222 MGP sites in NYS. Multi-site agreements are under negotiation with a seventh utility and several other responsible parties which have newly-identified sites.

NYSDEC continues to seek to identify any other possible MGP sites throughout the State.

For more information about the NYSDEC's MGP program, visit:
www.dec.ny.gov/chemical/8430.html

Submit written comments to:

Mr. Douglas MacNeal, P.E.
NYSDEC
625 Broadway, 11th Floor
Albany, NY 12233-7014
866-520-2334
518-402-9564
dkmacnea@gw.dec.state.ny.us

Summary of the Proposed Remedy

The proposed remedy represents the alternative preferred by NYSDEC, NYSDOH and NYSEG to address site impacts. The draft cleanup plan includes:

- The removal of the subsurface structure and MGP-related impacted soils. This will remove all of the source material that is accessible on the site.
- Construction of a one foot thick soil cover over the NYSEG-owned property. This will include the removal of the top layer of soil, re-grading of the property to ensure drainage, and installation of a demarcation barrier below the new soil cover.
- A technology to enhance natural processes for contaminant degradation in groundwater will be applied if it's determined to be viable.
- An environmental easement to restrict the use of the site to commercial use only.
- Development and implementation of a Site Management Plan.
- Evaluation of soil vapor intrusion prior to the construction of any future on-site buildings.

The proposed cleanup remedy was chosen following a detailed investigation of the site and evaluation of alternatives to address MGP impacts, called a "Remedial Investigation/Feasibility Study". Other alternatives presented in the Feasibility Study include no action, and containment and removal of contaminated soil to varying degrees. The proposed remedy would achieve the remediation goals for the site by permanently removing accessible source material, thereby greatly reducing the source of MGP impacts to groundwater. This would create the conditions needed to restore groundwater quality to the extent possible.

NYSEG will be financially responsible for implementation of the remedy.

Next Steps

NYSDEC will consider public comments as it finalizes the remedy for the site. The selected remedy will be described in a document called a "Record of Decision" that will explain why the remedy was selected and respond to public comments. This document will be made available to the public (see "Where to Find Information" below). The project then moves to designing and performing the cleanup action to address the site contamination.

NYSDEC will keep the public informed during the cleanup of the site.

Background

The NYSEG – Wadsworth St. -Geneva Former MGP Site is one of approximately 200 former MGP sites that existed across New York State in the early 20th century. The Wadsworth Street plant was operated by NYSEG and NYSEG's predecessor companies from approximately 1853 to 1903. Gas was manufactured by heating coal. Freshly-manufactured gas had to be cooled and its impurities removed before it could be used. A coal tar resulted from these processes, some of which was released to the environment. The coal tar contains a number of chemical contaminants, primarily benzene, toluene, ethylbenzene, xylene (BTEX) and polycyclic aromatic hydrocarbons (PAH). The extent of MGP impacts was delineated by a series of investigations conducted by NYSEG. MGP impacts were found primarily in soil and groundwater within the historic footprint of the plant. This area includes the NYSEG parcel as well as the Public Safety Building (PSB) and a portion of Railroad Place due south of the NYSEG property.

The NYSEG parcel of the site is being fenced and the remaining portion of the site is covered with buildings or asphalt; thus direct contact with MGP-related contaminants is not likely. The surrounding area is served by public water, so exposure to MGP-impacted groundwater is not likely. A sub-slab depressurization system was installed in the PSB to prevent the potential for future soil vapor intrusion. This system is monitored to ensure that it is operating successfully.

FOR MORE INFORMATION

Where to Find Information

Project documents are available at the following locations to help the public to stay informed. These documents include the proposed cleanup plan for the site, called the "Proposed Remedial Action Plan", and the Remedial Investigation and Feasibility Study reports.

Geneva Public Library
244 Main Street
Geneva, NY 14456
(315) 789-5303
Hours: Mon.-Thurs. 10-8
Fri. 10-6, Sat. 10-5

New York State DEC
Region 8 Headquarters
Avon Office
6274 Avon-Lima Rd. (Rtes. 5 and 20)
Avon, NY 14414-9519
(585) 226-5326
Hours: Mon.-Fri. 8:30-4:45
Contact: Lisa LoMaestro Silvestri

New York State DEC
Central Office
625 Broadway
Albany, NY 12233-7014
(518) 402-9564
Hours: Mon-Fri. 8:30-4:30
Contact: Douglas MacNeal, P.E.

You may also wish to visit NYSEG's website at **http://www.nyseg.com/OurCompany/mgp/GenevaWadsworth/GenevaWadsworth.html** for more information about the Geneva Wadsworth MGP site

Who to Contact

Comments and questions are always welcome and should be directed as follows:

<u>Project Related Questions</u>
Mr. Douglas MacNeal
Project Manager
NYSDEC
625 Broadway, 11th Floor
Albany, NY 12233
(518) 402-9662
866-520-2334
(518) 402-9564
dkmacnea@gw.dec.state.ny.us

Lisa LoMaestro Silvestri
Citizen Participation Specialist
NYSDEC
6274 East Avon-Lima Rd.
Avon, NY 14414
(585) 226-5326

<u>To direct questions to NYSEG, please contact:</u>
Mr. Robert Pass
Manager – Regional Outreach & Development
NYSEG
1387 Dryden Road
Ithaca, NY 14850-
Phone: 607-347-2148

<u>Site-Related Health Questions</u>
Ms. Debby McNaughton
NYSDOH
335 E. Main St.
Rochester, NY 14604
(585) 423-8069

If you know someone who would like to be added to the site contact list, have them contact the NYSDEC project manager listed above. We encourage you to share this fact sheet with neighbors and tenants, and/or post this fact sheet in a prominent area of your building for others to see.


N
E
S
W
Jackson St
Exchange St
Middle St
Wadsworth St
835015
NYEG - Wadsworth St. - Geneva MGP
Railroad Pl
E Lewis St
US Hwy 20
US Hwy 20
0
105
210 Feet

ARCADIS

Appendix H

Contingency Plan

NYSEG

Contingency Plan

Wadsworth Street Former Manufactured Gas Plant Site
Site No. 8-35-015
Geneva, New York

February 2014

ARCADIS

Contingency Plan

Wadsworth Street Former Manufactured Gas Plant Site Site No. 8-35-015

Prepared for:
NYSEG

Prepared by:
ARCADIS of New York, Inc.
6723 Towpath Road
P O Box 66
Syracuse
New York 13214-0066
Tel 315 446 9120
Fax 315 449 0017

Our Ref.:
B0013104

Date:
February 2014

1. Introduction

This *Contingency Plan* has been prepared to support the remedial construction activities at the NYSEG Wadsworth Street Former Manufactured Gas Plant (MGP) Site (the site) located in Geneva, New York (Site No. 8-35-015). The *Contingency Plan* provides responses to potential emergencies that may arise during construction of the selected remedy at the site. Details related to the selected remedy are presented in the *Final (100%) Remedial Design* (Remedial Design) (ARCADIS, 2014).

NYSEG's Remediation Contractor will identify a Site Health and Safety Officer (SHSO). The SHSO shall be made aware of any emergencies and coordinate any response activities carried out at the site. The SHSO shall also serve as the overall Project Emergency Coordinator (PEC) and have the ultimate authority in specifying and facilitating any contingency action.

If the SHSO is not able to perform the duties of the PEC, the PEC shall specify another senior individual (working for Remediation Contractor) to serve as the PEC. The alternate PEC shall become familiar with contingency plans developed by each Remediation Contractor/subcontractor.

1.1 Identifying the Hazards and Assessing the Risk

The objectives during any emergency shall be to first, protect human health and safety, and then the environment. Possible hazards to human health or the environment that may result from any emergency situation shall be identified by the PEC. The PEC shall take into consideration both direct and indirect effects of the incident. The PEC shall assess the possible risks to human health or the environment that may result from the emergency (e.g., release, fire, explosion, or severe weather conditions). The PEC shall make this assessment by:

- Identifying the materials involved in the incident.
- Consulting the appropriate occupational health guideline or material safety data sheets (MSDS) to determine the potential effects of exposure/release, and appropriate safety precautions.
- Identifying the exposure and/or release pathways and the quantities of materials involved.

Based on this information, the PEC shall determine the best course of action for dealing with the emergency and identify possible follow-up requirements (e.g., equipment repair, material disposal, etc.).

If the Remediation Contractor's personnel cannot control the incident without incurring undue risk, the PEC shall implement the Site Evacuation Procedures described in Section 3. If off-site neighboring population is at risk, the PEC will implement the Off-Site Evacuation Procedures described in Section 3. The PEC shall notify NYSEG's Project Manager and the appropriate government agencies and departments that a situation resulting in the need for evacuation has occurred. Should emergency assistance in treating injuries or carrying out the evacuation be required, the PEC shall request assistance of local emergency response personnel (e.g., ambulance service, fire department, police department).

1.2 Conditions for Implementing the Contingency Plan

Potential emergency conditions that require implementation of this *Contingency Plan* include the following:

- Fire or explosion
- Occurrence of a spill or material release
- Severe weather conditions
- Physical or chemical injury to a worker

These emergency conditions are discussed in the following subsections. Additional emergency conditions under that may require implementation of this *Contingency Plan* shall be identified by the PEC.

1.2.1 Fire and/or Explosion Conditions

Contingency procedures shall immediately be implemented upon notification that any of the following scenarios involving fire and/or explosion is imminent or has occurred:

- A fire that causes, or could cause, the release of toxic fumes.

- A fire that could possibly ignite nearby flammable materials or could cause heat-induced explosions.

- A fire that could possibly spread to off-site areas.

- A danger exists that an explosion could occur causing a safety or health hazard.

- An explosion has occurred.

1.2.2 Spill or Material Release Conditions

The following scenarios involving a spill or material release, whether imminent or having already occurred, shall cause implementation of contingency procedures:

- A spill or material release that could result in the release of flammable liquids or vapors, thus causing a fire or gas explosion hazard.

- A spill or material release that could cause the release of toxic vapors or fumes into the atmosphere in concentrations higher than the Occupational Safety and Health Administration (OSHA) Permissible Exposure Limits (PELs).

- A spill or material release that can be contained on site where a potential exists for groundwater or surface water contamination.

- A spill or material release that cannot be contained on site, resulting in a potential for off-site soil contamination and/or groundwater or surface water pollution.

All spills or material releases shall be reported immediately to the PEC. The PEC shall immediately identify the character, source, amount, and extent of any release. Initial identification shall be based on visual analysis of the material and location of the release. If the released material cannot be identified, samples of potentially affected media shall be taken for analysis, as directed by NYSEG.

1.2.3 Severe Weather Conditions

The following severe weather conditions, whether imminent or having occurred, may cause implementation of contingency procedures.

- A tornado has been sighted in the area.
- A tornado warning is in effect for the area.
- A lightning storm is underway in the area (storm center less than 5 miles away).

- Other severe weather or weather induced conditions (e.g., hurricane or flood).

1.2.4 Physical or Chemical Injury Conditions

The following worker injuries may cause implementation of the *Contingency Plan*:

- Major physical injuries
- Chemical injuries
- Severe symptoms of chemical overexposure

2. Contingency Procedures

If any of the aforementioned conditions for implementing the *Contingency Plan* are met, the appropriate following contingency procedure(s) shall be performed.

2.1 Contingency Procedures for Fire/Explosion

When fire or explosion appear imminent or have occurred, all normal site activity shall cease. The PEC shall make an assessment of the potential risk and severity of the situation to decide whether the emergency event shall or shall not be readily controllable with existing portable fire extinguishers or site equipment and materials at hand. Firefighting shall not be done at the risk to site workers. Local fire departments shall be contacted in all situations in which fires and/or explosions have occurred. The following steps shall be taken for localized fire.

- Contact local fire departments.
- Move all personnel to an upwind location at an appropriately safe distance away.
- Determine if fire is within on-site personnel capabilities to attempt initial firefighting.
- Determine if smoke and/or fumes from fire are potentially impacting off-site areas.
- If the fire is not impacting off-site areas and is within on-site personnel capabilities, utilize most appropriate means of extinguishing fire (e.g., fire extinguishers, water, covering with soil).
- Once fire is extinguished, containerize and properly dispose of any spilled material, runoff, or soil.

If the situation appears uncontrollable and poses a direct threat to human life, fire departments shall be contacted and the evacuation procedures described in Section 3 shall be implemented. If the chances of an impending explosion are high, the entire area within a 1,000-foot radius of the fire source shall be evacuated. The PEC shall alert personnel when all danger has passed, as determined by the chief fire fighter from the responding fire department. All equipment (e.g., fire extinguishers) used in the emergency shall be cleaned and refurbished as soon as possible after the emergency has passed so that it will be ready for use in the event of any future emergency.

2.2 Contingency Procedures for Spills or Material Releases

If a hazardous waste spill, material release, or process upset resulting in probable vapor release is identified, the PEC shall immediately assess the magnitude and potential seriousness of the spill or release based upon:

- MSDS for the material spilled or released.
- Source of the release or spillage of hazardous material.
- An estimate of the quantity released and the rate at which it is being released.
- The direction in which the spill or air release is moving.
- Personnel who may be or may have been in contact with the material, or air release, and possible injury or sickness as a result.
- Potential for fire and/or explosion resulting from the situation.
- Estimates of area under influence of the release.

If the spill or release is determined to be within the on-site emergency response capabilities, the PEC shall ensure implementation of the necessary remedial action. If the accident is beyond the capabilities of the operating crew, all personnel not involved with emergency response activity shall be evacuated from the immediate area and the appropriate emergency response group(s) shall be contacted.

2.3 Contingency Procedures for Severe Weather

When severe weather is forecasted or occurs, the information shall be immediately relayed to the PEC. In the case of a tornado sighting, the PEC shall institute emergency evacuation procedures, and all personnel shall be directed to proceed indoors after completing appropriate shutdown procedures. In the case of a tornado warning, or lightning storm, the PEC shall have operations stopped and direct all personnel to stand by for emergency procedures. Other types of weather or weather induced conditions (e.g., hurricane or flooding) for which long range prediction is available may also require positive action as identified herein.

When the severe weather has passed, the PEC shall direct the Remediation Contractor to inspect on-site equipment to ensure its readiness for operation prior to restarting operations. If an inspection indicates a fire, explosion, or release has occurred as the result of a severe weather condition, the contingency procedures for those events shall be followed.

2.4 Contingency Procedures for Physical Injury to Workers

Regardless of the nature and degree of the injury, the PEC shall be notified of all injuries requiring first aid treatment of any kind. A report of the injury or incident shall be completed by the PEC.

Upon notification that a worker has been injured, the PEC shall immediately determine the severity of the accident, and whether the victim can be safely moved from the incident site. Local medical assistance shall be requested immediately, if appropriate.

Minor injuries sustained by workers shall be treated on-site using materials from the first aid kits. Whenever possible, such treatment shall be administered by trained personnel in a “clean” support zone. Examples of minor injuries include small scrapes and blisters. Minor injuries would not be expected to trigger implementation of the contingency plan.

A major injury sustained by a worker will require professional medical attention at a hospital. The PEC shall immediately summon an ambulance and contact the hospital to which the injured worker will be transported. The PEC shall notify NYSEG project manager as soon as practical. The hospital and ambulance should be advised of:

- The nature of the injury.
- Whether the injured worker will be decontaminated prior to transport.
- When and where the injury was sustained.
- The present condition of the injured worker (e.g., conscious, breathing).

2.5 Contingency Procedures for Chemical Injury to Workers

Injuries involving hazardous chemicals or symptoms of severe chemical overexposure shall result in implementation of the *Contingency Plan*. Upon notification that a chemical injury has been sustained or severe symptoms of chemical exposure are being experienced, the PEC shall notify the hospital and ambulance of the occurrence. The PEC shall provide, to the extent possible, the following information:

- The nature of the injury (e.g., eyes contaminated)
- The chemical(s) involved
- The present condition of the injured worker (e.g., conscious, breathing)
- Whether the injured worker will be decontaminated prior to transport
- When and where the injury was sustained

The victim(s) shall be immediately removed from the incident site using appropriate personal protective equipment (PPE) and safety equipment. Rescuers shall check for vital signs and, if possible, remove contaminated outer clothing. If the victim's eyes have been contaminated, personnel trained in administering first aid shall flush the victim's eyes with eyewash solution until the emergency response team arrives.

Details on the nature of the contaminant and methods for treating exposure or injury can be obtained from the MSDSs or Occupational Health Guidelines.

3. Emergency Evacuation Procedures

In the event that emergency conditions require evacuation, the site and off-site evacuation procedures described in the following subsections shall be implemented.

3.1 Site Evacuation Procedures

If an emergency occurs that requires the evacuation of an on-site area to ensure personnel safety, including (but not limited to) fire, explosion, severe weather or hazardous waste/material spills, or a significant release of vapors into the atmosphere, an air horn shall be sounded on the site by the nearest person aware of the event. The horn shall sound continuously for approximately 15 seconds, signaling that immediate evacuation of all personnel from the area is necessary, as a result of an existing or impending danger. In areas where only two or three people are working side by side, and the need to evacuate can be communicated verbally by the nearest person aware of the event, the air horn shall not be necessary.

All heavy equipment in the area shall be shut down. Under no circumstances shall incoming visitors (other than emergency response personnel) be allowed to enter any area where an emergency is occurring. Visitors or observers and all non-essential personnel present in the area of an emergency shall be instructed to evacuate the area immediately.

Remediation Contractor(s) emergency coordinators and/or health and safety officers (as designated) will be responsible for ensuring that emergency response requirements specific to their own operations are carried out. These parties shall report their activities to the PEC. The PEC, however, has final authority regarding all emergency response activities.

All non-essential personnel shall evacuate the emergency areas and notify personnel in adjacent areas to evacuate also. The evacuated workers shall assemble at the site construction office trailer, where the PEC shall give directions for implementing necessary actions. In the event that the primary assembly area is involved, unapproachable, or unsafe due to the event, evacuated workers shall assemble at the alternate assembly area identified by the PEC.

Personnel are to avoid encountering smoke/gas plumes as practicable during evacuation and assembling.

The PEC shall take charge of all emergency response activities and dictate the procedures that will be followed until emergency personnel arrive. The PEC shall assess the seriousness of the situation, and direct whatever efforts are necessary until the emergency response units arrive.

After initiating emergency response procedures, the PEC shall assign appropriate personnel to check and attempt to ensure that access roads are not obstructed. If traffic control is necessary (e.g., in the event of a fire or explosion), personnel who have been trained in traffic control procedures and designated at the project safety meeting shall take over these duties until emergency units arrive.

The PEC shall remain at the site to provide any assistance requested by emergency response personnel when arriving to deal with the situation. The PEC shall have the authority to shut down any part or the entire project after an emergency, until the PEC deems it safe to continue operations. The PEC shall dictate any changes in project safety practices, which are made necessary by the emergency that has occurred, or are required for preventing further emergencies.

3.2 Off-Site Evacuation Procedures

If the PEC deems that human health beyond the site limits is at risk, the PEC shall notify the appropriate agencies and departments (e.g., NYSEG Project Manager, police, NYSDEC, fire department) of the need, or potential need, to institute off-site evacuation procedures. The PEC shall provide, at a minimum, the following information:

- His or her name and telephone number.
- Name and address of facility.
- Time and type of incident (e.g., release, fire).
- Name and quantity of materials or materials involved, to the extent this information is known.
- The extent of injuries, if any.
- The possible hazards to human health or environment, and cleanup procedures.

ARCADIS

Attachment 1

Supplemental Information Package
(On CD Only)

ARCADIS BBL
Infrastructure, environment, facilities

Imagine the result

New York State Electric & Gas Corporation

Remedial Investigation Report

Former Manufactured Gas Plant Site
Wadsworth Street, Geneva, New York

February 2008

ARCADIS BBL

Remedial Investigation Report

Former Manufactured Gas Plant Site, Wadsworth Street, Geneva, New York

Keith A. White

Keith A. White, C.P.G.
Associate

Scott A. Powlin
Sr. Geologist I

Prepared for:
New York State Electric & Gas Corporation

Prepared by:
ARCADIS of New York, Inc.
6723 Towpath Road
Syracuse
New York 13214-0066
Tel 315.446.9120
Fax 315.446.8053

Our Ref.:
B0013057

Date:
February 2008

Table of Contents

Tables in Text

Figures in Text

Tables

Figures

Appendices

Electronic Attachments (data CD)

Executive Summary

This Remedial Investigation (RI) Report presents the findings of environmental investigations conducted at NYSEG's (New York State Electric and Gas Corporation's) Wadsworth Street former Manufactured Gas Plant (MGP) site (the "site") located in Geneva, New York (Figure 1). ARCADIS BBL conducted the investigations on NYSEG's behalf to characterize environmental conditions at the site in compliance with an Order on Consent between the New York State Department of Environmental Conservation (NYSDEC) and NYSEG dated March 30, 1994.

NYSEG submitted a draft RI Report in November 2007 and the NYSDEC and NYS Department of Health (NYSDOH) provided comments on the draft report as documented in a January 22, 2008 letter from NYSDEC. NYSEG submitted a February 13, 2008 response to the January 22, 2008 comments, and NYSDEC transmitted a February 13, 2008 e-mail which approved NYSEG's responses. This RI Report incorporates the changes to the draft RI Report based on NYSEG's February 13, 2008 letter.

The MGP operated for approximately 50 years (ca. 1853 to 1903) producing gas using the coal carbonization process. As is typical with MGP sites, several byproducts from the MGP process, including coal tar, coal, slag, cinders, ash, and purifier wastes, were likely sold, disposed of off site, or, except for coal tar, used as fill in the area of the site. Relatively small amounts of these byproducts are present in soils and groundwater beneath the site. Several organic compounds associated with coal tar have toxic properties and are regulated by the NYSDEC. Chief among these are benzene, toluene, ethylbenzene, and xylenes (BTEX) and a more general class of organic compounds called polycyclic aromatic hydrocarbons (PAHs). The BTEX and PAH compounds are considered the constituents of concern (COCs) at the site. It is important to note that these COCs are not unique to coal tar; there are numerous other sources of these compounds. The inorganic compound cyanide is typically associated with purifier waste. This type of cyanide is almost entirely in the form of iron cyanide complexes which are generally non-toxic to humans. Nonetheless, cyanide is regulated by the NYSDEC. As such, cyanide is also considered a COC associated with the site.

NYSEG performed two investigations to characterize the nature and extent of site-related COCs from the former MGP. First a Site Characterization (SC) was performed to identify whether environmental conditions existed at the site that might be related to the MGP. That assessment determined that the quality of soils and groundwater had been affected by the former MGP; therefore, an RI was conducted. The RI determined the nature and extent of site-related COCs and assessed whether the COCs posed risks to human health or the environment.

Over the course of the SC and RI, 9 monitoring wells were installed, 24 soil borings were drilled, 5 test pits were excavated, and approximately 60 samples of environmental media were chemically analyzed. The information gathered will support a Feasibility Study, which will evaluate remedial alternatives for the site.

For the purposes of this summary, the work performed is divided into two categories:

- ***Soil, Soil Vapor, and Groundwater Investigations***
- ***Risk Evaluation***

The following paragraphs describe the work performed under these categories and the findings generated.

Soil, Soil Vapor, and Groundwater Investigations

These investigations characterized site hydrogeology, the nature and extent of site-related impacts to the subsurface, and the potential for soil vapor intrusion into the City of Geneva’s Public Safety Building (PSB). These investigations found that the geologic units beneath the site are composed of, in descending order: fill, silt and clay, and fine sand. These units comprise at least the upper approximately 40 feet of materials beneath the site. In terms of hydrogeology, the fill is the least significant unit because it is typically above the water table (unsaturated). The bottom few feet of fill are, however, saturated in the southern portion of the site, near the PSB. The bottom of the fill typically occurs at depths of about 4 to 8 feet below grade. The silt and clay is continuous across the site and is generally 12 to16 feet thick; however, the silt and clay is artificially thin (approximately 1 foot thick) in the area of former Gas Holder 1 because it was apparently excavated to construct the holder. The water table resides in the silt and clay in the northern portion of the site. The silt and clay grades into a fine sand unit at approximately 18 to 20 feet below grade. The fine sand is at least 22 feet thick.

Groundwater beneath the site moves slowly north-northeastward (about 30 feet per year). Although this flow direction is away from Seneca Lake, a regional groundwater discharge boundary, site groundwater is expected to eventually discharge to the lake. Local variability in groundwater flow direction is not uncommon in glacially-derived deposits, such as at those beneath the site. The silt and clay unit contains occasional horizontal seams of fine sand, which encourage horizontal, rather than vertical groundwater movement.

The soil investigation found that BTEX and PAH concentrations in subsurface soil exceeded NYSDEC criteria in only a few relatively isolated areas. With the exception of a sample from 4 to 6.5 feet below grade inside an apparent former structure, soils that exceeded BTEX- and PAH -criteria were encountered below the water table at depth, generally below 15 feet below grade, at or just beneath the bottoms of former Gas Holder 1 and the former lime house/purifier house.

One byproduct of the former MGP, coal tar, is denser than water (and therefore can migrate below the water table), and dissolves very slowly – sometimes acting as a long-term source of constituents to groundwater. Only two sections of soil were found that contained what appeared to be relatively small quantities of coal tar. The first section encompasses the area immediately above and below the floor of former Gas Holder 1, about 16 to 23 feet below grade. The other section was observed at approximately 4 to 6.5 feet below grade, inside of an apparent buried structure located just east of former Gas Holder 1.

Cyanide was detected at low levels in approximately one third of the analytical subsurface soil samples collected across the site. Concentrations of total cyanide above NYSDEC criteria were detected in only one sample – the sample collected from 4 to 6.5 feet below grade inside the apparent structure. The distribution of cyanide detected in soil is a reflection of the presence of fill material across the site that was observed to contain various apparent MGP wastes (e.g., clinkers, ash, cinders, purifier wastes).

The soil vapor intrusion investigation of the PSB found that several VOCs were present in vapor samples collected beneath the building foundation slab and in the air inside the building; but, it was not possible to attribute the VOCs to a particular source. Several of the VOCs, most notably BTEX and naphthalene are potentially related to the former MGP, but these same compounds have other possible non-MGP sources such as gasoline. Other detected VOCs, such as trichloroethene, are clearly not related to the former MGP. The levels of VOCs detected in indoor air were below appropriate criteria. Based on the investigation results, subsurface byproducts of the former MGP do not appear to be contributing VOCs to the indoor air at the PSB via soil vapor intrusion.

The groundwater data from one of the five monitoring wells near the PSB (MW-3) exhibit characteristics likely related to MGP waste. As such, it is possible that some fraction of the BTEX and naphthalene measured in the sub-slab vapor samples may be attributed to MGP byproducts and that there could be sub-slab vapor phase commingling of these compounds from both a gasoline and an MGP source. The NYSDEC/NYSDOH concluded that the levels of BTEX and naphthalene detected below the slab present a potential for future soil vapor intrusion into the PSB. As such, the NYSDEC/NYSDOH requested that NYSEG either install a sub-slab depressurization system or conduct additional vapor sampling in the 2007/2008 winter season. NYSEG plans to conduct an IRM to install a sub-slab depressurization system for the PSB during the 2007/2008 winter season.

Groundwater quality was found to be unaffected by BTEX and PAHs, except at one well (MW-3) located adjacent to the PSB. The sample from this well contained BTEX and several PAHs above NYSDEC criteria. The source of these constituents could be associated with the former lime house, purifier house, or other former MGP structures located beneath the PSB. Although no monitoring wells were installed inside/ immediately near former Gas Holder 1 or the buried structure located near this former holder, it is reasonable to assume that groundwater in immediate contact with soils at these locations would exceed NYSDEC criteria.

Groundwater in the silt and clay and fine sand was found to contain low level concentrations of total cyanide (generally below NYSDEC criteria) over a broader area than the region of groundwater affected by BTEX and PAHs. Low levels of cyanide were detected in all monitoring wells located near and downgradient of the former lime house/purifier house and former Gas Holder 1. Only two wells (MW-2 and MW-3) contained groundwater with total cyanide concentrations above NYSDEC criteria. MW-2 is located inside the footprint of former Gas Holder 2 (a formerly at-grade holder) and MW-3 is located at/near the former lime house/purifier house.

Risk Evaluation

This evaluation assessed the potential risks posed to human health and the environment by site-related constituents. Potential risks posed to wildlife were evaluated by conducting a Fish and Wildlife Resource Impact Analysis (FWRIA). Potential risks posed to human health were evaluated through a Human Heath Exposure Evaluation (HHEE).

The FWRIA found that no threatened or endangered plant or animal species inhabited the site or the immediate surrounding areas, and that use of the site by wildlife is limited to only a small area of natural habitat. Based on these findings, the risk posed to the environment by the site was concluded to be insignificant.

The HHEE found that levels of BTEX, PAHs, and cyanide in some subsurface soils and/or groundwater affected by the site were high enough to potentially present a risk to human health if a completed exposure pathway existed. No such pathways were identified under the current use of the site; however, excavation and maintenance work was identified as the most-likely *potential* completed pathway that might occur at the site in the future. Such work could include constructing basements or building foundations or installing/maintaining subsurface utilities. This potential exposure could be mitigated by using properly trained personnel and personal protective equipment. The HHEE also found that levels of PAHs in selected surface-soil samples were high enough to present a potential risk to human health. The most-likely completed exposure pathway for surface soils was determined to be inhalation of particulates or dermal contact with surface soils in a few sparse areas. Much of the “surface soil” at the site is covered by gravel, grass, buildings, or asphalt, all of which serve to mitigate surface-soil particulates from becoming airborne. A few small areas of surface soils were identified that were not covered by gravel or grass. Such areas could present a greater potential risk of exposure. The HHEE also evaluated potential risks posed to occupants of the PSB by breathing air in the building. That evaluation found that indoor air posed no unacceptable risks to human health. Despite this finding, several VOCs, which are not unique to MGP sites and are also present in such common products as gasoline, paints and adhesives, were detected in vapor *beneath* the building. These VOCs are believed by NYSDEC and NYSDOH to have the potential to adversely affect the quality of indoor air in the PSB in the future; therefore, NYSEG plans to install a sub-slab depressurization system to mitigate the potential for vapor intrusion into the PSB.

Conclusion

With the findings presented in this RI Report, NYSEG has characterized the nature and extent of the former MGP’s impacts on the environment and fulfilled the requirements of the Order on Consent. Following approval of this RI Report by the NYSDEC, NYSEG will prepare a Feasibility Study to identify Remedial Action Objectives and evaluate appropriate remedial measures to address MGP-related environmental impacts identified during the RI. As previously mentioned, NYSEG plans to conduct an IRM to install a sub-slab depressurization system for the PSB in the winter 2007/2008 to mitigate the potential for future vapor intrusion of BTEX and naphthalene detected in the soil vapor beneath the slab of the building.

1. Introduction

This *Remedial Investigation Report* (RI Report) documents the findings of environmental investigations conducted from 2005 to 2007 at the Wadsworth Street former MGP Site (site) (NYSDEC site number 8-35-015) located in Geneva, New York (Figure 1). The RI was performed in accordance with an Order on Consent (Index Number D0-0002-9309, effective March 30, 1994) between the New York State Department of Environmental Conservation (NYSDEC) and NYSEG (New York State Electric & Gas Corporation). The environmental investigations were conducted by ARCADIS BBL (formerly known as Blasland, Bouck & Lee, Inc. [BBL]) on behalf of NYSEG to meet the objectives described in the Order on Consent and the RI Work Plan which was approved by NYSDEC on August 15, 2006.

NYSEG submitted a draft RI Report in November 2007 and the NYSDEC and NYS Department of Health (NYSDOH) provided comments on the draft report as documented in a January 22, 2008 letter from NYSDEC. NYSEG submitted a February 13, 2008 response to the January 22, 2008 comments, and NYSDEC transmitted a February 13, 2008 e-mail which approved NYSEG's responses. This RI Report incorporates the changes to the draft RI Report based on NYSEG's February 13, 2008 letter.

In addition to the findings of the RI work detailed in the above-referenced RI work plan, this RI Report also incorporates the work and findings of environmental investigations completed during a Site Characterization (SC), which was conducted in 2005. The SC was conducted in accordance with the SC Work Plan which was approved by NYSDEC on November 18, 2005.

The results of the SC and RI fieldwork were previously presented to NYSDEC and the NYS Department of Health (NYSDOH) in letters dated March 29, 2006 and November 27, 2006, respectively. The NYSDEC provided a letter dated December 18, 2006 in response to NYSEG's November 27 letter which concurred with NYSEG's conclusion that additional soil and groundwater investigations are not warranted to support the RI. In the December 18, 2006 letter, NYSDEC and NYSDOH also agreed with NYSEG's conclusion that the next phase of RI fieldwork be a soil vapor investigation of the City of Geneva's Public Safety Building (PSB). A Soil Vapor Intrusion Evaluation (SVIE) Work Plan was then submitted to NYSDEC/NYSDOH and approved by NYSDEC/NYSDOH on February 20, 2007. The results of the soil vapor intrusion evaluation were presented in the Vapor Intrusion Evaluation Report, dated August 23, 2007. A copy of this report is provided on the attached CD (Appendix B). The soil vapor intrusion investigation of the PSB concluded the field investigations performed in connection with the RI.

For ease of presentation and review, the combined SC and RI subsurface fieldwork and soil vapor investigation work and findings are discussed together throughout the remainder of this RI Report. References to the SC, RI, and SVIE work plans will hereinafter be referred to as "work plans."

1.1 Report Organization

The RI Report is organized as follows:

- **Section 1: Introduction** — Discusses the site setting and history, including a summary of previous investigations and objectives that state the general purpose of the RI.
- **Section 2: Investigation Activities** — Describes the tasks performed and general methods followed to meet the investigation's objectives.
- **Section 3: Investigation Findings** — Presents and interprets field observations and laboratory results relating to the principal components of the field work: investigations of soil, groundwater, and soil vapor.
- **Section 4: Risk Evaluation** — Presents the results of a Fish and Wildlife Resource Impact Analysis (FWRIA) and a Human Health Exposure Evaluation (HHEE) completed for the site.
- **Section 5: Summary and Conclusions** — Summarizes the findings of the RI and presents the conclusions drawn.

The text of this RI Report is supported by a variety of attachments, including tables, figures, boring logs and other items. The CD included with this RI Report contains additional documentation, including the Data Usability Summary Reports (DUSRs). A complete list of the items contained on the CD can be found in the Table of Contents on pages i to iv.

1.2 Site Setting and History

The site is located in the City of Geneva, near the northwestern shore of Seneca Lake in eastern Ontario County, New York (Figure 1). The site comprises a rectangular piece of land that is now located in a mixed commercial and residential area in the east-central part of Geneva, New York. Seneca Lake is located about 900 feet to the southeast. The site is bordered by Wadsworth Street to the east, a railroad to the south, a restaurant to the west, and residential properties to the north. A dry cleaner is located northeast of the site, on the east side of Wadsworth Street. Railroad Place intersects Wadsworth Street and bisects the former MGP site boundary. A gas holder and coal shed formerly stood in portions of Railroad Place. The City of Geneva's PSB is located south of Railroad Place where the several MGP structures previously existed. Figure 2 shows the locations of the former MGP structures as they relate to present-day features.

The area of the former MGP north of Railroad Place is currently owned by NYSEG, while the area south of Railroad Place is owned by the City of Geneva. The area owned by NYSEG is grass covered to the east while a fenced in asphalt parking area is located west. The adjacent restaurant leases the parking area from NYSEG. A gravel parking area located in the extreme northeast of NYSEG's property is apparently used by residential property owners, as witnessed during the RI activities. A gas regulator shed maintained by NYSEG sits near the intersection of Railroad Place and Wadsworth Street. The City of Geneva's PSB is located south of Railroad Place. The PSB is comprised of office space, cell blocks, and court room in the western portion and an attached pole barn structure in the eastern portion. The large parking lot which services employees of the PSB is located west of the PSB. A railroad is located immediately south of the PSB. Figure 1.1 shows how the site appeared in 1989.

Figure 1.1 – 1989 Low Altitude Aerial Photo of Site, looking south.

The Wadsworth Street Former MGP was established in 1853, and operated continuously until 1903, producing gas by the coal carbonization method (Atlantic 1991). Limited information is available regarding gas production at the Wadsworth MGP; however, a review of the publication “Survey of Town Gas and By-Product Production and Locations in the U.S.” indicates that approximately 7 and 16 million cubic feet of gas was produced at the MGP in 1890 and 1900 (Radian Corporation, 1985).

The coal carbonization method consisted of heating bituminous coal in a sealed chamber (i.e., retorts), with destructive distillation of gas from the coal and the formation of coke. The gases were collected, cleaned, and distributed while coke was removed and sold or used. The main byproducts of the coal carbonization method were tars, oils, coke, ammoniacal liquor, ash and clinker, and purifier residuals. The tars were generally viscous (as compared to carbureted water-gas tars) and contained substantial amounts of phenols and base nitrogen organics. Coal carbonization also produced substantial amounts of cyanide in the gas, which was removed during gas cleaning and often appears in wastes such as lime and wood chips. Ammonia was also produced by coal carbonization. Ammonia was recovered at many coal carbonization plants through the use of ammonia stills (USEPA, 1988).

Based on review of available Sanborn Maps, the gas plant was constructed in 1853 and included a retort and condenser house, a purification building (including lime room, ammonia tank and cistern) a coal shed, and a single gas holder. A second gas holder was constructed around 1900 in the northwest corner of the site. Between 1903 and 1909, the gas plant was demolished; the only remaining structures were the second gas holder, a tool house, and a meter house. The remaining holder was demolished between 1915 and 1925. Between 1925 and 1943, a 500,000 cubic foot gas holder and a regulator house were constructed at the site to serve as a storage/distribution facility. This newer holder could have served as a remote distribution holder for the Border City MGP which was built as the Wadsworth MGP was decommissioned. The 500,000 cubic foot gas holder was demolished sometime after 1946. Railroad Place was constructed through the center of the former MGP site, covering the location of the southernmost former gas holder. The locations of the historic MGP structures and present-day features are shown on Figure 2.

1.3 Summary of Previous Investigations

On NYSEG’s behalf, Atlantic Environmental Services, Inc. performed a site screening investigation of the site between November 1990 and September 1991. The purposes of the investigation were to: 1) determine whether site conditions posed an imminent threat to human health or the environment, and 2) provide data necessary to prioritize the site for further investigation. NYSEG voluntarily performed this work prior to the 1994 Order on Consent and outside the purview of the NYSDEC. This investigation consisted of performing historical research, site reconnaissance, and surface-soil sampling. Four surface-soil samples were collected and analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and inorganics (including lead, chromium, and total cyanide). The results of the site screening investigation were transmitted to the NYSDEC in the September 1991 *Site Screening Report*, and are summarized below:

- Toluene was detected in one surface soil sample (at an estimated concentration of 0.59 parts per million [ppm]).

- PAHs were detected in each surface soil sample (at concentrations ranging from 6.74 to 49.85 ppm).

- All of the surface soil samples contained concentrations of several metals (arsenic, beryllium, and mercury). Cyanide was also detected in three of the four samples collected at concentrations ranging from 2 to 37 ppm.

The site was evaluated using a Site Screening Priority Setting System (SPSS) developed by the Electrical Power Research Institute (EPRI). The SPSS evaluation produced an actual risk score of 20.3 and a perceived risk score of 24.3. Direct contact with surficial soils containing constituents associated MGP residuals was identified as the major route of exposure.

The Site Screening Report recommended that the site be fenced and that NYSEG conduct an investigation of the groundwater use in the vicinity of the site. No other field investigations were recommended unless the usage of the site changes. If the site usage changed, the recommended investigations would include groundwater and subsurface soil studies focusing in areas where former MGP structures existed, and where relatively elevated levels of MGP-related constituents were detected during the site screening investigation.

In addition to the site screening investigation, on NYSEG's behalf, JBM Construction Company excavated a trench along Railroad Street to enable the City of Geneva to install a new waterline in May 1999. The trench was approximately 6 feet wide by 6 feet deep by 100 feet in length and ran through the foundation of the southernmost gas holder. Three subsurface soil samples were collected during the excavation, one from bottom of the excavation within the gas holder, and one from each of the side walls of the excavation. Benzene, toluene, ethylbenzene, and xylenes (BTEX) and polycyclic aromatic hydrocarbon (PAH) compounds and total cyanide were detected in each sample. Total BTEX concentrations ranged from 0.003 ppm to 0.407 ppm; total PAH concentrations ranged from 23.79 to 181.9 ppm; and total cyanide concentrations ranged from 110 to 250 ppm.

1.4 Remedial Investigation Objectives

The NYSDEC and NYSEG entered into a multi-site Order on Consent (Index #D0-002-9309), effective March 30, 1994, which outlined a general objective to satisfactorily complete RI's at thirty three MGP sites, including the Wadsworth Street Site. The general objective states that an RI should include all the appropriate elements set forth in the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA); the National Contingency Plan (NCP) of March 8, 1990; the United States Environmental Protection Agency (USEPA) guidance document entitled, *Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA* (USEPA, 1988); and appropriate USEPA and NYSDEC technical and administrative guidance documents, so that when completed, the RI and preceding work would meet the regulatory definition of an RI.

In compliance with the Order on Consent, the RI had the following overall objectives:

1) Characterize the site by establishing the nature and extent of on-site and off-site MGP-related impacts.

2) Provide the information needed to prepare a Feasibility Study (FS) for evaluating on-site and off-site remedial actions to address MGP-related impacts.

2. Remedial Investigation Activities

2.1 Overview

The RI consisted of three field programs designed to meet the RI objectives discussed in Section 1:

- Soil Investigation
- Groundwater Investigation
- Soil Vapor Intrusion Investigation

ARCADIS BBL conducted the fieldwork during the time period of 2005 and 2007. Three other firms contributed work integral to the field effort, as follows:

- Drilling services by Lyon Drilling of Tully, New York

- Analytical services by Severn Trent Laboratories of Knoxville, Tennessee and Buffalo, New York

The work plans (including RI, SC, and SVIE work plans) outlined the scope of the investigations and the procedures to be used to perform them. This section describes the work completed, including minor, but necessary variances from the work plans. The chronological sequence of field activities is summarized below.

Table 2.1. Chronology of Field Activities

Date	Activity Completed
December 2005	• Excavated 5 test pits (TP-1, 1A, 1B, 2, & 3). • Drilled 10 soil borings (SB-1 through SB-10). • Installed six overburden water table monitoring wells (MW-1 through MW-6). • Collected groundwater samples and measured fluid levels. • Collected 6 surface soil samples (SS-1 through SS-6).
September and October 2006	• Drilled 6 soil borings (SB-11 through SB-15, including SB-14A & 14B). • Installed 3 overburden water table wells (MW-7 through MW-9). • Collected groundwater samples and measured fluid levels.
March 2007	• Collected 3 sub-slab and indoor air samples (SS-1/IA-1, SS-2/IA-2, & SS-3/IA-3) and 1 outside ambient air sample (AA-1).

2.2 Soil Investigation

The soil investigation consisted of three forms of field exploration: drilling, test pit excavation, and surface-soil sampling. In most cases, this work provided two types of data: visual classification of geology and site-impacts and analytical samples to identify and quantify site-related impacts to soil. The investigation method, sampling location, and suite of samples collected varied from point to point in order to meet the specific objective of the investigation location. This section describes the varied tasks included in the soil investigation, including the general methods applied and specific objectives addressed.

Additional details on the soil investigation can be found in the following places:

- Figure 2 depicts soil-boring, test-pit, and surface-soil sample locations.
- Appendix A contains boring and test-pit logs.
- Table 1 summarizes the analytical sample locations and analytes, and Tables 2, 3, and 4 summarizes subsurface and surface soil analytical results. These results are discussed later in Section 3.
- The attached CD contains laboratory reports for analyses performed to characterize selected physical properties of the soils.

2.2.1 Soil Borings

Soil borings were drilled to provide subsurface physical or chemical data and, in some cases, to install monitoring wells. Twenty-four soil borings were drilled during the investigations between December 2005 and September 2006. These borings served as the primary method to investigate the geology and the nature and extent of site-related impacts to on and off-site soils. The borings ranged in depth from approximately 18 to 40 feet bgs and were generally terminated in the fine sand unit. Nine of the borings were completed as groundwater monitoring wells and are discussed later in Section 2.3.1.

2.2.1.1 Drilling Methods

Borings were drilled and sampled using hollow-stemmed augers and split-spoon samplers, following the drilling procedures outlined in the work plans. Borings were advanced following a consistent methodology, as follows:

- Soil samples were retrieved continuously from grade to the total boring depth.
- Recovered soil samples were observed and described by a geologist, and screened for VOCs using a photoionization detector (PID).
- Selected samples were submitted for various laboratory analyses, as described in Section 2.2.3.
- Upon completion, borings were tremie-grouted to grade (with the exception of those meant for monitoring wells).
- Boring locations were later surveyed for position (New York State Plane Central [3012] coordinate system) and surface elevation (NGVD 1929).

Figure 2.1 – Drilling at MW-3, north of the PSB.

2.2.1.2 Boring Location and Rationale

A total of 24 borings were drilled in and around the former MGP site. The boring locations were chosen to investigate the various subsurface former MGP structures in the area and to better characterize the geology and distribution of MGP byproducts and chemical compounds associated with the byproducts. Several of these borings were also completed to delineate the lateral and vertical extent of MGP byproducts in subsurface soil. Table 2.2 lists each boring completed and the feature or area it investigated. Soil boring locations are shown on Figure 2.

Table 2.2. Soil Boring Summary

Boring Identification	Boring Depth (ft)	Area Investigated
SB-1	20	Former Gas Holders 2 & 3
SB-2	21	Former Gas Holder 2
SB-3	20	Former Gas Holder 2
SB-4	20	Former Gas Holder 1
SB-5	30	Former Gas Holder 1
SB-6	22	Former Gas Holder 1
SB-7	23	Former Gas Holder 1
SB-8	20	Former lime house, purifier house, and concentrators
SB-9	22	Former lime house, purifier house, and concentrators
SB-10	21	Former lime house, purifier house, and concentrators
SB-11	40	Former lime house, purifier house, and concentrators
SB-12	40	Former Gas Holder 1
SB-13	40	Former Gas Holder 1
SB-14	40	Former Gas Holder 1 and coal sheds
SB-15	40	Coal sheds
MW-1	20	Downgradient from former Gas Holders 1 & 2
MW-2	22	Near former Gas Holders 1 & 2
MW-3	22	Near former lime house, purifier house and concentrators
MW-4	20	West of former lime house, purifier house and concentrators
MW-5	22	East of former lime house, purifier house, condensers, concentrators, and retorts
MW-6	20	South of former lime house, purifier house, condensers, concentrators, and retorts
MW-7	18	Downgradient of former Gas Holder 1
MW-8	20	Downgradient of former Gas Holder 3
MW-9	18	Upgradient of former lime house, purifier house, condensers, concentrators, and retorts

2.2.2 Test Pits

Figure 2.2 – Test Pit TP-1B, looking north.

Five test pits were excavated during the soil investigation. The test pits were excavated to confirm the location of former MGP structures, provide information on their construction and integrity, and characterize the nature of materials contained within and near them. The test pits were excavated using a rubber-tired backhoe. A geologist observed the excavations and recorded notes describing the soils and physical structures encountered. While excavating the test pits, soils observed were described and screened for volatile compounds using a PID, as described in the work plans. The descriptions, PID screening results and other observations made during the test pitting are contained in the test pit logs included in Appendix A. Soil samples were also collected from the test pits and analyzed as described in Section 2.2.3, below. Table 2.3 summarizes the location and rationale for the test pits.

Table 2.3. RI Test Pit Summary

Test Pit ID	Location	Rationale
TP-1,1A and 1B	Grassy area near NYSEG gas regulator building	Locate the foundation of the former coal shed and assess the potential presence of MGP residuals associated with this structure.
TP-2	Grassy area north of NYSEG gas regulator building	Locate the foundation of former Gas Holder 3 and assess the potential presence of MGP residuals associated with these structures.
TP-3	Gravel parking area at northern edge of NYSEG property	Locate the foundation of former Gas Holder 3 and assess the potential presence of MGP residuals associated with these structures.

Following excavation, the test pits were backfilled with the material removed from the pits. Soils were returned to approximately the same depth interval from which they were removed during excavation. After backfilling was completed, the ground surface at each location was restored to pre-excavation condition.

2.2.3 Soil Analyses for Soil Boring and Test Pit Samples

A total of 31 soil samples were collected from borings and test pits to assess the nature and extent of MGP-related constituents in the overburden. The samples collected were analyzed for Target Compound List (TCL) VOCs, TCL SVOCs, and total cyanide. Analytical methods, sample-handling procedures and laboratory protocols are outlined in the work plans. Sample analyses followed the most recent NYSDEC ASP analytical protocol and include quality assurance/quality control (QA/QC) samples as required by the Quality Assurance Sampling and Analysis Project Plan (QA/SAPP) included with the work plans. Table 1 lists the soil samples collected and the analyses run. DUSRs are included on the attached CD.

Sample intervals were chosen in the field on a case-by-case basis, depending on the subsurface conditions and data needs. At most locations, a sample was collected from the most impacted interval observed, if present. The field geologist inferred impacts if NAPL, sheens, or staining was observed, or if headspace readings were significantly above background. At selected locations, samples were also submitted from the first visibly non-impacted interval in order to delineate the vertical extent. If no impacts were noted at a particular location, samples were typically collected from the approximate elevation at which impacts were observed in neighboring borings or test pits or near the water table.

2.2.4 Surface Soil Sampling

Six surface-soil samples (SS-1 and SS-6; see Figure 2) were collected from grassy areas at the site during the investigation. Samples were collected to determine whether the former MGP has affected the quality of surface soils at the site. The samples collected were analyzed for TCL VOCs, TCL SVOCs, and total cyanide. Analytical methods, sample-handling procedures and laboratory protocols are outlined in the work plans. Sample analyses followed the most recent NYSDEC ASP analytical protocol and include QA/QC samples as required by the QA/SAPP included with the work plans. DUSRs are included on the attached CD.

The surface-soil samples were composites of eight individual grab samples collected from the top 2 inches of soil within a 1-square-meter area. The vegetative sod layer, gravel, or sub-base material was removed prior to collecting the samples. Samples were distributed evenly throughout the grassy area surrounding the gas regulator area.

2.3 Groundwater Investigation

The groundwater investigation consisted of the following four tasks:

- Installing nine groundwater monitoring wells
- Performing specific capacity tests on each of the monitoring wells
- Gauging water levels
- Sampling groundwater

These tasks provided two principal types of data needed to meet the RI objectives: 1) water quality data to quantify and delineate the nature and extent of site-related constituents in groundwater, and 2) potentiometric data to better quantify groundwater flow patterns and gradients.

2.3.1 Monitoring Well Installation

The intent of the wells installed for the RI varied by type and location. Table 2.4 summarizes the purpose of each.

Table 2.4. Monitoring Well Installation

ID	Screen Interval (ft. bgs)	Location	Purpose
MW-1	10 – 20	In grassy area along Wadsworth Street, north of the gas regulator building	Evaluate groundwater quality and flow direction near former Gas Holder 3.
MW-2	12 - 22	In Nonna Trattoria’s parking lot, west of the gas regulator building	Evaluate groundwater quality and flow direction near former Gas Holder 2.
MW-3	7 – 17	Adjacent to the north side of the PSB.	Evaluate groundwater quality and flow direction near the former purifier house.
MW-4	6 - 16	In the parking area west of the PSB	Evaluate groundwater quality and flow direction west of the former MGP.
MW-5	12 - 22	Parking area at the intersection of Wadsworth Street and Railroad Place.	Evaluate groundwater quality and flow direction east of the former retort house and coal sheds.

ID	Screen Interval (ft. bgs)	Location	Purpose
MW-6	8 - 18	Adjacent the south side of the PSB.	Evaluate groundwater quality and flow direction south of the former condensers and retort house.
MW-7	7 - 17	In Wadsworth Street east of former Gas Holders 2 and 3.	Evaluate groundwater quality downgradient of the former MGP.
MW-8	10 - 20	In gravel parking area at the northern edge of the site.	Evaluate groundwater quality downgradient of former Gas Holder 3.
MW-9	7 - 17	Adjacent the southwest corner of the PSB.	Evaluate groundwater quality upgradient of the former condensers and purifier house.

Well locations are shown on Figure 2 and boring and well construction logs are included in Appendix A. Monitoring well specifications are also summarized in Table 5.

2.3.1.1 Installation Procedures

The nine groundwater monitoring wells (identified with the prefix MW) each provide hydraulic and water-quality data to meet specific objectives (noted in Table 2.4 above). With some minor deviations, the monitoring wells were installed as follows:

- Borings were drilled to their target depths following the practices described in Section 2.2.1.1.

- All wells were constructed of 2-inch Schedule 40 PVC with 10-foot long, 0.010-inch slotted screens.

- Wells were not installed with sumps because tar was not observed in any of the soil samples recovered during well installation.

- #00 silica sand packs were installed in the annular space around the screened interval and generally extended 2 feet above the screen top.

- Above the sand pack, the well annulus was filled with approximately 2 feet of bentonite chips to provide a seal. The chips were hydrated, and a cement/ bentonite grout was placed on top of the seal, using tremie pipe, to approximately 2 feet below grade.

- Each well was protected at the surface with an 8-inch flush-mount curb box. Each well was also fitted with a 2-inch locking J-plug cap.

- The top of the PVC riser of each well was marked, and the elevation was determined by survey to the nearest 0.01 foot.

- Completed wells were surveyed for position, surface, and measuring-point elevation.

At least 24 hours after installation, the monitoring wells were developed by surging/ purging using a Waterra positive displacement pump and dedicated polyethylene tubing or new, disposable polyethylene bailers. The wells were surged and purged and developed until the water removed from the well was reasonably free of visible sediment (50 nephelometric turbidity units [NTUs]), or until the turbidity levels stabilized following the removal of 10 well volumes.

2.3.2 Surface Water Gauge

During the RI, ARCADIS BBL established one surface water gauge to better understand regional groundwater flow near the site. The surface water gauge was established on a boat launch retaining wall at the north end of Seneca Lake, approximately 900 feet southeast of the site.

2.3.3 Water-Level Measurement

Several rounds of groundwater levels were measured during the RI. The gauging rounds included surface-water levels measured at one staff gauges (SG-1) in Seneca Lake that was established southeast of the site. The most comprehensive round was measured on October 4, 2006, after monitoring wells MW-7, MW-8, and MW-9 were installed during the latest phase of RI fieldwork. The round measured on October 4, 2007 was used as the basis for water level information provided on Figure 3. During the gauging events, the field staff measured the depth to water and total depth at each monitoring well. The water-level measurements are summarized in Table 6.

2.3.4 Groundwater Sampling

Groundwater samples were collected from monitoring wells on two separate occasions: December 20, 2005 and October 4 and 5, 2006. Monitoring wells sampled during the December 20, 2005 round include MW-1 through MW-6. Note that monitoring wells MW-7, MW-8, and MW-9 were not yet installed during this sampling event. All nine site-related monitoring wells (MW-1 through MW-9) were sampled on October 4 and 5, 2006. Groundwater samples collected during each round were analyzed for TCL VOCs, TCL SVOCs, and total cyanide using the most recent version of the NYSDEC ASP.

Sampling was performed using the low-flow technique outlined in the work plans. At each of the monitoring wells, the low-flow sampling procedures were modified to allow slightly more drawdown, thus generating time-drawdown data suitable for determining specific capacity. Generally, drawdown of approximately 0.1 to 0.5 feet was achieved during the purging of each well, depending on the yielding capacity of the particular well. Specific-capacity data were used to estimate the hydraulic conductivity of the material screened by each well according to the method described by Walton (1962). The estimated hydraulic conductivity values are summarized in Table 7. The input parameters used in the calculations are provided on the attached CD.

2.4 Soil Vapor Investigation

Representatives from the City of Geneva, the NYSDOH, and ARCADIS BBL performed a building walk-over on December 18, 2006 to select sub-slab vapor and indoor air sampling locations in the PSB. Based on discussions with the NYSDOH during the building walk-over and review of construction plans for the PSB, co-located sub-slab and indoor air samples were collected at three locations in the PSB (locations SS-1/IA-1, SS-2/IA-2, and SS-3/IA-3), and an ambient air sample was collected outside the building (location AA-1). Samples SS-1/IA-1 and SS-2/IA-2 were collected in the men's and women's cell block areas, respectively, and sample SS-3/IA-3 was collected in the custodial/maintenance closet. These areas were chosen for sampling because historical mapping suggests that several MGP structures may have once existed near or below these areas. The building layout and the sampling locations are shown in Appendix B.

Figure 2.3 – Sub-Slab Sampling Setup at SS-3.

On March 21, 2007, ARCADIS BBL conducted a pre-sampling building walk-through and interviewed the head of the City of Geneva Building, Grounds, and Parks Department (Mr. Mark Perry) to complete the NYSDOH Indoor Air Quality Questionnaire and Building Inventory, included as Appendix B to the NYSDOH document titled *Guidance for Evaluating Soil Vapor Intrusion in the State of New York*, dated October 2006 (the “NYSDOH Soil Vapor Intrusion Guidance”). The completed questionnaire/inventory is included in Appendix B of this report. The purpose of the questionnaire/inventory was to identify and minimize conditions that could interfere with the sampling. Following the building walk-through, samples were collected in accordance with the procedures detailed in the *Soil Vapor Intrusion Evaluation Work Plan* (ARCADIS BBL, February 2007). Each sample was collected using a 6-liter SUMMA® canister with an attached, pre-set flow regulator. The laboratory-supplied, batch-certified-clean canisters and flow regulators were pre-set to uniformly collect samples over an approximately 2-hour sampling period (i.e., a flow rate of approximately 50 milliliters per minute). Photographs taken by ARCADIS BBL during the sampling activities are included in Appendix B. Copies of the field sampling logs are also presented in Appendix B.

After sampling was completed, the slab penetrations (i.e., cored concrete holes) for the sub-slab vapor sampling were restored using hydraulic cement. Samples were submitted to STL of Knoxville, Tennessee and analyzed in accordance with United States Environmental Protection Agency (USEPA) Compendium Method TO-15. STL–Knoxville is certified in the State of New York to perform air analyses. Each sample was analyzed for VOCs included in the laboratory’s standard TO-15 Target Analyte List, plus n-alkanes and VOC tentatively-identified compounds (TICs) to provide additional data to help differentiate between potential VOC sources. The sub-slab vapor samples were also analyzed for a tracer gas (helium) in accordance with ASTM Method D1946 to provide a mechanism for evaluating the integrity of the seal at each sub-slab sampling point.

The results of the soil vapor investigation are summarized in Section 3. The NYSDEC/NYSDOH-approved Vapor Intrusion Evaluation Report is provided in Appendix B.

2.5 Fish and Wildlife Resources Impact Analysis

A Fish and Wildlife Resource Impact Analysis (FWRIA) was conducted in accordance with NYSDEC guidance documents including *Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites* (NYSDEC, 1994) and *Draft DER-10 Technical Guidance for Site Investigation and Remediation* (NYSDEC, 2002a). The objectives of the FWRIA were to identify the fish and wildlife resources that exist on and in the vicinity of the site, and to evaluate the potential for exposure of these resources to site-related constituents in environmental media. Results of the FWRIA are generally used to aid in remedial decision-making.

In accordance with NYSDEC (1994; 2002a) guidance, FWRIAs are conducted in a step-wise manner. Specifically, this FWRIA consisted of Part 1 (Resource Characterization). The resource characterization consisted of the following five steps:

1. Identification of fish and wildlife resources.

2. Identification of contaminant migration pathways and fish and wildlife exposure pathways.

3. Description of resources on site and within 0.5-mile radius of the site.

4. Identification of contaminants of ecological concern (i.e., comparison of environmental data to Standards, Criteria, and Guidance [SCGs]).

5. Conclusions regarding the actual or potential adverse impacts to fish and wildlife resources.

If no resources or exposure pathways are present, impact to resources are considered minimal and no additional analyses are required.

Details of the FWRIA are presented in Section 4.

2.6 Human Health Exposure Evaluation

A qualitative human health exposure evaluation (HHEE) was conducted at the site to evaluate the potential for human exposure to potentially site-related constituents. The HHEE was conducted consistent with the New York State Department of Health (NYSDOH) guidance as presented in *Draft DER-10 Technical Guidance for Site Investigation and Remediation* (NYSDOH, 2002). The HHEE uses information regarding current and foreseeable land uses and available site data to evaluate the potential for exposure of human receptors. The HHEE includes a characterization of the environmental setting of the site, identification of constituents of interest and complete exposure pathways, and an evaluation of contaminant fate and transport. The results of this qualitative HHEE will be used, in part, to help evaluate proposed remedial actions for the site. Details of the HHEE are presented in Section 4.

2.7 Decontamination

All equipment was decontaminated following the procedures outlined in the Field Sampling Plan (FSP) included in the work plans. In general, all nondisposable equipment (including all drilling tools and groundwater sampling equipment) was decontaminated prior to first use on site, between each investigation location and prior to demobilization. The integrity of the decontamination procedures was checked periodically with equipment rinse blanks, as required by the work plans. The results of the rinse blank sample results are included in the DUSRs on the attached CD.

2.8 Waste Handling

All investigation-derived waste (IDW) was contained on site in a secure area for appropriate characterization and disposal. Soil cuttings, PPE and spent disposable sampling materials were segregated by waste type and placed in New York State Department of Transportation- (NYSDOT-) approved steel 55-gallon drums. All decontamination water and purged groundwater water was stored in polyethylene tanks. All storage vessels were labeled with the contents, generator, location and date. IDW was characterized by NYSEG for off-site disposal.

2.9 Survey

The NYSEG Engineering Services Department surveyed the locations and elevations of all test pits, monitoring wells, soil borings, and the stream gauge. Survey data for the monitoring wells are shown on the logs included in Appendix A. Surface coordinates refer to the New York State Plane Central (3102) coordinate system (North American Datum [NAD] 83) and elevations are referenced to National Geodetic Vertical Datum (NGVD) 1929.

2.10 Data Usability Summary Report

ARCADIS BBL prepared DUSRs of the soil, groundwater, and soil vapor/air sample analytical results following the RI field activities. QA/QC information is contained and examined in the DUSR. The analytical summary tables include the data qualifiers identified in the DUSR. Electronic copies of the DUSRs are provided on the attached CD.

3. Remedial Investigation Findings

3.1 Overview

This section reports the cumulative findings of site investigations into the nature and condition of the soil, groundwater, and soil vapor at and near the Wadsworth Street Former MGP site. The discussion is divided into the following sections:

- Geology and physical setting (Section 3.2)
- Groundwater flow (Section 3.3)
- Soil-quality evaluation (Section 3.4)
- Soil vapor intrusion evaluation (Section 3.5)
- Groundwater-quality evaluation (Section 3.6)

Findings of the Fish and Wildlife Resource Impact Analysis (FWRIA) and Human Health Exposure Evaluation (HHEE) are reported in Section 4.

3.2 Geology and Physical Setting

The following discussion of the geology and hydrogeology of the site and surroundings is divided into three subsections. The first two subsections (3.2.1 and 3.2.2) provide an overview of the regional and site-specific geologic settings. The third subsection (3.2.3) identifies and describes the site stratigraphy in terms of hydrostratigraphic units.

3.2.1 Regional Geologic Setting

The site is located at the immediate northwest end of Seneca Lake, one of 11 elongated, north-south trending basins which make up the Finger Lakes (Figure 1). The lake basins are glacially scoured into the northern edge of the Appalachian Plateau (Coates, 1968, 1974). At Seneca Lake, the bedrock is primarily Devonian age shales (approximately 395 to 345 million years ago [mya]), and lesser amounts of sandstones and corbonates that gently dip to the south-southwest. Silurian age (approximately 435 to 395 mya) carbonates, shales and most importantly evaporates (mostly halite) are found below the Devonian section (Halfman, 2000).

During the Mesozoic Era (i.e., 195 to 65 mya), the Finger Lakes region was eroded to a surface of little of no relief, termed a peneplane. It is postulated that the peneplane was uplifted approximately 2000 feet about 30 mya (Von Engelin, 1961). This uplift brought on renewed erosion and dissection of the plateau-like region by streams. The eastern

Finger Lakes region, encompassing Seneca Lake and those lakes to the east, exhibited a preglacial river system that was established in the peneplane and maintained during the uplift of the region. Each of the north-south trending basins (i.e., Cayuga, Seneca, Owasco, Skaneateles and Otisco) carried a north flowing preglacial river which provided drainage for the area until the start of the Pleistocence Epoch (i.e., 1.8 mya to 10,000 years ago) when glaciers began to resculpture the region (Von Engelin, 1961).

There is evidence of at least two glacial advances in the Finger Lakes regions during the Pleistocence. The first advance is believed to have been initiated about one million years ago. The final retreat of glacial ice from the regions did not occur until about 10,000 years ago, with retreat of the Wisconsin Laurentide ice sheet. The Pleistocene Epoch modified the preexisting topography resulting in the distinctive landforms associated with the region today.

Deglaciation of the Laurentide ice sheet, as recorded by recessional moraines and kame deposits, is linked to the present day erosional and depositional geomorphology of the Finger Lakes Region (Muller and Cadwell, 1986), and specifically, the excavation and subsequent filling of the Finger Lakes Basins (Halfman, 2000). The best developed moraines are the east-west trending moraines near Geneva, and the kame moraines immediately to the south of each Finger Lake (Halfman, 2000). The Kame moraines are collectively known as the Valley Heads Moraine that dams each lake at their southern margins, are restricted to the valleys and reveal evidence for deposition by moving water. It suggests that glacial erosion aided by large volumes of glacial meltwater during the occupation of the Valley Heads Moraine were the erosional agents for the Finger Lake Basins (Coates, 1968).

The geologic sediments in the region consist of primarily glacio-lacustrine deposits such as silt, clay and fine sand (New York State Museum/Geological Survey, 2000). Glacial ice contact and outwash deposits such as sand and gravel can also be locally found. These glacial deposits are believed to be related to the most recent glacial stage, the Wisconsin Episode. More recent sand and gravel deposits are found as alluvium in major river valleys.

3.2.2 Site Geologic Setting

The site comprises a rectangular piece of land that is located approximately 900 feet northwest of the northwestern corner of Seneca Lake (Figure 1). The land surface at the site is relatively flat, with elevations ranging from approximately 454 to 457 feet above mean sea level (MSL)[1]. As shown on Figure 2, the southern portion of the site is overlain by Railroad Place and the City of Geneva's PSB. The northern portion of the site, north of Railroad Place, is overlain by the asphalt parking lot for a restaurant, a grassy lawn area, and a gravel parking area for residential properties north of the site. Stormwater at the site either recharges groundwater directly or is conveyed off site via a combination of overland sheet flow and underground storm sewer piping connected to various storm-water catch basins. These catch basins convey storm-water runoff to the municipal storm sewer system.

Site investigations have identified three principal stratigraphic units beneath the site. These units, listed below, show a sequence of events, from the land surface down (youngest to oldest) specific to the site's geologic and industrial history.

- Fill and the remnants of an assortment of man-made structures, originating from the site's industrial history.
- Silt and clay likely deposited at the bottom of a much higher Seneca Lake.
- Fine sand possibly deposited either at the bottom of Seneca Lake or during the last glacial recession.

The generalized description of these units is provided in Table 3.1.

Table 3.1. Generalized Geologic Column at the Site

Unit	Thickness (feet)	Stratigraphic Description
Fill	4 to 8 (18 ft in former Holder 1)	Sand with varying amounts of silt and gravel, cinders, slag, demolition debris, foundation remnants and buried utilities. Present across the site.
Silt and Clay	12 to 16 (1 ft below former Holder 1)	Predominately silt and clay with thin (few millimeters thickness) fine sand seams. Present continuously across site.
Fine Sand	> 22	Fine to very fine sand with varying amounts of silt, and traces of medium sand and clay. Present continuously across site.

---

[1] Relative to the National Geodetic Vertical Datum (NGVD) 1929.

The cross sections on Figures 4 and 5 show the vertical distribution of these units in the site area. The locations of the cross sections are shown on Figure 2.

3.2.3 Hydrostratigraphy

Hydrostratigraphic units comprise one or more geologic units of similar hydrogeologic properties (e.g., hydraulic conductivity) that may be grouped together to aid interpretation and simplify the discussion of groundwater flow. The hydrostratigraphic units at the site are discussed individually below, and their relationship to one another is depicted in cross-section on Figures 4 and 5.

3.2.3.1 Fill

The fill unit forms the uppermost hydrostratigraphic unit, and is bound by the water table above, and by the silt and clay unit below. This unit is relatively insignificant in terms of groundwater flow because it is saturated in only approximately southern half of the site (south of Railroad Place). Where it is saturated, this unit is only approximately 1 to 2 feet in thickness; however, the saturated thickness of the fill is approximately 10 feet in the immediate vicinity of former Gas Holder 1 (i.e., inside and immediately around this holder). The water table lies below the bottom of the fill north of Railroad Place, and as such, the fill is unsaturated in this area.

Beneath the site, this unit derives its water from direct recharge of infiltrating rain water or snow-melt and horizontal flow through the fill unit from upgradient sources. Although not directly measured during the RI, the hydraulic conductivity of this unit is expected to be relatively high due to the coarse nature of the materials comprising this unit.

3.2.3.2 Silt and Clay

The silt-and-clay hydrostratigraphic unit comprises the middle hydrostratigraphic unit investigated during the RI. This unit is significant because the majority of the site-related impacts were observed in it – thus, the majority of the RI wells and borings were installed to investigate its physical characteristics and the extent of impacts observed in this unit.

The unit can generally be described as a brownish-gray silt and clay with occasional fine sand lenses. The unit is found across the entire site and is approximately 12 to 16 feet in thickness; however, the unit is artificially thin in the immediate vicinity of former Gas Holder 1. A significant thickness of this unit was apparently excavated during the construction of this gas holder. The top of this unit likely formed the original land surface prior to development of the area. Its surface is currently covered by fill, and is relatively flat (with the exception of the former Gas Holder 1 area). It is apparent that the upper portion of this unit may have been re-worked in some areas as the site was developed because the lower portion of the fill appears to contain varying amounts of silt and clay mixed with anthropogenic materials.

Five monitoring wells (MW-3, MW-4, MW-6, MW-8, and MW-9) installed during the RI are screened entirely in this unit. The remaining four monitoring wells have screens that are partially in this unit and in the fine sand unit located beneath the silt and clay. Specific-capacity tests performed at all nine wells yielded horizontal hydraulic conductivity values (K_h) ranging from 0.03 to 41 feet per day, resulting in a geometric mean value of approximately 0.95 feet per day. The geometric mean K_h for wells screened only in the silt and clay is approximately 1.1 feet per day, which is similar to the K_h measured at all wells. This suggests that the silt and clay unit and upper few feet of fine sand unit have similar K_h values. The hydraulic conductivity test results for site wells are presented in Table 7.

Given the origin of the silt and clay unit (i.e., possibly formed as lake deposits by Seneca Lake), the anisotropy between horizontal and vertical conductivity is expected to be quite high. In such a setting, a degree of bedding and horizontal lamination is generally formed – a characteristic that was observed in site borings. Groundwater may therefore move more rapidly laterally along bedding than vertically across the bedding. Because if this anisotropy, the silt and clay unit is significant hydrogeologically because it may limit recharge to the fine sand unit by restricting downward infiltration of precipitation.

In fine-grained units of this sort, vertically-oriented fractures and/or plant roots can create a secondary porosity, and thereby increase the vertical conductivity. No such features were observed in the silt and clay unit. This observation agrees with the inferred geologic history of the unit: given the site's locale, the unit has likely been fully saturated since deposition, and would not, therefore, have had the opportunity to desiccate and fracture or support vegetation.

3.2.3.3 Fine Sand

The fine sand unit is the deepest unit encountered during the RI, and generally consists of fine to very fine sand with varying amounts of medium sand, silt, and clay. This unit is continuous across the site. None of the soil borings drilled during the RI penetrated the bottom of this unit. The deepest soil boring installed during the RI penetrated approximately 22 feet of the fine sand. The fine sand unit derives its groundwater from leakage down through the overlying silt and clay and from upgradient sources in the fine sand unit itself.

None of the monitoring wells installed during the RI exclusively screen the fine sand unit; however, four monitoring wells (MW-1, MW-2, MW-5, and MW-7) partially screen the upper few feet of this unit and the lower portion of the silt and clay unit mentioned above. The geometric mean K_h for the wells that partially screen the fine sand is approximately 0.81 feet/day. This value is comparable to the hydraulic conductivity values measured at wells that entirely screen the silt and clay unit, suggesting that the upper few feet of fine sand has similar permeability as the silt and clay unit. For this reason, the silt and clay unit and fine sand unit could be combined into one hydrostratigraphic unit.

3.3 Groundwater Flow

Seneca Lake dominates the surface and groundwater flow systems of the Geneva area, receiving all tributary flow and groundwater discharge. Seneca Lake drains northward via the Seneca River (located approximately 2 miles east of the site), which transports all water via circuitous path northward approximately 30 miles to Lake Ontario. Although shallow groundwater in the site area appears to flow in the northeasterly direction, it is reasonable to assume that site groundwater eventually finds its way to Seneca Lake. Local variability in groundwater flow direction is common in glacial/glacio-lacustrine depositional settings (such as the site area) due to the heterogeneous nature of glacially-derived overburden materials.

To aid interpretation of groundwater flow in the shallow overburden investigated during the RI, a water table contour map was prepared using water level data collected on October 4, 2006 (Figure 3). Several other rounds of water levels were also measured during the RI, but the October 4, 2006 round of measurements is the most comprehensive. Regardless of the measurement date, all water level rounds show the same general trend in water elevations – higher elevations in the southern portion of the site (near the PSB) and lower elevations in the northern portion of the site. A summary of the measured groundwater elevations is provided in Table 6.

Based on the water table map depicted on Figure 3, groundwater in the shallow overburden (upper approximately 20 to 30 feet of saturated material) is interpreted to move predominantly horizontally toward the north-northeast. As previously discussed, vertical groundwater movement is limited due to the horizontal bedding of the silt and clay and fine sand units. The average rate at which groundwater moves in the shallow overburden, known as the average linear velocity (Fetter, 1994), is calculated to be approximately 0.09 feet/day using the geometric mean hydraulic conductivity of 0.95 feet/day, a horizontal hydraulic gradient of 0.019 and an assumed effective porosity of 20 percent. Note that this is an *average* velocity for groundwater movement in the overburden. Groundwater velocities could be much higher or lower within zones of higher or lower hydraulic conductivity.

3.4 Soil-Quality Evaluation

Soil samples collected from the site included both surface soil samples (from the top 2 inches) and subsurface samples from soil borings and test pits (which ranged from 4 to 40 feet bgs). At MGP sites, two types of gas-production byproducts often account for the majority of affected soils: NAPLs (primarily coal-tar DNAPL) and spent purifier wastes. Principal components of coal tar that are routinely analyzed for at MGP sites are BTEX (benzene, toluene, ethylbenzene and xylenes), which are VOCs, and PAHs (polycyclic aromatic hydrocarbons), which are SVOCs. Knowing the levels and distribution of these two classes of organic compounds is a useful way of identifying the nature and extent of soils affected by coal tar. Because coal tar typically contains elevated levels of these compounds, soil samples that contain it need not always be chemically analyzed; rather it can be assumed that the levels of BTEX and PAHs will likely be above applicable Standards, Criteria, and Guidance (SCGs). The gas purification process commonly entailed running the unpurified gas through ground limestone or a mixture of wood chips/sawdust and iron filings. The spent purifier wastes were commonly disposed of on site or near the MGP, and these wastes commonly contain cyanide in the form of stable iron cyanide complexes (Ghosh, et. al., 2004). The iron cyanide complexes are typically bright blue in color, making it easy to detect these materials in the field. Complexed cyanide species have been shown to be stable, thus not a toxicological concern for humans (NGA, 2004). Potential purifier waste was identified at the site in several soil samples in the form of woody material.

3.4.1 Surface Soil

Surface soils are often considered separately from other soils because surface soils pose a greater potential exposure risk to human health and the environment because they are more-readily accessible. For this reason, surface soil quality is discussed in Section 4 – *Risk Evaluation.*

3.4.2 Visual Impacts in Subsurface Soil

Soil collected from subsurface investigation locations was visually characterized and the presence of potential impacts (NAPL, sheen, odor, staining) was noted. The distribution of the observed impacts is shown on Figure 6 in terms of observed odor/sheens, NAPL blebs, and samples saturated with NAPL. As shown on Figure 6, potential impacts were observed at 10 of the 30 subsurface investigation locations. Indications of only odor were observed at 5 of these 10 locations. The remaining 5 locations mostly contained trace-to-little amounts of tar and/or sheen and odor.

As shown on Figure 6, indications of NAPL and/or sheen were observed in three areas of the site: former Gas Holder 1, an unknown buried structure at the SB-14 borings, and at MW-3 (near the former purifier house). Additional details regarding the observations in these three areas are provided below. Refer to the logs presented in Appendix A for further details regarding the subsurface materials penetrated.

It should be noted that MGP impacts were not observed at or in the immediate vicinity of former Gas Holders 2 and 3.

3.4.2.1 Former Gas Holder 1

A trace-to-little viscous, tar-like NAPL was observed at three soil borings (SB-5, SB-7, and SB-13) drilled inside the footprint of former Gas Holder 1. The interval that the viscous tar was observed at each location corresponds to immediately above and below the floor of the holder at a depth interval of approximately 16 to 23 feet below grade (the holder floor was encountered at approximately 18 feet below grade). The deepest impact observed in the area of former Gas Holder 1 is a trace sheen observed at approximately 28 to 29 feet below grade at SB-13. No impacts were observed in soils encountered below this interval.

Figure 3.1 – Sample Collected from 16.5 to 16.8 Feet Below Grade at SB-17, above Former Holder 1 floor.

3.4.2.2 Buried Structure at SB-14

A potential buried structure, as evidenced by void space encountered during drilling, was observed at the first boring (SB-14A) completed at the SB-14 location. The void was encountered at approximately 4 to 6.5 feet below grade, and contained water (likely perched) and a black oil-like fluid. Drilling at boring SB-14A was discontinued at approximately 6.5 feet below grade and a second boring (SB-14B) was drilled approximately 5-feet west in an attempt to miss the apparent structure. Strong odors and relatively minor PID readings were observed at SB-14B to approximately 14 feet below grade.

3.4.2.3 Former Lime House or Purifier House

MGP-related impacts were observed at MW-3, where a moderate to faint odor, trace sheen, and/or slightly elevated PID readings (up to 42 ppm) were noted intermittently between 10 and 22 feet below grade. The soil boring for MW-3 was drilled through a brick foundation. The impacts were observed below the foundation. As shown on Figure 2, the foundation could be part of the former MGP, possibly associated with the former lime house or purifier house.

3.4.3 Subsurface Soil Analytical Results

Laboratory analytical results for the soil samples collected as part of the RI are summarized in Table 1. To evaluate the potential significance of the results, soil analytical results were compared to the unrestricted and restricted use soil cleanup objectives (SCOs) for the protection of public health as presented in the NYSDEC’s Part 375 Regulations. The commercial SCOs are the focus of the discussion below because the current and intended use of the site is commercial. The soil analytical results that exceed the commercial SCOs are shown in Figure 7. The discussion below focuses on BTEX, PAHs, and cyanide because these are the constituents of concern (COCs) associated with MGP sites.

3.4.3.1 BTEX

A total of 31 subsurface soil samples were collected and analyzed for VOCs. All but four of the 31 samples contained detectable concentrations of BTEX compounds. Concentrations of total BTEX ranged from 0.002 ppm (SB-2 [8-10’]) to 980 ppm (SB-13[16-18’]). The highest concentrations of total BTEX were in samples collected from the visually impacted material (discussed above) at SB-5, SB-7, SB-13, and SB-14A.

Only two samples contained concentrations of benzene above the commercial SCO: SB-13(16-18’) at 240 ppm and SB-14A(4-6.5’) at 64 ppm. No samples contained concentrations of toluene, ethylbenzene, or xylenes above commercial SCOs.

3.4.3.2 PAHs

A total of 31 subsurface soil samples were collected and analyzed for SVOCs. All but two of the 31 samples contained detectable concentrations of PAH compounds. Concentrations of total PAHs ranged from 0.011 ppm (TP-1[7’]) to 11,000 ppm (SB-5[23-23.3’]). Similar to the concentration trend observed for BTEX, the highest concentrations of total PAHs were in samples collected from the visually impacted material (discussed above) at MW-3, SB-5, SB-7, SB-13, and SB-14A. Samples collected from visually non-impacted intervals contained concentrations of total PAHs less than 50 ppm.

Ten samples contained concentrations of one or more PAHs above the commercial SCO. Eight of these samples correspond to the areas where visually impacted material was observed. The remaining two samples were collected from SB-9 (6-6.8’) and SB-12(16-18’). These two samples contained concentrations of benzo(a)pyrene and/or dibenz(a,h)anthracene at levels slightly above the commercial SCO.

3.4.3.3 Cyanide

A total of 31 subsurface soil samples were collected and analyzed for total cyanide. Ten of the 31 samples contained detectable concentrations of total cyanide. Concentrations of total cyanide ranged from 0.87 ppm (SB-8[14-16’]) to 2,170 ppm (SB-14A[4-6.5’]). The sample containing the second highest concentration of total cyanide (26.7 ppm) was collected from SB-13(16-18’). The sample from SB-14A was the only sample containing a concentration greater than the commercial SCO for total cyanide.

The distribution of cyanide detected in soil is a reflection of the presence of fill material across the site that contains apparent MGP wastes (e.g., clinkers, ash, cinders, purifier wastes). Since MGP wastes sometimes contain cyanide and MGP-related wastes (mostly in the former of cinders and ash) were observed in nearly every subsurface investigation location, it is not surprising that cyanide was detected in subsurface soils in many areas of the site. Although cyanide was detected at several locations, the concentrations were relatively low (generally detected at less than 20 ppm), with the exception of the sample from SB-14A that was saturated with NAPL.

3.5 Soil Vapor Intrusion Evaluation

Co-located sub-slab and indoor air samples were collected at three locations in the PSB (locations SS-1/IA-1, SS-2/IA-2, and SS-3/IA-3), and an ambient air sample was collected outside the building (location AA-1). Samples SS-1/IA-1 and SS-2/IA-2 were collected in the men's and women's cell block areas, respectively, and sample SS-3/IA-3 was collected in the custodial/maintenance closet. These areas were chosen for sampling because historical mapping suggests that several MGP structures may have once existed near or below these areas. The building layout and the sampling locations are shown on Figure 1 of Appendix B. The NYSDEC/NYSDOH-approved Vapor Intrusion Evaluation Report is provided in Appendix B.

Several VOCs were identified in vapor samples collected beneath the PSB floor slab, in the air inside the building, and in ambient air. The helium tracer gas was not detected in any of the sub-slab vapor samples, which indicates that the seal was adequate and sub-slab vapor samples were not diluted by surface air during sample collection. Tabulated analytical results are provided in the Vapor Intrusion Evaluation Report provided in Appendix B.

New York State does not currently have SCGs for concentrations of compounds in subsurface vapors. The concentrations detected in indoor air are all less than the NYSDOH indoor air guidance values presented in Section 3.2.5 (Table 3.1) of the NYSDOH Soil Vapor Intrusion Guidance. The detected indoor air concentrations are also less than the 90th percentile of background indoor air levels observed by the USEPA in public and commercial office buildings as referenced in Section 3.2.4 of the NYSDOH Soil Vapor Intrusion Guidance. Five VOC constituents (1,2,4-trichlorobenzene, carbon tetrachloride, styrene, toluene, and trichloroethene) were detected in indoor air at concentrations slightly above the 75th percentile of background values observed by the NYSDOH in a study of single-family fuel oil heated homes as referenced in Section 3.2.4 of the NYSDOH Soil Vapor Intrusion Guidance. One VOC constituent (m- and p-xylene) was detected in outdoor air at a concentration slightly above the 75th percentile of background values observed by the NYSDOH in a study of single-family fuel oil heated homes as referenced in Section 3.2.4 of the NYSDOH Soil Vapor Intrusion Guidance.

It is not possible to attribute the constituents detected in sub-slab vapor, indoor air, and outdoor air to a particular source. However, the chemical signature of the VOCs detected in indoor air is typically associated with common cleaning products, solvents, pesticides, fire extinguishers, paint removers, refrigerants, and/or gasoline. While

MGP-related waste materials do contain some of the same VOCs as gasoline, most notably BTEX, the chlorinated VOCs (such as 1,2,4-trichlorobenzene and carbon tetrachloride) are not related to former MGP operations. The presence of numerous alkanes (e.g., n-butane, n-decane, etc.) suggests that the BTEX detected in the indoor air samples are from a gasoline source. Based on the investigation results, subsurface byproducts of the former MGP do not appear to be contributing VOCs to the indoor air at the PSB via soil vapor intrusion.

Upon review of the vapor intrusion data, concern regarding the concentrations of BTEX and naphthalene in the sub-slab vapor samples was raised by NYSDEC/NYSDOH in a June 12, 2007 letter from NYSDEC (see Appendix B). NYSDEC and NYSDOH believe that the concentrations of BTEX and naphthalene compounds detected in sub-slab vapor of the PSB have the potential for future vapor intrusion into the building. In the June 12 letter, NYSDEC recommended that either a sub-slab depressurization system be installed in the PSB to mitigate the potential for future vapor intrusion or to conduct additional vapor sampling at the PSB during the 2007/2008 heating season to further evaluate vapor intrusion potential.

BTEX and naphthalene are components of both petroleum products (e.g., gasoline) and MGP wastes; however, several alkanes (e.g., n-butane, n-decane, etc.) and methyl tert-butyl ether (MTBE), which were also detected in the sub-slab vapor samples, suggest a gasoline source. The PSB was previously used as an automotive repair shop known as Tallmadge Tire.

Although the results of the sub-slab vapor sampling suggest that the BTEX and naphthalene may be related to a gasoline source, the groundwater data from one of the five monitoring wells proximate to the PSB (i.e., MW-3, located just north of the PSB), exhibit characteristics likely related to MGP waste (i.e., polycyclic aromatic hydrocarbons, total cyanide, and BTEX). In light of this, it is possible that some fraction of the BTEX and naphthalene measured in the sub-slab vapor samples may be attributed to MGP wastes and that there could be sub-slab vapor phase commingling of these compounds from both a gasoline and an MGP source.

In discussions conducted during a meeting between NYSEG, NYSDEC, NYSDOH and the City of Geneva on July 18, 2007 (meeting minutes presented in Appendix B), options to install a sub-slab depressurization system in the PSB or conduct additional vapor sampling at the PSB during the 2007/2008 heating season were presented to the City. The City has since agreed with NYSEG’s proposal to install a sub-slab depressurization system. NYSEG plans to design and install the system during the 2007/2008 winter season.

3.6 Groundwater-Quality Evaluation

This section discusses groundwater quality at and near the site based on analytical results of groundwater samples collected at monitoring wells during the RI. Samples were collected from wells MW-1 through MW-6 during sampling events in December 2005 and October 2006, and samples were collected from wells MW-7, MW-8, and MW-9 in October 2006. For the same reasons as stated in the Soil Quality Evaluation (Section 3.4), this evaluation also focuses on the nature and extent of BTEX, PAHs, and total cyanide, the COCs at this site. The analytical results presented in Table 8 are compared with NYSDEC TOGS 1.1.1 (June 1998) Class GA groundwater Standards and Guidance Values (referred to hereafter as “Class GA Standards or Guidance Values”). Note that NYSDEC has not determined groundwater quality Standards for certain inorganic and organic compounds that were analyzed during the site investigations, most significantly, some of the PAH compounds. Where available, NYSDEC Guidance Values are used for comparison. The distribution of groundwater samples with concentrations exceeding the Class GA Standards and Guidance Values is provided on Figure 8.

Although this discussion focuses on exceedences of BTEX, PAHs, and total cyanide in groundwater, it should be noted that only one other compound was detected in groundwater above a NYSDEC Guidance Value - the sample collected from MW-6 in December 2005 contained 68 J ppb of acetone. The Guidance Value for acetone is 50 ppb. Acetone was not detected at MW-6 during the October 2006 sampling event. Acetone is not known to be associated with MGP sites. It is possible that acetone could be associated with laboratory contamination.

3.6.1 BTEX

BTEX were only detected in groundwater sampled from monitoring well MW-3. Benzene, toluene, ethylbenzene, and xylene were detected in both sampling events at MW-3 at concentrations above the Class GA Standards for these compounds. Total BTEX concentrations detected in the October 2006 sample were considerably lower than the concentrations detected in December 2005: total BTEX in October 2006 was 6,100 ppb and total BTEX in December 2005 was 20,000 ppb. The presence of elevated BTEX in groundwater at this location is not surprising given that odor and trace sheen were observed in soil encountered while this well was being installed.

3.6.2 PAHs

PAHs were detected in groundwater sampled from MW-3 and MW-6. At MW-6 only a trace amount of naphthalene (1.3 J ppb) was detected during the December 2005 sampling event. No PAHs were detected in groundwater from MW-6 during the October 2006 event. Groundwater from MW-3 contained total PAH concentrations of 4,500 J ppb on the December 2005 event and 1,400 J ppb on the October 2006 event. Concentrations of naphthalene comprised most of the PAH concentration for both events. Naphthalene exceeded its Class GA Guidance Value on both events. Fluorene was also detected above its Class GA Guidance Value on the December 2005 event; however, fluorene did not exceed the Guidance Value on the October 2006 event. No other PAHs were detected in groundwater sampled from MW-3 at levels exceeding the Class GA Standards or Guidance Values.

3.6.3 Cyanide

Total cyanide was detected in six of nine monitoring wells at concentrations ranging from 46.4 ppb (MW-8, October 2006) to 600 ppb (MW-3, December 2005). Total cyanide was not detected in monitoring wells MW-5, MW-6, and MW-9. Monitoring wells MW-6 and MW-9 are located on the upgradient edge of the site and monitoring well MW-5 is located on the side-gradient (southeast) edge of the site.

Monitoring wells MW-2 and MW-3 are the only wells containing groundwater with total cyanide concentrations above the Standard (200 ppb). Groundwater from MW-2 contained 340 ppb of total cyanide during the December 2005 sampling event, but the total cyanide concentration (197 J ppb) at this well was slightly lower than the Standard during the October 2006 event. Groundwater from MW-3 contained concentrations of total cyanide above the Standard during both sampling events: 600 ppb in December 2005 and 259 J ppb in October 2006.

Total cyanide concentrations in groundwater are highest in the area of MW-3 and appear to decrease with increased distance downgradient from the MW-3 area. The concentration of total cyanide in the furthest downgradient monitoring wells is 114 J ppb (MW-7) and 46.4 J (MW-8).

The presence of total cyanide in groundwater is not surprising given that cyanide was detected in several soil samples collected across the site. As discussed in the Soil Quality Evaluation (Section 3.4), MGP-related wastes were observed in the fill materials across the site and there is a potential for those wastes to contain cyanide.

4. Risk Evaluation

This section presents the results of the Fish and Wildlife Resources Impact Analysis (FWRIA) and Human Health Exposure Evaluation (HHEE) performed to assess the potential risks to humans and the environment posed by site-related constituents. The results are summarized as follows:

- Fish and Wildlife Resource Impact Analysis (Section 4.1)
- Human Health Exposure Evaluation (Section 4.2)

4.1 Fish and Wildlife Resource Impact Analysis

This section presents the FWRIA that was conducted for the site. The FWRIA was conducted in accordance with NYSDEC guidance documents including *Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites* (NYSDEC, 1994) and *Draft DER-10 Technical Guidance for Site Investigation and Remediation* (NYSDEC, 2002a). The objectives of the FWRIA are to identify the fish and wildlife resources that exist on and in the vicinity of the site, and to evaluate the potential for exposure of these resources to site-related constituents in environmental media. Results of the FWRIA are generally used to aid in remedial decision-making.

In accordance with NYSDEC (1994; 2002a) guidance, FWRIAs are conducted in a step-wise manner. Specifically, this FWRIA includes Part 1 (Resource Characterization), which consists of the following five steps:

1. Identification of fish and wildlife resources.

2. Identification of contaminant migration pathways and fish and wildlife exposure pathways.

3. Description of resources on site and within 0.5-mile radius of the site.

4. Identification of contaminants of ecological concern (i.e., comparison of environmental data to ecological benchmarks).

5. Conclusions regarding the actual or potential adverse impacts to fish and wildlife resources.

If no resources or exposure pathways are present, impact to resources are considered minimal and no additional analyses are required.

4.1.1 Ecological Characterization

Topographic maps and aerial photographs were reviewed to identify the general physical and ecological features of the site and surrounding areas. A site visit was conducted to aid in the development of a covertype map for the site and surrounding areas within a 0.5-mile radius of the site. The covertype map (Figure 9) classifies these areas into ecological communities based on physical characteristics and vegetation (e.g., mowed lawn with trees, railroad). As part of the ecological characterization, natural resources (i.e., rivers, lakes, wetlands) located within a 2-mile radius of the site were also identified. This information assisted in evaluating wildlife habitat value for the site and surrounding areas.

4.1.1.1 Vegetative Covertypes

Although most of the former MGP site is either paved /covered by gravel or overlain by a building, there is a vegetated (grass) area surrounding the gas regulator shed along the fence line to the west, along the sidewalks to the south and east, and adjacent to the gravel parking lot to the north. Land use in the vicinity of the former MGP site is primarily commercial and residential. Seneca Lake borders the site to the southeast. There is a large park along the shoreline of the lake, and farther to the south along the shoreline is a commercial hotel. Ecological communities within a 0.5-mile radius of the site were generally classified according to the NYSDEC (2002b) document entitled *Ecological Communities of New York State, Second Edition*. Eight major covertypes were identified within a 0.5-mile radius of the site, including:

1. Commercial/industrial/residential.

2. Mowed lawn.

3. Mowed lawn with trees.

4. Railroad.

5. Summer-stratified monomictic lake.

6. Paved road/path.

7. Unpaved road/path.

8. Hardwood forest.

A map showing these covertypes is presented on Figure 9. Individual covertypes are described below.

Commercial/Industrial/Residential Covertype – The lower third of the site and most of the surrounding areas to the north, south, east, and west are characterized as an industrial/commercial/residential covertype (Figure 9). This covertype generally consists of industrial buildings, commercial businesses, paved and gravel lots, public roads, and limited amounts of cultivated vegetation (i.e., lawns, ornamental trees and shrubs).

Mowed Lawn Covertype – The mowed lawn covertype is present on site, to the northeast in the form of a baseball field, and to the south of the site in the form of a park along the shore of Seneca Lake (Figure 9). This covertype is generally characterized by residential, recreational, or commercial lands, in which the groundcover is dominated by clipped grasses and there is less than 30% cover of trees. Ornamental and/or native shrubs may be present, usually with less than 50% cover.

Mowed Lawn with Trees Covertype – The mowed lawn with trees covertype is present to the northeast, west and southeast of the site in the (Figure 9) in the form of parks. This covertype is generally characterized by open recreational lands (e.g., parks), in which the groundcover is dominated by maintained grasses. Ornamental and/or native shrubs, along with planted flower beds, are present along pathways and scattered throughout the area. Mature hardwood trees (e.g., maples, oaks) provide at least 30% cover.

Railroad – The railroad covertype is present to the west and south from two lines merging to the east of the site (Figure 9). This covertype is generally comprised of a permanent road having a line of steel rails fixed to wood ties and laid on a gravel bed. There may be sparse vegetation rooted in the gravel substrate. The railroad right of way may be maintained by mowing or herbicide spraying.

Summer-Stratified Monomictic Lake Covertype – The summer-stratified monomictic lake covertype is present to the south of the site as the northern portion of Seneca Lake (Figure 9). This covertype is an aquatic community that has only one period of mixing or turnover each year (monomictic), and one period of stratification (NYSDEC, 2002b). These lakes generally do not freeze over in winter (except in unusually cold years) or form only a thin or sporadic ice cover during the coldest parts of midwinter, so the water circulates and is isothermal during the winter. These lakes are typically thermally stratified only in the summer; they are oligotrophic to mesotrophic and alkaline. The water depths observed along the lake shoreline and within the boat ramp areas were approximately 4 to 10 feet. Bluegill (*Lepomis macrochirus*), bluntnose minnow (*Pimephales notatus*), common carp (*Cyprinus carpio*), and smallmouth bass (*Micropterus dolomieu*) were observed along the shoreline.

Paved Road/Path Covertype – The paved road/path covertype is present throughout the area surrounding the site and is found on site in the form of a parking lot (Figure 9). This covertype is characterized as a road or pathway that is paved with asphalt, concrete, brick, stone, etc. There may be sparse vegetation rooted in cracks in the paved surface. Within the on-site parking lot, several herbaceous species were observed within the cracks and along the fenceline including horse nettle (*Solanum carolinense*), wild carrot (*Daucus carota*), least hop clover (*Trifolium dubium*), field sow thistle (*Sonchus arvensis*), and common sow thistle (*Sonchus oleraceus*).

Unpaved Road/Path Covertype – The unpaved road/path covertype is present along the northern boundary of the site (Figure 9). This covertype is characterized by a sparsely vegetated road or pathway of gravel, bare soil, or bedrock outcrop. These roads or pathways are maintained by regular trampling or scraping of the land surface. The substrate consists of the soil or parent material at the site, which may be modified by the addition of local organic material (woodchips, logs, etc.), or sand and gravel.

Hardwood Forest Covertype – The hardwood forest covertype is characterized by a mixture of mature hardwood trees. This covertype exists within several swaths along the railroad line to the west of the site and to the north of the railroad yard to the east of the site (Figure 9). Dominant species within this covertype include oaks (*Quercus* spp.), maples (*Acer* spp.), and American beech (*Fagus grandifolia*).

4.1.1.2 Surface Waters

The main surface water body in the vicinity of the site is Seneca Lake (to the south). The NYSDEC best usage classification for Seneca Lake is Class B(T). According to

New York Regulations Title 6 §701.7, the best usage of Class B(T) lakes are primary and secondary contact recreation and fishing; this includes the designation of specifications applying to trout waters. These waters shall be suitable for fish propagation and survival. Marsh Creek lies to the east of the site and has a NYSDEC best usage classification of C. According to New York Regulations Title 6 §701.8, the best usage of Class C streams is primary and secondary contact recreation and fishing. These waters shall be suitable for fish propagation and survival.

4.1.1.3 Wetlands

According to the NYSDEC Freshwater Wetlands Maps for the site (which encompasses four quadrangles -- Geneva South, Geneva North, Stanley, Phelps), there are two state wetlands within a 2-mile radius of the site (Figure 10). State wetland GN-28 is located approximately 1.2 miles northeast of the site, and state wetland GV-5 is located approximately 0.8 miles north of the site. Neither of these wetlands appears to be hydraulically connected to the site.

The National Wetlands Inventory (NWI) Maps for the site (which encompasses four quadrangles -- Geneva South, Geneva North, Stanley, Phelps), identifies numerous wetlands within a 2-mile radius of the site (Figure 11), including palustrine open water, emergent, scrub-shrub and forested wetlands. The NWI wetland maps are generated by the U.S. Fish and Wildlife Service (USFWS) using stereoscopic analysis of high-altitude aerial photographs, and the majority of the mapped wetlands are not field verified. None of the mapped wetlands are located in close proximity to the site, and as such, are expected to be hydraulically isolated from the site.

4.1.2 Fish and Wildlife Resources

Due to the commercial nature of the site itself coupled with surrounding land use within the City of Geneva, wildlife usage of the site is expected to be minimal due to its lack of natural resources. In general, the wildlife species that may use the site are likely common species typical of urbanized and disturbed areas (e.g., small mammals, passerine birds). Table 9 presents a list of biota that were observed in the vicinity of the site, as well as typical fish and wildlife species that may inhabit the site and/or surrounding areas based on the habitat types that are present.

Commercial/Industrial/Residential Covertype – The site itself, as well as a significant portion of the surrounding lands, is classified as a commercial/industrial/ residential covertype (Figure 9). Wildlife species that utilize these covertypes are generally those that are capable of utilizing habitats that are created by urban landscapes. Typical wildlife species that may use this covertype include, but are not limited to, gray squirrel, mice, rock dove, and house sparrow. The majority of the site does not offer wildlife habitat that would be conducive to foraging, nesting, or shelter. The lower third of the site consists of paved roads, cement sidewalks, and a commercial building. The middle section of the site consists of an asphalt parking lot and an area of mowed lawn. The upper third of the site consists of a gravel and dirt parking area with a small seasonal shrub/grass area along its southwestern boundary. This small seasonal shrub/grass area may offer wildlife habitat that would be conducive to foraging, nesting, and/or shelter, but use of this area is likely limited due to surrounding land use.

Mowed Lawn Covertype – This covertype is present along the middle third of the site, to the south of the site (near Seneca Lake), and to the northeast (ballfield) (Figure 9), and is generally characterized by open recreational lands (e.g., parks) where the ground cover is dominated by maintained grass. Surrounding land use near the site most likely limits wildlife use of this covertype. Wildlife species that may use this covertype include, but are not limited to, eastern cottontail, gray squirrel, and passerine and migratory birds (e.g., house sparrow, Canada goose). Large mammals such as whitetail deer and red fox most likely do not use this covertype due to the surrounding commercial and residential areas.

Mowed Lawn with Trees Covertype – This covertype is present to the west (park), to the northeast (park) and to the south of the site along the northern shore of Seneca Lake (Figure 9), and is generally characterized by open recreational lands (e.g., parks) where the groundcover is dominated by maintained grasses. This covertype includes a mixture of mature hardwoods (e.g., oaks, maples), various ornamental trees (e.g., crab apple, hawthorns), and is predominately characterized by mowed lawn. Wildlife species that may utilize this covertype generally consist of species that are capable of utilizing habitats created by urban landscapes. Typical wildlife species that may use these areas include, but are not limited to, eastern cottontail, gray squirrel, and passerine and migratory birds (e.g., house sparrow, Canada goose).

Railroad Covertype – This covertype is present as two rail lines converge to the southeast of the site (Figure 9). This covertype is generally comprised of a permanent gravel road bed with steel rails fixed to wooden ties, with sparse vegetation that is typically maintained through mowing or herbicide spraying. Due to the general lack of vegetation within this covertype, the railroad does not provide wildlife habitat that would be conducive to foraging, nesting and/or cover.

Summer-Stratified Monomictic Lake Covertype - This covertype is present to the south of the site as the northern portion of Seneca Lake (Figure 9). Characteristic fishes of this community are usually well developed and vary based on several factors such as substrate type, water depth, presence of macrophytes, and food sources. The portion of the lake nearest the site is characterized by diverse substrate, man-made structures (e.g., docks, piers), water depths from 4 to 10 feet, and the presence of various submerged aquatic vegetation. Fishes observed during the site visit included bluegill, bluntnose minnow, common carp, and smallmouth bass; other fish species are likely present as well (e.g., rock bass, perch).

Paved Road/Path Covertype - This covertype is present throughout the area surrounding the site and is found on site in the form of a parking lot (Figure 9). This covertype is characterized as a road or pathway that is paved with asphalt, concrete, brick, stone, etc. Due to the general lack of vegetation within this covertype, the parking lot and roads do not provide wildlife habitat that would be conducive to foraging, nesting, and/or cover.

Unpaved Road/Path Covertype - This covertype is present along the northern boundary of the site (Figure 9). This covertype is characterized by a sparsely vegetated road or pathway of gravel, bare soil, or bedrock outcrop. Due to the general lack of vegetation within this covertype, the parking lot and roads do not provide wildlife habitat that would be conducive to foraging, nesting, and/or cover.

Hardwood Forest Covertype – The hardwood forest covertype is characterized by a mixture of mature hardwood trees. This covertype exists within several swaths along the railroad line to the west of the site and to the north of the railroad yard to the east of the site (Figure 9). These forested swaths most likely provides habitat for passerine birds and small mammals. Several bird species (crow, house and field sparrows), and a woodchuck, were observed within the area north of the railroad yard. Large mammals such as whitetail deer and red fox may utilize this covertype, but given the surrounding commercial and residential land use, use of this covertype by larger fauna is unlikely.

4.1.3 Threatened/Endangered Species and Significant Habitat

Information requests for threatened/endangered species information were sent to both the USFWS and NYSDEC Natural Heritage Program to assist in the evaluation of sensitive species or habitats in the vicinity of the site. According to the NYSDEC (2007), a significant waterfowl winter concentration area exists along the northern end of Seneca Lake, and an endangered plant, common mare's-tail (*Hippuris vulgaris*), may be present within the vicinity of the site. The common mare's-tail has been historically recorded in the vicinity of the project site, but has not been documented there since 1979 or earlier. The USFWS (2007) responded with a referral to their website, which lists threatened and endangered species by county. According to the USFWS website, two species currently may be present in Ontario and Seneca counties: bog turtle (*Clemmys muhlenbergii*) (threatened) and Indiana bat (*Myotis sodalis*) (endangered). However, based on the specific habitat requirements of these two species, the site does not contain suitable habitat, and as such, these species most likely do not use site resources. The bald eagle is still listed as a federally-protected species, although it was de-listed on August 8, 2007. While there are no Endangered Species Act (ESA) requirements for bald eagles after this date, the eagles continue to receive protection under the Bald and Golden Eagle Protection Act (BGEPA). Despite this, habitat suitable for the bald eagle does not exist on site, and as such, this species most likely does not use site resources.

4.1.4 Observations of Stress

During the site visit on June 28, 2007, no evidence of stressed vegetation or negative impacts on wildlife was observed for the site or surrounding areas.

4.1.5 Fish and Wildlife Resources Values

As part of the FWRIA, a qualitative assessment was performed to address: 1) the general ability of the area within 0.5-mile of the site to support fish and wildlife resources, and 2) the value of fish and wildlife resources to humans. The following subsections provide a qualitative evaluation of the value of the identified covertypes to wildlife and the value of these wildlife resources to humans.

4.1.5.1 Value of Habitat to Associated Fauna

The qualitative determination of habitat value is based on field observations, research, and professional judgment. Habitat values are assigned using the following classification system:

- **No Value –** Paved areas, building, and parking lots.

- **Low Value –** Areas with habitat quality that marginally supports a minimal number and diversity of low quality species.

- **Moderate Value –** Areas that support a variety of quality species with little or no stress related to anthropogenic disturbance.

- **High Value –** Critical habitat for rare species and/or extensive undeveloped habitat supporting a great diversity and abundance of wildlife without functional restraints imposed by anthropogenic disturbance.

The site is described as a mix of paved and unpaved roads, mowed lawn, and commercial/industrial/residential covertypes. The majority of the site consists of an asphalt parking lot, commercial building, gravel and dirt parking area, and an area of mowed lawn. Due to the general lack of vegetation within the commercial/industrial/residential and paved and unpaved roads/paths covertypes, these covertypes are concluded to provide no value to wildlife. Similarly, the surrounding areas that are classified as commercial/industrial/residential and paved and unpaved roads/paths covertypes do not provide adequate food, shelter and/or nesting areas for most species. Therefore, these covertypes in the surrounding areas of the site are concluded to provide low value to wildlife. The mowed lawn and limited area of seasonal grasses and shrubs present on the site provide minimal forage base, shelter and/or nesting areas which may attract migratory birds (e.g., Canada geese) and other wildlife typical of urban settings. Therefore, the mowed lawn covertype is concluded to provide low value to wildlife.

The mowed lawn with trees covertype is present to the west, northeast and southeast of the site. This covertype contains mature trees that may provide arboreal habitat to terrestrial wildlife (e.g., birds, small mammals) and mowed lawn expanses which may attract migratory birds (e.g., Canada geese). The mature trees may offer food, cover, and nesting habitat for a variety of urbanized animal species, but use of these covertypes by large mammals is most likely limited due to the surrounding land use (i.e., commercial/industrial/residential). As such, the mowed lawn with trees covertype is concluded to offer low value to wildlife.

The railroad covertype is present along two rail lines which converge to the southeast of the site. This covertype is comprised of a permanent gravel road bed with steel rails fixed to wooden ties, with sparse vegetation that is typically maintained through mowing or herbicide spraying. Because this covertype generally lacks vegetation, it is concluded to provide no value to wildlife.

The hardwood forest covertype exists along the railroad line to the west of the site and to the north of the railroad yard to the east of the site. This covertype most likely provides some shelter, cover, and nesting habitat for a limited number of avian and mammalian species. However, the surrounding land use most likely limits the use of this covertype by large mammals. Based on this information, the hardwood forest covertype is concluded to provide a low value to wildlife.

The summer-stratified monomictic lake covertype is present to the south of the site as the northern portion of Seneca Lake. Several fish species were observed along the northern shoreline closest to the site. Also, this northern end is known to provide wintering habitat for migrating waterfowl (NYSDEC, 2007). This section of Seneca Lake likely supports a variety of aquatic organisms, habitat for birds, and may support semi-aquatic mammal species. Based on this information, this covertype is concluded to offer moderate value to fish and wildlife.

4.1.5.2 Value of Resources to Humans

The site itself is relatively small and does not offer any natural resources that would encourage recreational use of the site. Activities associated with the mowed lawn with and without trees covertypes (i.e., parks and ball fields) most likely consist of wildlife observation and other recreational activities (e.g., picnics, sports). The small areas of forested riparian corridor are located within the city of Geneva and are most likely only used (if at all) for wildlife observation. Because these forested areas are within city limits, hunting is prohibited in these areas. Seneca Lake supports various recreational activities (e.g., boating, fishing, swimming) and wildlife viewing opportunities. These uses of the lake and park areas are likely to remain consistent in the future, and are not likely to be affected by activities or conditions at the site.

4.1.6 Fish and Wildlife Regulatory Criteria

The following New York State laws, rules, regulations, and criteria are relevant to this FWRIA:

- Title 6 of the New York Codes, Rules, and Regulations (6 NYCRR)
    - Part 608, Use and Protection of Waters
    - Part 663, Freshwater Wetlands Permit Requirements
    - Part 664, Freshwater Wetlands Maps and Classifications

  - Part 701, Classifications—Surface Waters and Groundwaters
  - Part 702, Derivation and Use of Standards and Guidance Values
  - Part 703, Surface Water and Groundwater Quality Standards and Groundwater Effluent Standards
  - Part 800 ff., Classes and Standards of Quality and Purity Assigned to Fresh Surface and Tidal Salt Waters
- Environmental Conservation Law—Chapter 43-B of the Consolidated Laws
  - Article 11, Fish and Wildlife:
    - §11-0503, Polluting Streams Prohibited
    - §11-0535, Endangered and Threatened Species
  - Article 15, Water Resources: Title 5, Protection of Water
  - Article 24, Freshwater Wetlands
- Criteria and Guidelines
  - New York State Department of Environmental Conservation (NYSDEC) Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1., “Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations” (June, 1998)
  - 6 NYCRR Part 375 Soil Cleanup Objectives for the protection of ecological resources (NYSDEC, 2006)

4.1.7 Impact Assessment

Part 1 of the FWRIA includes an impact assessment to determine the impacts, if any, on fish and wildlife resources. This impact assessment includes a pathway analysis, which determines if there are complete or potentially complete ecological exposure pathways to site-related constituents, and a criteria-specific analysis, which compares site data to numerical criteria.

4.1.7.1 Pathway Analysis

The objective of the pathway analysis is to identify constituents of interest associated with the site, and to evaluate potential pathways by which fish and wildlife receptors may be exposed to such constituents. A complete exposure pathway exists of the following five elements:

1. Contaminant source.
2. Contaminant release and transport mechanisms.
3. Potential point of exposure.
4. Viable route of exposure.
5. Receptor population.

If any one of these elements is missing, then the pathway is not considered to be complete and exposure cannot occur, irrespective of chemical concentrations in environmental media. Potential media of interest associated with the site include surface soils, subsurface soils, and groundwater. Potential exposure pathways associated with these media are discussed below.

Surface Soils

The majority of the site is covered by asphalt, gravel, and a commercial building. There are a few small areas of natural habitat (i.e., vegetated soils) located to the east of the asphalt parking lot and south and west of the gravel parking area. Although the surrounding commercial/industrial/residential land use most likely limits wildlife use of these areas, they may be used by common wildlife species such as passerine birds and small mammals. Therefore, exposure to surface soils within this area is a potentially complete exposure pathway.

Subsurface Soils

As previously stated, the site is primarily characterized by asphalt, gravel, and a commercial building. The site itself provides low value to wildlife due to its general lack of natural resources. Wildlife are generally not exposed to subsurface soils (soils deeper than 0.5 feet below ground surface) during normal activities such as foraging and nesting. Based on these factors, exposure to subsurface soils does not present a complete exposure pathway.

Groundwater

Groundwater investigations indicate that depth to groundwater ranges from approximately 6 to 10 feet below grade. There are no groundwater seeps identified at the site, and exposure of wildlife to groundwater would only occur if an animal were to burrow down to the water table, which is unlikely given the depth to groundwater. Because the site itself offers low value to local wildlife, burrowing animals most likely would not use the site. Based on these factors, exposure to groundwater is not a complete exposure pathway.

4.1.7.2 Criteria-Specific Analysis

The objective of the criteria-specific analysis is to provide an assessment of potential ecological impact for those media that present potentially complete exposure pathways by comparing site data to ecological screening criteria.

Surface Soils

Six surface (0 – 2 inches) soil samples were collected and analyzed for SVOCs, VOCs, and total cyanide. Surface soil samples consisted of SS-1 through SS-6 which were all collected within the confines of the site, specifically within the mowed lawn area. Surface soil locations are shown on Figure 2. Surface soil data were compared to 6 NYCRR Part 375 Soil Cleanup Objectives (SCOs) for the Protection of Ecological Resources (NYSDEC, 2006). Table 3 compares surface soils data to ecological SCOs.

A limited number of VOCs (acetone, benzene, toluene) were detected in the surface soil samples. No VOCs exceeded their respective ecological SCO. Total cyanide was detected in samples SS-1 and SS-5 with concentrations of 1.4 and 2.9 milligrams per kilogram (mg/kg), respectively. Currently, there is no associated SCO for total cyanide. Several SVOCs and PAHs were detected, but only two samples (SS-1 and SS-5) had exceedences of SCOs. Specifically, acenaphthene, benzo(a)pyrene, and fluorene exceeded their associated ecological SCOs. However, acenaphthene and fluorene only exceeded their SCOs in one surface soil sample (SS-1). Benzo(a)pyrene exceeded its SCO is samples SS-1 and SS-5.

4.1.8 Summary and Conclusions

The FWRIA for the site was conducted in accordance with NYSDEC (1994; 2002a) guidance. The site is a former MGP site predominately characterized by paved (asphalt) and unpaved (gravel) surfaces and a commercial building, which provide no value to wildlife. The areas of mowed lawn and seasonal grasses and shrubs on the site provide limited wildlife habitat conducive to foraging, nesting and/or cover. Due to the general lack of natural resources and the surrounding industrial/commercial/ residential land use, fauna that may utilize site resources are most likely restricted to those typical of an urban setting. Exposure to on-site surface soils is identified as a potentially complete exposure pathway.

Three PAHs (acenaphthene, benzo(a)pyrene, and fluorene) exceeded their associated SCOs in surface soil samples collected from the mowed lawn area. Benzo(a)pyrene was the only constituent whose concentration exceeded the SCO in sample SS-5, with a concentration of 3.4 mg/kg, which was only slightly higher than its SCO (2.4 mg/kg). Acenaphthene and fluorene concentrations exceeded their associated SCOs in sample SS-1.

The site contains only a small area of natural habitat, which coupled with surrounding land use, most likely limits wildlife use of the site. Therefore, ecological exposures to surface soil are not considered to be significant.

4.2 Human Health Exposure Evaluation

This section presents a HHEE that describes the potential for human exposure to site-related constituents. This HHEE was conducted to support the RI consistent with the New York State Department of Health (NYSDOH) guidance as presented in *Draft DER-10 Technical Guidance for Site Investigation and Remediation* (NYSDEC, 2002). This HHEE uses information regarding current and foreseeable land uses and available site data to evaluate the potential for exposure of human receptors. The HHEE includes a characterization of the environmental setting of the site, identification of constituents of interest and complete exposure pathways, and a brief discussion on contaminant fate and transport. The results of this qualitative HHEE will be used, in part, to help evaluate proposed remedial actions for the site.

4.2.1 Constituents of Potential Concern

Analytical data for the site are available for surface soil, subsurface soil, air (ambient, indoor, and sub-slab vapor), and groundwater. Data used in this evaluation were collected as part of the Site Characterization activities conducted in December 2005 and RI activities conducted during September and October 2006. These samples were analyzed for VOCs, SVOCs, and cyanide. Ambient air, sub-slab vapor and indoor air samples were collected from inside and outside the PSB on March 21, 2007. These samples were analyzed for VOCs. The following subsections briefly discuss the analytical data for each medium and the comparison of these data to screening criteria to identify constituents of potential concern (COPCs).

Surface Soil

Six surface (0 – 2 inches) soil samples were collected and analyzed for SVOCs, VOCs, and total cyanide. Surface soil samples consisted of SS-1 through SS-6 and were all collected within the confines of the site. Surface soil sampling locations are shown on Figure 2. Surface soil data were compared to 6 NYCRR Part 375 SCOs for commercial land use (NYSDEC, 2006a). These SCOs were developed to represent exposure of an adult worker and a child visitor to soils via ingestion, inhalation, and dermal contact, and were deemed to be the most appropriate based on current and potential future use of the site. Table 4 compares surface soils data to commercial use SCOs.

Eight PAHs [benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, and phenanthrene] were detected in one surface soil sample (SS-1) at concentrations that exceeded their SCOs. For the remainder of the surface soil samples, the only other exceedence was benzo(a)pyrene at SS-5 and SS-6 locations.

Subsurface Soil

Thirty-one discrete subsurface soil samples and three duplicates were collected and analyzed for VOCs, SVOCs, and total cyanide. Subsurface soil data were compared to 6 NYCRR Part 375 SCOs for commercial land use (NYSDEC, 2006a). Table 2 presents the comparison of subsurface soil data to these screening criteria. Subsurface soil sample locations are shown Figure 2 and Figure 7.

Benzene and several PAHs were detected in some subsurface soil samples at concentrations that exceeded their associated SCOs. Specifically, benzene exceeded its SCO in two soil boring samples at locations SB-13 and SB-14A. Several PAHs [acenaphthlyene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, dibenzofuran, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, and pyrene] exceeded their SCOs at various sample locations. All of these exceedences fall within the area of former Gas Holder 1 and to the southwest of this area near the former lime house and purifier house. Sample location SB-5 (within former Gas Holder 1 area) had the only exceedences for acenaphthylene, anthracene, benzo(k)fluoranthene, dibenzofuran, fluoranthene, fluorene, phenathrene, and pyrene. Former Gas Holder 1 lies mostly beneath Railroad Place.

Groundwater

Fifteen discrete groundwater samples and two duplicates were collected and analyzed for VOCs, SVOCs, and total cyanide. Groundwater sample locations are shown Figures 2 and 8. Analytical results were compared to criteria presented in the NYSDEC Division of Water Technical and Operational Guidance Series (TOGS 1.1.1) document entitled *Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations* (NYSDEC, 1998). Groundwater samples from monitoring wells MW-2 and MW-3 contained concentrations of VOCs, PAHs, and/or total cyanide at levels exceeding the NYSDEC Standards and/or Guidance Values. These wells are located near former Gas Holder 1 and the former lime house and purifier house. Groundwater from monitoring well MW-3 contained the most number of exceedences, including exceedences for all the BTEX compounds as well as styrene, numerous PAHs, phenols, and total cyanide. Acetone exceeded its NYSDEC Guidance Value at monitoring well MW-6; however, acetone is not known to be associated with MGPs. Total cyanide exceeded its NYSDEC Standard at monitoring well locations MW-2 and MW-3.

Air

A vapor intrusion evaluation was conducted at the PSB in March 2007 in support of the RI. This evaluation consisted of collecting co-located sub-slab vapor and indoor air samples at three locations in the PSB, and an ambient air sample was collected outside the building. Analytical results were compared to target shallow soil gas concentrations presented in the NYSDOH (2006) document entitled *Guidance for Evaluating Vapor Intrusion in the State of New York*.

Several VOCs (which may not be MGP related) were identified in vapor samples collected beneath the PSB floor slab, in the air inside the building, and in ambient air. The helium tracer gas was not detected in any of the sub-slab vapor samples, which indicates that the seal was adequate and sub-slab vapor samples were not diluted by surface air during sample collection.

New York State does not currently have SCGs for concentrations of compounds in subsurface vapors. Despite this, NYSDEC and NYSDOH, as noted in their June 12, 2007 letter and during a July 18, 2007 meeting (see Appendix B for detail), believe sub-slab vapor concentrations of BTEX and naphthalene compounds are of concern and “have the potential for future vapor intrusion into the building” (NYSDEC, 2006b). The concentrations detected in indoor air are all less than the NYSDOH indoor air guidance values presented in Section 3.2.5 (Table 3.1) of the NYSDOH Soil Vapor Intrusion Guidance. The detected indoor air concentrations are also less than the 90th percentile of background indoor air levels observed by the USEPA in public and commercial office buildings as referenced in Section 3.2.4 of the NYSDOH Soil Vapor Intrusion Guidance. Five VOC constituents (1,2,4-trichlorobenzene, carbon tetrachloride, styrene, toluene, and trichloroethene) were detected in indoor air at concentrations slightly above the 75th percentile of background values observed by the NYSDOH in a study of single-family fuel oil heated homes as referenced in Section 3.2.4 of the NYSDOH Soil Vapor Intrusion Guidance. One VOC constituent (m- and p-xylene) was detected in outdoor air at a concentration slightly above the 75th percentile of background values observed by the NYSDOH in a study of single-family fuel oil heated homes as referenced in Section 3.2.4 of the NYSDOH Soil Vapor Intrusion Guidance.

The NYSDEC/NYSDOH-approved Vapor Intrusion Evaluation Report is in Appendix B.

4.2.2 Contaminant Fate and Transport

The following discussions of environmental fate and transport for identified COPCs are taken from the toxicological profiles provided by the Agency for Toxic Substances and Disease Registry (ATSDR).

Acetone

Because acetone is miscible in water, partitioning of this chemical from the water column to sediments and suspended solids in water is not significant (ATSDR, 1994). In soil, acetone partitions to the atmosphere through volatilization and to groundwater through leaching (ATSDR, 1994). Bioaccumulation of acetone in the aquatic food chain does not occur, and there is no scientific evidence of biomagnification in aquatic and terrestrial food chains. Biodegradation is the primary mechanism for degradation of acetone in soils. In groundwater, sorption to soil particles and biodegradation are the primary mechanisms of removal and degradation. In air, acetone exists as vapor and is readily degraded by reactions with hydroxyl radicals and through photolysis. To a lesser degree acetone is removed from the air by wet deposition.

Styrene

Styrene is found in air in the vapor phase and degrades through photooxidation with ozone and hydroxyl radicals (ATSDR, 1992). In groundwater, styrene may partition to soil, but the rate is dependent upon several chemical factors, such as water solubility, vapor pressure, Henry’s law constant, octanol-water partition coefficient and organic carbon partition coefficient. Aerobic biodegradation of styrene in groundwater is slow, with a half-life of 6 weeks to 7.5 months (ATSDR, 1992). Mobility in soil is moderate and limited through absorption processes that are largely impacted by the amount of organic carbon content. Bioaccumulation of styrene in the food chain generally does not occur, and there is no scientific evidence of biomagnification.

Benzene

The environmental fate and transport of benzene is primarily attributed to its high volatility (ATSDR, 1997). In soil, benzene partitions to the atmosphere through volatilization and to groundwater through leaching. Aerobic biodegradation is the primary mechanism for degradation of BTEX in soils and groundwater.

Toluene

The majority of toluene released to the environment partitions to air, although rates of volatilization from soils depends on temperature, humidity, and soil type (ATSDR, 2000a). Transport of toluene from soil to groundwater depends on the degree of adsorption to soil, which is mediated by the presence of organic matter. Toluene will be readily leached from soils with low organic content. The degradation of toluene in soil occurs primarily by microbial action.

Ethylbenzene

Ethylbenzene has a high vapor pressure and will partition into the atmosphere from surface soils; subsurface soil infiltration will also occur (ATSDR, 1999). This chemical has a relatively high mobility in soils because sorption is not significant enough to prevent migration. Ethylbenzene will leach into groundwater, particularly in soils with low organic carbon content. In soils, aerobic soil microbes are responsible for biodegradation.

Xylenes

In soils, xylenes tend to adsorb to organic matter, and will leach into groundwater from subsurface soils with low organic carbon content. Volatilization and photooxidation are the primary removal mechanisms in surface soil. Biodegradation is the primary removal mechanism in subsurface soils.

PAHs

Some PAHs may leach into groundwater from subsurface soils. The transport and partitioning of PAHs in the environment are dependent on several chemical factors, such as water solubility, vapor pressure, Henry’s law constant, octanol-water partition coefficient and organic carbon partition coefficient.

Phenols

In soil, phenols degrade readily through both aerobic and anaerobic processes (ASTDR, 2006a). In air, phenols degrade rapidly through gas-phase hydroxyl radical reactions.

Cyanide

Cyanide is released to air primarily as hydrogen cyanide gas, and to a lesser extent, as particulate cyanides (ASTDR, 2006b). Hydrogen cyanide in air reacts with hydroxyl radicals to allow the photochemical process of degradation. In water and surface soils, cyanide occurs most commonly as hydrogen cyanide and is removed primarily by volatilization. Mobility is lowest in soils with low pH and high concentrations of free iron oxides, positively charged particles, and clays (e.g., chlorite, kaolin, gibbsite), and highest in soils with high pH, high concentrations of free $CaCO_3$ and negatively charged particles, and low clay content (ASTDR, 2006b).

Although cyanide has a low soil sorption capability, it is usually not detected in groundwater, probably because of fixation by trace metals through complexation or transformation by soil microorganisms (ASTDR, 2006b). In subsurface soils, cyanide at low concentrations is expected to biodegrade through aerobic or anaerobic processes. At higher concentrations, those toxic to microorganisms, cyanide is able to leach to groundwater. Bioaccumulation of simple metal cyanides and hydrogen cyanide in aquatic organisms is not suggested in the scientific literature.

4.2.3 Potential Exposure Points, Receptors and Route of Exposure

An initial step in evaluating potential human exposure is the identification of potentially complete exposure pathways. For an exposure pathway to be complete, the following five elements must exist: 1) a contaminant source; 2) contaminant release and transport mechanisms; 3) a point of exposure; 4) a route of exposure; and 5) a receptor population. If all five elements exist, then that exposure pathway is considered to be complete (NYSDOH, 2002).

As previously described, several PAHs had concentrations exceeding their associated screening criteria in surface soil locations SS-1, SS-5, and SS-6. COPCs identified for subsurface soil include benzene and PAHs from soil borings located within the former Gas Holder 1 and near the former lime and purifier houses. Acetone, BTEX, styrene, phenols, fluorene, naphthalene, and total cyanide were identified as COPCs in groundwater samples mainly from monitoring wells MW-2 and MW-3. Several VOCs were identified in vapor samples collected beneath the PSB floor slab, in the air inside the building, and in ambient air.

The most likely current and future receptors at the site are on-site personnel such as maintenance workers, as well as commercial visitors to both the PSB and the restaurant. Trespassers may also represent a potential exposure group because there is no fencing around the site that would prevent access. Residents along the northern boundary of the site may utilize the dirt and gravel parking area and therefore represent a potential receptor group. Since the site does not have any recreational value (e.g., parks, natural resources), recreational receptors are not considered to be a population of interest. Although no development is currently planned for the site, construction workers represent a potential future receptor group.

Potentially complete human exposure pathways for the site are discussed below.

Potential direct contact with soils – The majority of the site is covered by asphalt road and parking lots. There is an area of vegetated (i.e., grassed) soils along the eastern boundary that runs from the sidewalk along Railroad Place north to the dirt and gravel parking area at the northern boundary. Since the gas regulator shed currently exists within this area, utility maintenance workers will utilize this area during routine site visits. Potential exposure of trespassers, residents, commercial visitors, maintenance workers and construction workers to COPCs in surface soils within this area could occur via incidental ingestion and dermal contact. A few small areas of surface soils in the gravel parking area were identified that were not covered by gravel or grass. Such areas could present a greater potential risk of exposure. Exposure of trespassers, residents, and commercial visitors to subsurface soils is unlikely because the majority of the site is covered by asphalt road and parking lot, and these receptors are not expected to be involved in intrusive activities. Since no redevelopment of the site is anticipated, potential exposure of construction and maintenance workers to subsurface soils is not likely. However, if on-site subsurface construction/excavation/maintenance activities did occur, potential exposures to these workers could be mitigated by the use of personal protective equipment (PPE).

Potential inhalation of vapors and/or particulates – Surface soil COPCs are primarily non-volatile constituents (i.e., PAHs). Workers, residents, and trespassers may be exposed to COPCs in surface soils via inhalation of particulates from areas of exposed soil within the gravel parking area. However, the presence of gravel provides some level of mitigation to the potential generation of fugitive dust. The remaining maintained lawn area surrounding the gas regulator shed most likely limits the generation of fugitive dust due to the presence of vegetation. Since no redevelopment of the site is anticipated, potential exposure of construction workers is not likely. However, if on-site construction/excavation activities did occur, potential exposures to these workers could be mitigated by the use of PPE.

As previously discussed, the vapor intrusion to indoor air pathway within the PSB does not appear to be complete at this time. However, sub-slab vapor concentrations were considered to be a potential concern for future intrusion into the PSB based on discussions with NYSDEC and NYSDOH. As discussed in the Vapor Intrusion Evaluation Report (Appendix B), NYSEG plans to design and install a sub-slab depressurization system for the PSB in the near future. As such, the potential for future vapor intrusion will be mitigated.

Direct contact with groundwater – The groundwater table beneath the site ranges from approximately 6 to 10 feet below grade, and generally flows in a southwest to northeast direction away from Seneca Lake. Groundwater is not used as a potable source at the site, and depth to groundwater precludes potential direct exposures of residents, trespassers, and commercial visitors to this medium. If on-site construction/excavation/maintenance activities did occur, potential exposures could be mitigated by the use of PPE.

The magnitude of exposure to COPCs is dependent upon the type of worker activity, the specific areas of the site used in daily activities, and the frequency and length of time spent at each area. Surface soils represent the greatest potential for exposure (via all pathways). As stated above, there still may be some potential for future exposure of construction and maintenance workers to COPCs in subsurface soils and/or groundwater during intrusive activities (e.g., water pipe maintenance).

4.2.4 Summary

Analytical data indicate that benzene and PAHs are present in subsurface soils at concentrations exceeding NYSDEC-recommended values. The majority of the site is covered by asphalt road and parking lots. As such, the potential for exposure to COPCs in subsurface soils is limited to hypothetical future construction and maintenance workers that might be engaged in intrusive activities, although potential exposures could be mitigated through the use of personal protective equipment. Potential exposures of residents, commercial visitors, and trespassers to constituents in subsurface soils are unlikely because these receptors would not be involved in intrusive activities.

Surface soils represent a potentially complete exposure pathway for trespassers, residents, commercial visitors, maintenance workers, and construction workers. However, potential exposures to COPCs in surface soil (i.e., PAHs) are limited to the sparse areas of exposed soil within the gravel parking lot and within the area of vegetated soils on site (i.e., soils that are not covered by impervious surfaces such as asphalt and concrete). Further, PAH concentrations exceeding the NYSDEC screening criteria in the surface soil were generally limited to the area of the former Gas Holder 1 (as shown by SS-1 analytical results). Benzo(a)pyrene was the only PAH that exceeded criteria outside of this area, with slight exceedences occurring near the northern boundary of the site (SS-5 and SS-6).

Groundwater beneath the site is not used as a potable source, and therefore exposure via ingestion of groundwater is unlikely. Likewise, exposure of trespassers, commercial visitors, and residents to groundwater is unlikely based on the depth to groundwater and the lack of surface expressions (i.e., seeps). Hypothetical future construction and maintenance workers may be exposed to shallow groundwater during intrusive activities, but exposures would likely be mitigated with the use of personal protective equipment.

Soil vapor concentrations for several VOCs (which may not be MGP related) are believed to have the potential for future intrusion into the PSB. In a June 12, 2007 letter, NYSDEC recommended that either a sub-slab depressurization system be installed in the PSB to mitigate the potential for future vapor intrusion, or to conduct additional vapor sampling at the PSB during the 2007/2008 heating season to further evaluate vapor intrusion. In discussions conducted during a meeting between NYSEG, NYSDEC, NYSDOH and the City of Geneva on July 18, 2007, options to install a sub-slab depressurization system in the PSB or conduct additional vapor sampling at the PSB during the 2007/2008 heating season were presented to the City. The City has since agreed with NYSEG’s proposal to install a sub-slab depressurization system. NYSEG is currently designing the system and hopes to install the system during the 2007/2008 heating season.

5. Summary and Conclusions

The site has been the subject of three phases of environmental investigation: The Site Screening Investigation conducted in 1990 and 1991, the Site Characterization conducted in 2005, and the Remedial Investigation conducted in 2006 and 2007. This report describes the results and conclusions of the Site Characterization and Remedial Investigation work. During these investigations, 9 monitoring wells were installed, 24 soil borings were drilled, 5 test pits were excavated and approximately 60 samples of environmental media were chemically analyzed. The primary objectives of this work were to characterize the nature and extent of site-related impacts to the environment and to evaluate the risk posed to human health and the environment by those impacts. These objectives have been satisfied by the work performed during these investigations, and the information gathered will enable an evaluation of remedial alternatives for the site.

This section summarizes the findings of the RI and presents relevant conclusions.

5.1 Site Setting

The site is located in the City of Geneva, near the northwestern shore of Seneca Lake in eastern Ontario County, New York (Figure 1). The site comprises a rectangular piece of land that is now located in a mixed commercial and residential area in the east-central part of Geneva, New York. Seneca Lake is located about 900 feet to the southeast. The site is bordered by Wadsworth Street to the east, a railroad to the south, a restaurant to the west, and residential properties to the north. A dry cleaner is located northeast of the site, on the east side of Wadsworth Street. Railroad Place intersects Wadsworth Street and bisects the site. A gas holder and coal shed formerly stood where Railroad Place now runs. The City of Geneva’s PSB is located south of Railroad Place where the several MGP structures previously existed. Figure 2 shows the locations of the former MGP structures as they relate to present-day features.

The area of the former MGP site north of Railroad Place is currently owned by NYSEG, while the area south of Railroad Place is owned by the City of Geneva. The area owned by NYSEG is grass covered to the east while a fenced in asphalt parking area is located west. The restaurant leases the parking area from NYSEG. A gravel parking area located in the extreme northeast of NYSEG’s property is apparently used by residential property owners. A gas regulator shed maintained by NYSEG sits near the intersection of Railroad Place and Wadsworth Street. The City of Geneva’s PSB is located south of Railroad Place. The Public Safety Building is comprised of office space in the western portion and an attached pole barn structure in the eastern portion. The large parking lot which services employees of the PSB is located west of the PSB. A railroad is located immediately south of the PSB.

The gas plant was constructed in 1853 and included a retort and condenser house, a purification building (including lime room, ammonia tank and cistern) a coal shed, and a single gas holder. A second gas holder was constructed around 1900 in the northwest corner of the site. Between 1903 and 1909, the gas plant was demolished; the only remaining structures were the second gas holder, a tool house, and a meter house. The remaining holder was demolished between 1915 and 1925. Between 1925 and 1943, a 500,000 cubic foot gas holder and a regulator house were constructed at the site to serve as a storage/distribution facility. This newer holder could have served as a remote distribution holder for the Border City MGP which was built as the Wadsworth MGP was decommissioned. The 500,000 cubic foot gas holder was demolished sometime after 1946. Railroad Place was constructed through the center of the former MGP site, covering the location of the southernmost former gas holder. The locations of the historic MGP structures and present-day features are shown on Figure 2.

5.2 Geology/Hydrogeology

Three geologic units were observed/investigated beneath the site during the RI. In descending order these are fill, silt and clay, and fine sand. These units comprise at least the upper approximately 40 feet of materials that underlie the site. Since the deepest investigation location terminated approximately 40 feet below grade, the geologic materials below 40 feet are unknown. In terms of hydrogeology, the fill is the least significant unit because it is typically unsaturated. The fill is, however, saturated in the southern portion of the site, in the area of the PSB. The saturated portion of the fill is only a few feet in thickness. The bottom of the fill is typically encountered at approximately 4 to 8 feet below grade. The silt and clay is continuous across the site and is generally 12 to16 feet in thickness; however, the silt and clay is artificially thin (approximately 1 feet in thickness) in the area of former Gas Holder 1. The water table resides in the silt and clay in the northern portion of the site. The silt and clay grades into a fine sand unit at approximately 18 to 20 feet below grade. The fine sand is at least 22 feet in thickness.

The horizontal hydraulic conductivity (ability of the units to transmit groundwater horizontally) of the silt and clay and fine sand appears to be similar. The average horizontal hydraulic conductivity for these units is low - approximately 0.9 feet/day. The vertical hydraulic conductivity of the silt and clay is expected to be much less because of the bedding and horizontal laminations observed in this unit. Groundwater in this unit likely moves more rapidly laterally along bedding than vertically across the bedding. Because if this anisotropy, the silt and clay unit is significant hydrogeologically because it may limit recharge to the fine sand unit by restricting downward infiltration of precipitation.

Groundwater beneath the site moves north-northeast. Although groundwater appears to flow away from Seneca Lake, a regional groundwater discharge boundary, it is likely that site groundwater eventually finds its way to Seneca Lake. Local variability in groundwater flow direction is common in glacial/glacio-lacustrine depositional settings (such as the site area) due to the heterogeneous nature of glacially-derived overburden materials.

5.3 Soil-Quality Evaluation

The quality of soils beneath the site was evaluated by observing visually impacted soils and by comparing soil analytical results to the commercial soil cleanup objectives (SCOs) for the protection of public health as presented in the NYSDEC Part 375 regulations. That comparison found that BTEX and PAH concentrations exceeded the SCOs in only a few relatively isolated areas. With the exception of a samples collected from SB-14A at 4 to 6.5 feet below grade inside an apparent structure, BTEX- and PAH -impacted soils were encountered below the water table at depths of approximately 14 to 23 feet below grade, generally at or just beneath the bottoms of former Gas Holder 1 and the former lime house/purifier house. A region with a trace to little amount of coal-tar-containing soils was identified immediately above and below the floor of former Gas Holder 1, located beneath Railroad Place. The vertical limits of this impacted soil appear to range from approximately 16 to 23 feet below grade. One other area of coal-tar containing soil was observed at SB-14A at approximately 4 to 6.5 feet below grade, inside of an apparent buried structure located approximately 15 to 20 feet east of former Gas Holder 1.

Total cyanide was detected in approximately 1/3rd of the analytical subsurface soil samples collected across the site. Where detected, total cyanide concentrations were generally less than 20 ppm. Concentrations of total cyanide above the SCO were detected in only one sample – the sample saturated with NAPL at SB-14A at 4 to 6.5 feet below grade. The distribution of cyanide detected in soil is a reflection of the presence of fill material across the site that was observed to contain various apparent MGP wastes (e.g., clinkers, ash, cinders, purifier wastes).

5.4 Soil Vapor Evaluation

A soil vapor intrusion investigation was conducted at the City of Geneva's PSB located in the southern half of the site. The investigation involved collecting soil vapor samples from below the floor slab of the building, and samples of air inside and outside of the building. The investigation found that several VOCs were present in vapor samples collected beneath the building foundation slab and in the air inside the building; but, it was not possible to attribute the VOCs to a particular source. Several of the VOCs, most notably BTEX and naphthalene are potentially related to the former MGP, but these same compounds have other possible non-MGP sources such as gasoline. Other detected VOCs, such as trichloroethene,, are clearly not related to the former MGP. The levels of VOCs detected in indoor air were below appropriate criteria. Based on the investigation results, subsurface byproducts of the former MGP do not appear to be contributing VOCs to the indoor air at the PSB via soil vapor intrusion.

The presence of alkanes in the sub-slab vapor samples suggests that the BTEX and naphthalene may be related to a gasoline source. However, the groundwater data from one of the five monitoring wells proximate to the PSB (i.e., MW-3, located just north of the PSB), exhibit characteristics likely related to MGP waste (i.e., polycyclic aromatic hydrocarbons, total cyanide, and BTEX). In light of this, it is possible that some fraction of the BTEX and naphthalene measured in the sub-slab vapor samples may be attributed to MGP byproducts and that there could be sub-slab vapor phase commingling of these compounds from both a gasoline and an MGP source.

The NYSDEC/NYSDOH concluded that the levels of BTEX and naphthalene detected below the slab present a potential for future soil vapor intrusion into the PSB. As such, the NYSDEC/NYSDOH requested that NYSEG either install a sub-slab depressurization system or conduct additional vapor sampling in the 2007/2008 winter season. NYSEG plans to conduct an IRM to install a sub-slab depressurization system for the PSB during the 2007/2008 winter season.

5.5 Groundwater-Quality Evaluation

The quality of groundwater was evaluated by comparing the analytical results of groundwater samples to appropriate TOGS criteria. The interval of groundwater that was evaluated is the groundwater in the silt and clay and upper few feet of fine sand. The quality in these units was found to be unaffected by BTEX and PAHs, except at well MW-3. The sample from this well contained BTEX and several PAHs above TOGS criteria. The source of these constituents could be associated with the former lime house, purifier house, or other former MGP structures located beneath the PSB. Although no monitoring wells were installed inside/immediately near former Gas Holder 1 or the buried structure at SB-14A, it is reasonable to assume that groundwater in immediate contact with soils at these locations likely exceeds the TOGS criteria for BTEX and PAHs.

Groundwater in the silt and clay and fine sand was found contain low level concentrations of total cyanide over a broader area than the region of groundwater affected by BTEX and PAHs. Low levels of cyanide were detected in all monitoring wells located near and downgradient of the former lime house/purifier house and former Gas Holder 1. Monitoring wells MW-2 and MW-3 are the only wells containing groundwater with total cyanide concentrations above the TOGS criteria. MW-2 is located inside the footprint of former Gas Holder 2 (a formerly at-grade holder) and MW-3 is located at/near the former lime house/purifier house.

5.6 Risk Evaluation

A risk evaluation was performed by reviewing data collected during the RI. The risk evaluation included performing a FWRIA (through Part 1: Resource Characterization) and a qualitative HHEE. The summary and conclusions of the FWRIA and HHEE are discussed below.

5.6.1 Fish and Wildlife Resource Impact Analysis

The FWRIA for the site was conducted in accordance with NYSDEC (1994; 2002a) guidance. No threatened or endangered plant or animal species were found to inhabit the site or the immediate surrounding areas. The site is predominately characterized by paved (asphalt) and unpaved (gravel) surfaces and a commercial building, which provide no value to wildlife. The areas of mowed lawn and seasonal grasses and shrubs on the site provide limited wildlife habitat conducive to foraging, nesting and/or cover. Due to the general lack of natural resources and the surrounding industrial/commercial/residential land use, fauna that may utilize site resources are most likely restricted to those typical of an urban setting. Exposure to on-site surface soils is identified as a potentially complete exposure pathway.

The criteria-specific analysis found that three PAHs (acenaphthene, benzo(a)pyrene, and fluorene) exceeded their associated SCOs in surface soil samples collected from the mowed lawn area. The site contains only a small area of natural habitat, which coupled with surrounding land use, most likely limits wildlife use of the site. Therefore, ecological exposures to surface soil are not considered to be significant.

5.6.2 Human Health Exposure Evaluation

Analytical data indicate that benzene and PAHs are present in subsurface soils at concentrations exceeding NYSDEC-recommended values. The majority of the site is covered by asphalt road and parking lots and a commercial building. As such, the potential for exposure to constituents of potential concern (COPCs) in subsurface soils is limited to hypothetical future construction and maintenance workers that might be engaged in intrusive activities, although potential exposures could be mitigated through the use of personal protective equipment. Potential exposures of residents, commercial visitors, and trespassers to constituents in subsurface soils are unlikely because these receptors would not be involved in intrusive activities.

Surface soils represent a potentially complete exposure pathway for trespassers, residents, commercial visitors, maintenance workers, and construction workers. However, potential exposures to COPCs in surface soil (i.e., PAHs) are limited to the sparse areas of exposed soil within the gravel parking lot. Such areas could present a greater potential risk of exposure. PAH concentrations exceeding the NYSDEC screening criteria in the surface soil were generally limited to the area of the former Gas Holder 1 (as shown by SS-1 analytical results). Benzo(a)pyrene was the only PAH that exceeded criteria outside of this area, with slight exceedences occurring near the northern boundary of the site (SS-5 and SS-6).

Groundwater beneath the site is not used as a potable source, and therefore exposure via ingestion of groundwater is unlikely. Likewise, exposure of trespassers, commercial visitors, and residents to groundwater is unlikely based on the depth to groundwater and the lack of surface expressions (i.e., seeps). Hypothetical future construction and maintenance workers may be exposed to shallow groundwater during intrusive activities, but exposures would likely be mitigated with the use of personal protective equipment.

Although subsurface byproducts of the MGP do not appear to be currently affecting indoor air quality at the PSB, sub-slab soil vapor concentrations for several VOCs, which may not be entirely MGP related, are believed by NYSDEC and NYSDOH to have the potential for future intrusion into the PSB. NYSEG plans to install a sub-slab depressurization system to mitigate the potential future vapor intrusion into the PSB.

5.7 Conclusion

With the findings presented in this RI Report, NYSEG has characterized the nature and extent of the former MGP's impacts on the environment and fulfilled the requirements of the Order on Consent. Following approval of this RI Report by the NYSDEC, NYSEG will prepare a Feasibility Study to identify Remedial Action Objectives and evaluate appropriate remedial measures to address MGP-related environmental impacts identified during the RI. NYSEG plans to conduct an IRM to install a sub-slab depressurization system for the PSB in the winter 2007/2008 to mitigate the potential for future vapor intrusion of BTEX and naphthalene detected in the soil vapor beneath the slab of the building. RI data suggest that the BTEX and naphthalene detected beneath the slab of the PSB may be attributable to both MGP byproducts and a petroleum source related to post-MGP activity.

6. References

Agency for Toxic Substances and Disease Registry (ATSDR). 1995a. Toxicological profile for xylene. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

ATSDR. 1995b. Toxicological profile for polycyclic aromatic hydrocarbons (PAHs). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

ATSDR. 1997. Toxicological profile for benzene. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

ATSDR. 1999a. Toxicological profile for ethylbenzene. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

ATSDR. 1999b. Toxicological profile for lead. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

ATSDR. 1999c. Toxicological profile for mercury. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

ATSDR. 2000a. Toxicological profile for toluene. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

ATSDR. 2000b. Toxicological profile for arsenic. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

ATSDR. 2000c. Toxicological profile for manganese. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

ATSDR. 2004. Toxicological profile for copper. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

ARCADIS BBL, 2007. Vapor Intrusion Evaluation Report, Geneva (Wadsworth Street) Former MGP Site, Geneva, New York. Prepared for New York State Electric & Gas Corporation. May 2007 (Revised August 2007).

Atlantic Environmental Services, Inc. (AES), 1991. Manufactured Gas Plant Site Screening Report, Wadsworth Street Site, Geneva, New York. Prepared on behalf of NYSEG. September 1991.

Blasland, Bouck, & Lee, Inc. (BBL). 2005. Site Characterization Work Plan, Wadsworth Street Former MGP Site, Geneva, New York. Prepared for New York State Electric & Gas Corporation. November 2005.

Coates, D.R., 1968, Finger Lakes, Fairbridge, R. W., ed., Encyclopedia of geomorphology: New York, Reinhold Corporation, p. 351-357.

Coates, D. R., 1974, Reappraisal of the glaciated Appalacian Plateau, in Coates, D. R., ed., Glacial geomorphology: Binghamton, New York, State University of New York Publications, p. 205-243.

Domenico, P.A. and F.W. Schwartz, 1998. Physical and Chemical Hydrogeology. John Wiley & Sons, Inc., New York. 506 p.

Fetter, C.W., Jr., 1994, Applied Hydrogeology, Third Edition, Macmillan College Publishing Co., New York. New York.

Freeze and Cherry. 1979. Groundwater. Prentice-Hall, Inc., New Jersey.

Ghosh. R. S., Nakles, D.V., Mukarka, I., and Neuhauser, E., 2004. Cyanide Speciation in Soil and Groundwater at Manufactured Gas Plant (MGP) Sites. Environmental Engineering Science. 21(6):752-767.

Halfman, J. D., 2000, Stratigraphy, sedimentology, and geochemistry of Seneca Lake, New York, in Field Trip Guide, 72nd annual meeting of the New York State Geological Association: Hobart and William Smith Colleges, Geneva, New York, p. 27-38.

Maxey, G.B., 1964. Hydrostratigraphic Units. Journal of Hydrology *2*, pp. 124-129.

Muller, E. H., and Cadwell, D. H., 1986, Surficial geologic map of New York – Finger Lakes sheet: Albany, New York State Museum, Geological Survey Map and Chart Series no. 40, 1 sheet, scale 1:250,000.

Northeast Gas Association (NGA), 2004. Investigate Analytical Methods, Aqueous Speciation and Toxicology of Cyanide at Manufactured Gas Plant (MGP) Sites in New York State, Final Report – Northeast Gas Association, New York, NY.

New York State Department of Environmental Conservation (NYSDEC). 1994. *Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites*. October 1994.

NYSDEC. 1998. Division of Water Technical and Operational Guidance Series (1.1.1): *Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations*. June 1998.

NYSDEC. 2002a. *Draft DER-10 Technical Guidance for Site Investigation and Remediation*. December 2002.

NYSDEC. 2002b. *Ecological Communities of New York State – Second Edition*. January 2002.

NYSDEC, 2006. 6 NYCRR Subpart 375-6, Remedial Program Soil Cleanup Objectives. December 14, 2006.

NYSDEC. 2007. Letter to Jason C. Vogel (ARCADIS BBL) from Tara Seoane (NY Natural Heritage Program), providing a report of rare or state-listed animals and plants, significant natural communities, and other significant habitats that may occur, on site or in the immediate vicinity of the site. July 31, 2007.

NYSDEC. 2007. Letter to John J. Ruspantini, NYSEG, from Douglas MacNeal, NYSDEC, regarding the vapor intrusion evaluation for the NYSEG Wadsworth Street Former MGP Site in Geneva, New York. Dated June 12, 2007.

New York State Department of Health (NYSDOH). 2002. Qualitative Human Health Exposure Assessment as presented in NYSDEC's Draft DER-10 Technical Guidance for Site Investigation and Remediation. December 2002.

NYSDOH, 2006. Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York, October 2006.

New York State Electric and Gas Corporation (NYSEG). 2006a. Letter to Douglas MacNeal, NYSDEC, from John J. Ruspantini, NYSEG, providing site characterization results for Wadsworth Street Former MGP Site, Geneva, New York. Dated March 29, 2006.

NYSEG. 2006b. Letter to Douglas MacNeal, NYSDEC, from John J. Ruspantini, NYSEG, providing remedial investigation results for Wadsworth Street Former MGP Site, Geneva, New York. Dated November 27, 2006.

NYSEG. 2007. Letter to Douglas MacNeal, NYSDEC, from John J. Ruspantini, NYSEG, providing response to NYSDEC June 12, 2007 comment letter for vapor intrusion report at Wadsworth Street Former MGP Site, Geneva, New York. Dated August 3, 2007.

New York State Museum/Geological Survey, The State Education Department and The University of the State of New York. 2000. Geology of New York State A Simplified Account (2nd Edition).

Seaber, P.R. 1988. Hydrostratigraphic Units, In: Hydrogeology (W. Back, J.S. Rosenshein, and P.R. Seaber, eds.), The Geology of North America, V. 0-2, Geol. Soc. Amer., pp. 9-14.

United States Environmental Protection Agency (USEPA). 2002. A resource for MGP Site Characterization and Remediation. EPA 542-R-00-005. Solid and Emergency Response. July 2000.

USEPA. 2002. *Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils*. Available at http://www.epa.gov/correctiveaction/eis/vapor/complete.pdf.

USEPA, 1988. U.S. Production of Manufactured Gases: Assessment of Past Disposal Practices. USEPA Report No. 600/2-88/012, February 1988.

Von Engelin, O.D. 1961. The Finger Lakes Region, Its Origin and Nature. Cornell University Press. Ithaca, New York, 156 p.

TABLES

Table 1. Sample Summary Table, Remedial Investigation, New York State Electric & Gas Corporation, Geneva (Wadsworth Street) Former MGP Site, Geneva, New York

Location ID	Date Collected	Sample Depth Range (feet)	SVOCs	VOCs	Total Cyanide	Helium
Air Samples						
AA-1	3/21/2007	NA	--	X	--	--
IA-1	3/21/2007	NA	--	X	--	--
IA-2	3/21/2007	NA	--	X	--	--
IA-3	3/21/2007	NA	--	X	--	--
SS-1	3/21/2007	NA	--	X	--	X
SS-2	3/21/2007	NA	--	X	--	X
SS-3	3/21/2007	NA	--	X	--	X
Groundwater Samples						
MW-1	12/20/2005	10 - 20	X	X	X	--
MW-1	10/5/2006	10 - 20	X	X	X	--
MW-2	12/20/2005	12 - 22	X	X	X	--
MW-2	10/5/2006	12 - 22	X	X	X	--
MW-3	12/20/2005	7 - 17	X	X	X	--
MW-3	10/5/2006	7 - 17	X	X	X	--
MW-3 (Dup)	10/5/2006	7 - 17	X	X	X	--
MW-3 (Dup)	12/20/2005	7 - 17	X	X	X	--
MW-4	12/20/2005	6 - 16	X	X	X	--
MW-4	10/4/2006	6 - 16	X	X	X	--
MW-5	12/20/2005	12 - 22	X	X	X	--
MW-5	10/5/2006	12 - 22	X	X	X	--
MW-6	12/20/2005	8 - 18	X	X	X	--
MW-6	10/4/2006	8 - 18	X	X	X	--
MW-7	10/4/2006	7 - 17	X	X	X	--
MW-8	10/5/2006	10 - 20	X	X	X	--
MW-9	10/4/2006	7 - 17	X	X	X	--
Subsurface Soil Samples						
MW-3	12/8/2005	19.5 - 20	X	X	X	--
SB-1	12/6/2005	4 - 6.5	X	X	X	--
SB-2	12/13/2005	8 - 10	X	X	X	--
SB-2 (Dup)	12/13/2005	8 - 10	X	X	X	--
SB-3	12/6/2005	10 - 11.8	X	X	X	--
SB-4	12/5/2005	10 - 12	X	X	X	--
SB-4	12/5/2005	18 - 20	X	X	X	--
SB-5	12/14/2005	16 - 16.8	X	X	X	--
SB-5	12/14/2005	17.8 - 19.4	X	X	X	--
SB-5	12/14/2005	23 - 23.3	X	X	X	--
SB-6	12/1/2005	19.8 - 21.4	X	X	X	--
SB-7	12/1/2005	14 - 16.5	X	X	X	--
SB-7	12/1/2005	20.5 - 21.3	X	X	X	--
SB-7 (Dup)	12/1/2005	14 - 16.5	X	X	X	--
SB-8	12/5/2005	14 - 16	X	X	X	--
SB-8	12/5/2005	6 - 8	X	X	X	--
SB-9	12/13/2005	6 - 6.8	X	X	X	--
SB-10	12/14/2005	9.2 - 10.7	X	X	X	--
SB-11	9/20/2006	20 - 22	X	X	X	--

See Notes on Page 2.

Table 1. Sample Summary Table, Remedial Investigation, New York State Electric & Gas Corporation, Geneva (Wadsworth Street) Former MGP Site, Geneva, New York

Location ID	Date Collected	Sample Depth Range (feet)	SVOCs	VOCs	Total Cyanide	Helium
Subsurface Soil Samples (Cont'd.)						
SB-11	9/20/2006	38 - 40	X	X	X	--
SB-12	9/19/2006	16 - 18	X	X	X	--
SB-12 (Dup)	9/19/2006	16 - 18	X	X	X	--
SB-12	9/19/2006	38 - 40	X	X	X	--
SB-13	9/19/2006	16 - 18	X	X	X	--
SB-13	9/19/2006	36 - 38	X	X	X	--
SB-14A	9/18/2006	4 - 6.5	X	X	X	--
SB-14B	9/18/2006	10 - 12	X	X	X	--
SB-14B	9/18/2006	38 - 40	X	X	X	--
SB-15	9/20/2006	23.4 - 24	X	X	X	--
SB-15	9/20/2006	38 - 40	X	X	X	--
SB-15	9/20/2006	4-5	X	X	X	--
TP-1	12/2/2005	7	X	X	X	--
TP-2	12/2/2005	6.2	X	X	X	--
TP-3	12/2/2005	6	X	X	X	--
Surface Soil Samples						
SS-1	12/7/2005	0 - 0.2	X	X	X	--
SS-2	12/7/2005	0 - 0.2	X	X	X	--
SS-3	12/7/2005	0 - 0.2	X	X	X	--
SS-4	12/7/2005	0 - 0.2	X	X	X	--
SS-5	12/7/2005	0 - 0.2	X	X	X	--
SS-6	12/7/2005	0 - 0.2	X	X	X	--

Notes:

-- = Not Analyzed.

NA = Not Available.

VOCs = Target Compound List (TCL) Volatile Organic Compounds.

SVOCs = TCL Semi-Volatile Organic Compounds.

Table 2. Summary of Subsurface Soil Sample Analytical Results, Remedial Investigation, New York State Electric & Gas Corporation, Geneva (Wadsworth Street) Former MGP Site, Geneva, New York

Sample ID: **Sample Depth (feet):** **Date Collected:**	**Unrestricted Use SCOs**	**Restricted Use SCOs Commercial**	**Units**	**MW-3** **19.5 - 20** **12/08/05**	**SB-1** **4 - 6.5** **12/06/05**	**SB-2** **8 - 10** **12/13/05**	**SB-3** **10 - 11.8** **12/06/05**	**SB-4** **10 - 12** **12/05/05**	**SB-4** **18 - 20** **12/05/05**	**SB-5** **16 - 16.8** **12/14/05**	**SB-5** **17.8 - 19.4** **12/14/05**	**SB-5** **23 - 23.3** **12/14/05**	**SB-6** **19.8 - 21.4** **12/01/05**
VOCs													
1,1,1-Trichloroethane	0.68 f	500 b	mg/kg	0.60 U	0.0060 U	0.0060 U [0.0059 U]	0.0060 U	0.0062 U	0.62 U	0.60 U	0.60 U	0.60 U	0.0056 U
1,1,2,2-Tetrachloroethane	- -	- -	mg/kg	0.12 U	0.0012 UJ	0.0012 U [0.0012 U]	0.0012 UJ	0.0012 UJ	0.12 U	0.12 U	0.12 U	0.12 U	0.0011 UJ
1,1,2-Trichloroethane	- -	- -	mg/kg	0.36 U	0.0036 U	0.0036 U [0.0036 U]	0.0036 U	0.0037 U	0.37 U	0.36 U	0.36 U	0.36 U	0.0034 U
1,1-Dichloroethane	0.27 f	240	mg/kg	0.60 UJ	0.0060 U	0.0060 U [0.0059 U]	0.0060 U	0.0062 U	0.62 UJ	0.60 U	0.60 U	0.60 U	0.0056 U
1,1-Dichloroethene	0.33 f	500 b	mg/kg	0.24 U	0.0024 UJ	0.0024 UJ [0.0024 UJ]	0.0024 UJ	0.0025 UJ	0.25 U	0.24 UJ	0.24 UJ	0.24 UJ	0.0022 UJ
1,2,4-Trichlorobenzene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dibromo-3-chloropropane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dibromoethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	1.1 f	500 b	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	0.02 c	30	mg/kg	0.24 U	0.0024 U	0.0024 U [0.0024 U]	0.0024 U	0.0025 U	0.25 U	0.24 U	0.24 U	0.24 U	0.0022 U
1,2-Dichloropropane	- -	- -	mg/kg	0.12 U	0.0012 UJ	0.0012 U [0.0012 U]	0.0012 UJ	0.0012 UJ	0.12 U	0.12 U	0.12 U	0.12 U	0.0011 U
1,3-Dichlorobenzene	2.4 f	280	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	1.8	130	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Butanone	0.12	500 b	mg/kg	0.60 UJ	0.0060 UJ	0.0060 U [0.0059 U]	0.0060 UJ	0.0062 UJ	0.62 U	0.60 U	0.60 U	0.60 U	0.0056 UJ
2-Hexanone	- -	- -	mg/kg	0.60 UJ	0.0060 UJ	0.0060 UJ [0.0059 UJ]	0.0060 UJ	0.0062 UJ	0.62 UJ	0.60 UJ	0.60 UJ	0.60 UJ	0.0056 UJ
4-Methyl-2-Pentanone	- -	- -	mg/kg	0.60 U	0.0060 UJ	0.0060 U [0.0059 U]	0.0060 UJ	0.0062 UJ	0.62 U	0.60 U	0.60 U	0.60 U	0.0056 UJ
Acetone	0.05	500 b	mg/kg	**1.6**	0.0060 UJ	0.0060 U [0.0059 U]	0.0060 UJ	0.026 UJ	0.62 U	0.60 U	0.60 UJ	0.60 U	0.018 UJ
Benzene	0.06	44	mg/kg	**0.15**	0.0022	0.0010 J [0.0018]	0.0017	0.0020	**4.5**	**6.6**	**1.5**	**3.4**	0.016
Bromodichloromethane	- -	- -	mg/kg	0.12 U	0.0012 U	0.0012 U [0.0012 U]	0.0012 U	0.0012 U	0.12 U	0.12 U	0.12 U	0.12 U	0.0011 U
Bromoform	- -	- -	mg/kg	0.48 UJ	0.0048 U	0.0048 UJ [0.0048 UJ]	0.0048 U	0.0049 U	0.50 UJ	0.48 UJ	0.48 UJ	0.48 UJ	0.0045 U
Bromomethane	- -	- -	mg/kg	0.60 U	0.0060 U	0.0060 UJ [0.0059 UJ]	0.0060 U	0.0062 U	0.62 U	0.60 UJ	0.60 UJ	0.60 UJ	0.0056 U
Carbon Disulfide	- -	- -	mg/kg	0.60 U	0.0020 J	0.0060 U [0.0059 U]	0.0060 UJ	0.0062 UJ	0.62 U	0.60 U	0.60 UJ	0.60 U	0.0056 UJ
Carbon Tetrachloride	0.76 f	22	mg/kg	0.24 U	0.0024 U	0.0024 U [0.0024 U]	0.0024 U	0.0025 U	0.25 U	0.24 U	0.24 U	0.24 U	0.0022 U
Chlorobenzene	1.1	500 b	mg/kg	0.60 UJ	0.0060 U	0.0060 UJ [0.0059 UJ]	0.0060 U	0.0062 U	0.62 UJ	0.60 UJ	0.60 U	0.60 UJ	0.0056 U
Chloroethane	- -	- -	mg/kg	0.60 U	0.0060 U	0.0060 U [0.0059 U]	0.0060 U	0.0062 U	0.62 U	0.60 U	0.60 U	0.60 U	0.0056 U
Chloroform	0.37	350	mg/kg	0.60 U	0.0060 U	0.0060 U [0.0059 U]	0.0060 U	0.0062 U	0.62 U	0.60 U	0.60 U	0.60 U	0.0056 U
Chloromethane	- -	- -	mg/kg	0.60 U	0.0060 U	0.0060 U [0.0059 U]	0.0060 U	0.0062 U	0.62 U	0.60 U	0.60 U	0.60 U	0.0056 U
cis-1,2-Dichloroethene	0.25 f	500 b	mg/kg	0.60 U	0.0060 U	0.0060 U [0.0059 U]	0.0060 U	0.0062 U	0.62 U	0.60 U	0.60 U	0.60 U	0.0056 U
cis-1,3-Dichloropropene	- -	- -	mg/kg	0.60 U	0.0060 U	0.0060 U [0.0059 U]	0.0060 U	0.0062 U	0.62 U	0.60 U	0.60 U	0.60 U	0.0056 U
Cyclohexane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibromochloromethane	- -	- -	mg/kg	0.60 U	0.0060 U	0.0060 U [0.0059 U]	0.0060 U	0.0062 U	0.62 UJ	0.60 U	0.60 UJ	0.60 U	0.0056 U
Dichlorodifluoromethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	1 f	390	mg/kg	0.37 J	0.0048 U	0.0048 U [0.0048 U]	0.0048 U	0.0049 U	0.33 J	**1.4**	0.20 J	0.58	0.0045 U
Isopropylbenzene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl acetate	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl tert-butyl ether	0.93 f	500 b	mg/kg	0.60 U	0.0060 UJ	0.0060 U [0.0059 U]	0.0060 UJ	0.0062 UJ	0.62 U	0.60 U	0.60 UJ	0.60 U	0.0056 U
Methylcyclohexane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	0.05	500 b	mg/kg	0.36 UJ	0.0036 U	0.0036 UJ [0.0036 UJ]	0.0036 U	0.0037 U	0.37 UJ	0.36 UJ	0.36 UJ	0.36 UJ	0.0034 U
Styrene	- -	- -	mg/kg	0.60 UJ	0.0060 U	0.0060 UJ [0.0059 UJ]	0.0060 U	0.0062 U	0.62 UJ	0.60 UJ	0.60 UJ	1.3 J	0.0056 U
Tetrachloroethene	1.3	150	mg/kg	0.12 U	0.0012 U	0.0012 U [0.0012 U]	0.0012 U	0.0012 U	0.12 U	0.12 U	0.12 U	0.12 U	0.0011 U

See Notes on Page 10.

Table 2. Summary of Subsurface Soil Sample Analytical Results, Remedial Investigation, New York State Electric & Gas Corporation, Geneva (Wadsworth Street) Former MGP Site, Geneva, New York

Sample ID:	**Unrestricted Use SCOs**	**Restricted Use SCOs Commercial**	**Units**	**MW-3**	**SB-1**	**SB-2**	**SB-3**	**SB-4**	**SB-4**	**SB-5**	**SB-5**	**SB-5**	**SB-6**
Sample Depth (feet):				**19.5 - 20**	**4 - 6.5**	**8 - 10**	**10 - 11.8**	**10 - 12**	**18 - 20**	**16 - 16.8**	**17.8 - 19.4**	**23 - 23.3**	**19.8 - 21.4**
Date Collected:				**12/08/05**	**12/06/05**	**12/13/05**	**12/06/05**	**12/05/05**	**12/05/05**	**12/14/05**	**12/14/05**	**12/14/05**	**12/01/05**
VOCs (Cont'd.)													
Toluene	0.7	500 b	mg/kg	0.077 J	0.0034 J	0.0010 J [0.0020 J]	0.0015 J	0.0012 J	0.62 U	**12**	**1.5**	**5.6**	0.0010 J
trans-1,2-Dichloroethene	0.19 f	500 b	mg/kg	0.60 U	0.0060 U	0.0060 U [0.0059 U]	0.0060 U	0.0062 U	0.62 U	0.60 U	0.60 UJ	0.60 U	0.0056 U
trans-1,3-Dichloropropene	- -	- -	mg/kg	0.60 U	0.0060 U	0.0060 U [0.0059 U]	0.0060 U	0.0062 U	0.62 U	0.60 U	0.60 U	0.60 U	0.0056 U
Trichloroethene	0.47	200	mg/kg	0.12 U	0.0012 UJ	0.0012 U [0.0012 U]	0.0012 UJ	0.0012 UJ	0.12 U	0.12 U	0.12 U	0.12 U	0.0011 UJ
Trichlorofluoromethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl Chloride	0.02 f	13	mg/kg	0.60 U	0.0060 U	0.0060 U [0.0059 U]	0.0060 U	0.0062 U	0.62 U	0.60 U	0.60 U	0.60 U	0.0056 U
Xylene (Total)	0.26	500 b	mg/kg	**1.4 J**	0.0031 J	0.0060 UJ [0.0059 UJ]	0.0016 J	0.0062 U	0.19 J	**19 J**	**2.2**	**7.7 J**	0.0031 J
Total BTEX	- -	- -	mg/kg	2.0 J	0.0087 J	0.0020 J [0.0038 J]	0.0048 J	0.0032 J	5.0 J	39 J	5.4 J	17 J	0.020 J
Total VOCs	- -	- -	mg/kg	3.6 J	0.011 J	0.0020 J [0.0038 J]	0.0048 J	0.0032 J	5.0 J	39 J	5.4 J	19 J	0.020 J
SVOCs													
1,2,4-Trichlorobenzene	- -	- -	mg/kg	1.0 U	0.040 U	0.040 U [0.041 U]	0.040 U	0.043 U	0.042 U	0.82 U	0.040 U	10 U	0.040 U
1,2-Dichlorobenzene	1.1 f	500 b	mg/kg	10 U	0.40 U	0.40 U [0.41 U]	0.40 U	0.43 U	0.42 U	8.2 U	0.40 U	100 U	0.40 U
1,3-Dichlorobenzene	2.4 f	280	mg/kg	10 U	0.40 U	0.40 U [0.41 U]	0.40 U	0.43 U	0.42 U	8.2 U	0.40 U	100 U	0.40 U
1,4-Dichlorobenzene	1.8	130	mg/kg	10 U	0.40 U	0.40 U [0.41 U]	0.40 U	0.43 U	0.42 U	8.2 U	0.40 U	100 U	0.40 U
2,4,5-Trichlorophenol	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,6-Trichlorophenol	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dichlorophenol	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dimethylphenol	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrophenol	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	- -	- -	mg/kg	2.0 U	0.080 U	0.080 U [0.083 U]	0.081 U	0.086 U	0.085 U	1.6 U	0.081 U	20 U	0.079 U
2,6-Dinitrotoluene	- -	- -	mg/kg	2.0 U	0.080 U	0.080 U [0.083 U]	0.081 U	0.086 U	0.085 U	1.6 U	0.081 U	20 U	0.079 U
2-Chloronaphthalene	- -	- -	mg/kg	10 U	0.40 U	0.40 U [0.41 U]	0.40 U	0.43 U	0.42 U	8.2 U	0.40 U	100 U	0.40 U
2-Chlorophenol	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	- -	- -	mg/kg	1.1 J	0.40 U	0.40 U [0.41 U]	0.40 U	0.43 U	0.42 U	53	2.2	1,100	0.022 J
2-Methylphenol	0.33 b, f	500 b	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Nitroaniline	- -	- -	mg/kg	20 U	0.80 U	0.80 U [0.83 U]	0.81 U	0.86 U	0.85 U	16 U	0.81 U	200 U	0.79 U
2-Nitrophenol	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3,3'-Dichlorobenzidine	- -	- -	mg/kg	20 UJ	0.80 U	0.80 UJ [0.83 UJ]	0.81 U	0.86 U	0.85 U	16 UJ	0.81 UJ	200 UJ	0.79 UJ
3-Nitroaniline	- -	- -	mg/kg	20 U	0.80 U	0.80 U [0.83 U]	0.81 U	0.86 U	0.85 U	16 U	0.81 U	200 U	0.79 U
4-Bromophenyl-phenylether	- -	- -	mg/kg	10 U	0.40 U	0.40 U [0.41 U]	0.40 U	0.43 U	0.42 U	8.2 U	0.40 U	100 U	0.40 U
4-Chloro-3-methylphenol	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chloroaniline	- -	- -	mg/kg	10 U	0.40 UJ	0.40 U [0.41 U]	0.40 UJ	0.43 UJ	0.42 UJ	8.2 U	0.40 U	100 U	0.40 U
4-Chlorophenyl-phenylether	- -	- -	mg/kg	10 U	0.40 U	0.40 U [0.41 U]	0.40 U	0.43 U	0.42 U	8.2 U	0.40 U	100 U	0.40 U
4-Methylphenol	0.33 b, f	500 b	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitroaniline	- -	- -	mg/kg	20 U	0.80 U	0.80 U [0.83 U]	0.81 U	0.86 U	0.85 U	16 U	0.81 U	200 U	0.79 U
4-Nitrophenol	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	20	500 b	mg/kg	6.7 J	0.40 U	0.40 U [0.41 U]	0.40 U	0.43 U	0.42 U	4.5 J	0.32 J	**180**	0.40 U
Acenaphthylene	100 a, f	500 b	mg/kg	33	0.030 J	0.40 U [0.41 U]	0.40 U	0.43 U	0.42 U	26	1.3	**760**	0.023 J
Anthracene	100 a, f	500 b	mg/kg	40	0.028 J	0.40 UJ [0.41 UJ]	0.40 U	0.43 U	0.42 U	24 J	2.1 J	**1,100 J**	0.027 J
Benzo(a)anthracene	1 c, f	5.6	mg/kg	**24**	0.13	0.040 U [0.041 U]	0.018 J	0.043 U	0.042 U	**15**	**2.8**	**710**	0.016 J

See Notes on Page 10.

Table 2. Summary of Subsurface Soil Sample Analytical Results, Remedial Investigation, New York State Electric & Gas Corporation, Geneva (Wadsworth Street) Former MGP Site, Geneva, New York

Sample ID:	Unrestricted Use SCOs	Restricted Use SCOs Commercial	Units	MW-3	SB-1	SB-2	SB-3	SB-4	SB-4	SB-5	SB-5	SB-5	SB-6
Sample Depth (feet):				19.5 - 20	4 - 6.5	8 - 10	10 - 11.8	10 - 12	18 - 20	16 - 16.8	17.8 - 19.4	23 - 23.3	19.8 - 21.4
Date Collected:				12/08/05	12/06/05	12/13/05	12/06/05	12/05/05	12/05/05	12/14/05	12/14/05	12/14/05	12/01/05
SVOCs (Cont'd.)													
Benzo(a)pyrene	1 c	1 f	mg/kg	**18**	0.14	0.040 U [0.041 U]	0.017 J	0.043 U	0.042 U	**9.0**	**2.3**	**400**	0.011 J
Benzo(b)fluoranthene	1 c, f	5.6	mg/kg	**9.1**	0.098	0.040 U [0.041 U]	0.011 J	0.043 U	0.042 U	**4.9**	**1.6**	**240**	0.040 U
Benzo(g,h,i)perylene	100 f	500 b	mg/kg	6.6 J	0.091 J	0.40 UJ [0.41 UJ]	0.40 U	0.43 U	0.42 U	3.2 J	1.1 J	88 J	0.40 U
Benzo(k)fluoranthene	0.8 c, f	56	mg/kg	**19 J**	0.15	0.040 UJ [0.041 UJ]	0.020 J	0.043 U	0.042 U	**8.8 J**	**2.1 J**	**420 J**	0.040 UJ
bis(2-Chloroethoxy)methane	- -	- -	mg/kg	10 U	0.40 U	0.40 U [0.41 U]	0.40 U	0.43 U	0.42 U	8.2 U	0.40 U	100 U	0.40 U
bis(2-Chloroethyl)ether	- -	- -	mg/kg	1.0 U	0.040 UJ	0.040 UJ [0.041 UJ]	0.040 UJ	0.043 UJ	0.042 UJ	0.82 UJ	0.040 UJ	10 UJ	0.040 U
bis(2-chloroisopropyl)ether	- -	- -	mg/kg	10 U	0.40 U	0.40 U [0.41 U]	0.40 U	0.43 U	0.42 U	8.2 U	0.40 U	100 U	0.40 U
bis(2-Ethylhexyl)phthalate	- -	- -	mg/kg	10 U	0.40 U	0.40 UJ [0.41 UJ]	0.40 U	0.43 U	0.10 J	8.2 UJ	0.40 UJ	100 UJ	0.40 U
Butylbenzylphthalate	- -	- -	mg/kg	10 U	0.40 U	0.40 U [0.41 U]	0.40 U	0.43 U	0.42 U	8.2 U	0.40 U	100 U	0.40 U
Carbazole	- -	- -	mg/kg	2.2 J	0.40 U	0.40 U [0.41 U]	0.40 U	0.43 U	0.42 U	5.2 J	0.43	44 J	0.40 U
Chrysene	1 c, f	56	mg/kg	**22**	0.14 J	0.40 U [0.41 U]	0.018 J	0.43 U	0.42 U	**12**	**2.3**	**580**	0.015 J
Dibenz(a,h)anthracene	0.33 b, f	0.56	mg/kg	**1.2**	0.030 J	0.040 U [0.041 U]	0.040 U	0.043 U	0.042 U	**1.3**	**0.40**	**46**	0.040 U
Dibenzofuran	7 f	350	mg/kg	**29**	0.40 U	0.40 U [0.41 U]	0.40 U	0.43 U	0.42 U	**16**	1.0	**690**	0.016 J
Diethylphthalate	- -	- -	mg/kg	10 U	0.40 U	0.40 U [0.41 U]	0.40 U	0.43 U	0.42 U	8.2 U	0.40 U	100 U	0.40 U
Dimethylphthalate	- -	- -	mg/kg	10 U	0.40 U	0.40 U [0.41 U]	0.40 U	0.43 U	0.42 U	8.2 U	0.40 U	100 U	0.40 U
Di-n-butylphthalate	- -	- -	mg/kg	10 U	0.40 U	0.40 UJ [0.41 UJ]	0.40 U	0.43 U	0.42 U	8.2 UJ	0.40 UJ	100 UJ	0.40 U
Di-n-octylphthalate	- -	- -	mg/kg	10 U	0.40 U	0.40 U [0.41 U]	0.40 U	0.43 U	0.42 U	8.2 U	0.40 U	100 U	0.40 U
Fluoranthene	100 a, f	500 b	mg/kg	53	0.20 J	0.40 UJ [0.41 UJ]	0.042 J	0.43 U	0.42 U	25 J	4.7 J	**1,100 J**	0.030 J
Fluorene	30	500 b	mg/kg	**47**	0.40 U	0.40 U [0.41 U]	0.40 U	0.43 U	0.42 U	28	1.6	**1,200**	0.031 J
Hexachlorobenzene	0.33 b, f	6	mg/kg	1.0 U	0.040 U	0.040 U [0.041 U]	0.040 U	0.043 U	0.042 U	0.82 U	0.040 U	10 U	0.040 U
Hexachlorobutadiene	- -	- -	mg/kg	2.0 U	0.080 U	0.080 U [0.083 U]	0.081 U	0.086 U	0.085 U	1.6 U	0.081 U	20 U	0.079 U
Hexachlorocyclopentadiene	- -	- -	mg/kg	10 UJ	0.40 UJ	0.40 U [0.41 U]	0.40 UJ	0.43 UJ	0.42 UJ	8.2 U	0.40 U	100 U	0.40 UJ
Hexachloroethane	- -	- -	mg/kg	1.0 U	0.040 U	0.040 U [0.041 U]	0.040 U	0.043 U	0.042 U	0.82 U	0.040 U	10 U	0.040 U
Indeno(1,2,3-cd)pyrene	0.5 c, f	5.6	mg/kg	**7.0**	0.085	0.040 U [0.041 U]	0.040 U	0.043 U	0.042 U	**3.5**	**1.2**	**100**	0.040 U
Isophorone	- -	- -	mg/kg	10 U	0.40 U	0.40 U [0.41 U]	0.40 U	0.43 U	0.42 U	8.2 U	0.40 U	100 U	0.40 U
Naphthalene	12 f	500 b	mg/kg	7.0 J	0.017 J	0.40 U [0.41 U]	0.40 U	0.43 U	0.056 J	**100**	4.9	**120**	0.11 J
Nitrobenzene	- -	- -	mg/kg	1.0 UJ	0.040 UJ	0.040 UJ [0.041 UJ]	0.040 UJ	0.043 UJ	0.042 UJ	0.82 UJ	0.040 UJ	10 UJ	0.040 UJ
N-Nitroso-di-n-propylamine	- -	- -	mg/kg	1.0 U	0.040 U	0.040 U [0.041 U]	0.040 U	0.043 U	0.042 U	0.82 U	0.040 U	10 U	0.040 U
N-Nitrosodiphenylamine	- -	- -	mg/kg	10 U	0.40 U	0.40 UJ [0.41 UJ]	0.40 U	0.43 U	0.42 U	8.2 UJ	0.40 UJ	100 UJ	0.40 U
Pentachlorophenol	0.8 b	6.7	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	100 f	500 b	mg/kg	95	0.064 J	0.40 U [0.41 U]	0.029 J	0.43 U	0.42 U	51	4.6	**2,100**	0.058 J
Phenol	0.33 b	500 b	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	100 f	500 b	mg/kg	38	0.19 J	0.40 U [0.41 U]	0.032 J	0.43 U	0.42 U	20	3.9	**870**	0.025 J
Total PAHs	- -	- -	mg/kg	430 J	1.4 J	ND [ND]	0.19 J	ND	0.056 J	390 J	39 J	11,000 J	0.37 J
Total SVOCs	- -	- -	mg/kg	460 J	1.4 J	ND [ND]	0.19 J	ND	0.16 J	410 J	41 J	12,000 J	0.38 J
Inorganics													
Cyanide, Total	27 e, f	27 h	mg/kg	0.500 U	1.40	1.60 [0.960]	0.500 U	0.500 U	0.500 U	15.2	1.20	0.500 U	0.500 U

See Notes on Page 10.

Table 2. Summary of Subsurface Soil Sample Analytical Results, Remedial Investigation, New York State Electric & Gas Corporation, Geneva (Wadsworth Street) Former MGP Site, Geneva, New York

Sample ID: Sample Depth (feet): Date Collected:	Unrestricted Use SCOs	Restricted Use SCOs Commercial	Units	SB-7 14 - 16.5 12/01/05	SB-7 20.5 - 21.3 12/01/05	SB-8 6 - 8 12/05/05	SB-8 14 - 16 12/05/05	SB-9 6 - 6.8 12/13/05	SB-10 9.2 - 10.7 12/14/05	SB-11 20 - 22 09/20/06	SB-11 38 - 40 09/20/06	SB-12 16 - 18 09/19/06	SB-12 38 - 40 09/19/06
VOCs													
1,1,1-Trichloroethane	0.68 f	500 b	mg/kg	0.63 U [0.66 U]	0.60 U	0.0061 U	0.64 U	0.0059 U	0.0056 U	0.0060 U	0.0060 U	0.0070 U	0.0060 U
1,1,2,2-Tetrachloroethane	- -	- -	mg/kg	0.13 U [0.13 U]	0.12 U	0.0012 UJ	0.13 U	0.0012 U	0.0011 U	0.0060 U	0.0060 U	0.0070 U	0.0060 U
1,1,2-Trichloroethane	- -	- -	mg/kg	0.38 U [0.40 U]	0.36 U	0.0036 U	0.38 U	0.0035 U	0.0034 U	0.0060 U	0.0060 U	0.0070 U	0.0060 U
1,1-Dichloroethane	0.27 f	240	mg/kg	0.63 UJ [0.66 UJ]	0.60 UJ	0.0061 U	0.64 UJ	0.0059 U	0.0056 U	NA	NA	NA	NA
1,1-Dichloroethene	0.33 f	500 b	mg/kg	0.25 U [0.26 U]	0.24 U	0.0024 UJ	0.26 U	0.0023 UJ	0.0022 UJ	0.0060 U	0.0060 U	0.0070 U	0.0060 U
1,2,4-Trichlorobenzene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	0.0060 U	0.0060 U	0.0070 U	0.0060 U
1,2-Dibromo-3-chloropropane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	0.0060 U	0.0060 U	0.0070 U	0.0060 U
1,2-Dibromoethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	0.0060 U	0.0060 U	0.0070 U	0.0060 U
1,2-Dichlorobenzene	1.1 f	500 b	mg/kg	NA	NA	NA	NA	NA	NA	0.0060 U	0.0060 U	0.0070 U	0.0060 U
1,2-Dichloroethane	0.02 c	30	mg/kg	0.25 U [0.26 U]	0.24 U	0.0024 U	0.26 U	0.0023 U	0.0022 U	0.0060 U	0.0060 U	0.0070 U	0.0060 U
1,2-Dichloropropane	- -	- -	mg/kg	0.13 U [0.13 U]	0.12 U	0.0012 UJ	0.13 U	0.0012 U	0.0011 U	0.0060 U	0.0060 U	0.0070 U	0.0060 U
1,3-Dichlorobenzene	2.4 f	280	mg/kg	NA	NA	NA	NA	NA	NA	0.0060 U	0.0060 U	0.0070 U	0.0060 U
1,4-Dichlorobenzene	1.8	130	mg/kg	NA	NA	NA	NA	NA	NA	0.0060 U	0.0060 U	0.0070 U	0.0060 U
2-Butanone	0.12	500 b	mg/kg	0.63 U [0.66 U]	0.60 U	0.0061 UJ	0.64 U	0.015	0.0056 U	0.030 U	0.030 U	0.037 U	0.030 U
2-Hexanone	- -	- -	mg/kg	0.63 U [0.66 U]	0.60 U	0.0061 UJ	0.64 UJ	0.0059 UJ	0.0056 UJ	0.030 U	0.030 U	0.037 U	0.030 U
4-Methyl-2-Pentanone	- -	- -	mg/kg	0.63 U [0.66 U]	0.60 U	0.0061 UJ	0.64 U	0.0059 U	0.0056 U	0.030 U	0.030 U	0.037 U	0.030 U
Acetone	0.05	500 b	mg/kg	**1.2 [1.3]**	0.60 U	0.061 UJ	0.64 U	**0.054**	0.039 J	0.017 J	0.0060 J	0.011 J	0.030 U
Benzene	0.06	44	mg/kg	**22 [15]**	**2.2**	0.0012 U	**0.60**	0.0012	0.0015	**0.067**	0.0060 U	0.041	0.0060 U
Bromodichloromethane	- -	- -	mg/kg	0.13 U [0.13 U]	0.12 U	0.0012 U	0.13 U	0.0012 U	0.0011 U	0.0060 U	0.0060 U	0.0070 U	0.0060 U
Bromoform	- -	- -	mg/kg	0.51 UJ [0.53 UJ]	0.48 UJ	0.0048 U	0.51 UJ	0.0047 UJ	0.0045 UJ	0.0060 U	0.0060 U	0.0070 U	0.0060 U
Bromomethane	- -	- -	mg/kg	0.63 UJ [0.66 UJ]	0.60 UJ	0.0061 U	0.64 U	0.0059 UJ	0.0056 UJ	0.0060 U	0.0060 U	0.0070 U	0.0060 U
Carbon Disulfide	- -	- -	mg/kg	0.12 J [0.13 J]	0.60 U	0.0061 UJ	0.64 U	0.011	0.0056 UJ	0.0040 J	0.0060 U	0.0070 U	0.0060 U
Carbon Tetrachloride	0.76 f	22	mg/kg	0.25 U [0.26 U]	0.24 U	0.0024 U	0.26 U	0.0023 U	0.0022 U	0.0060 U	0.0060 U	0.0070 U	0.0060 U
Chlorobenzene	1.1	500 b	mg/kg	0.63 U [0.66 U]	0.60 U	0.0061 U	0.64 UJ	0.0059 UJ	0.0056 U	0.0060 U	0.0060 U	0.0070 U	0.0060 U
Chloroethane	- -	- -	mg/kg	0.63 U [0.66 U]	0.60 U	0.0061 U	0.64 U	0.0059 U	0.0056 U	0.0060 U	0.0060 U	0.0070 U	0.0060 U
Chloroform	0.37	350	mg/kg	0.63 U [0.66 U]	0.60 U	0.0061 U	0.64 U	0.0059 U	0.0056 U	0.0060 U	0.0060 U	0.0070 U	0.0060 U
Chloromethane	- -	- -	mg/kg	0.63 U [0.66 U]	0.60 U	0.0061 U	0.64 U	0.0059 U	0.0056 U	0.0060 U	0.0060 U	0.0070 U	0.0060 U
cis-1,2-Dichloroethene	0.25 f	500 b	mg/kg	0.63 U [0.66 U]	0.60 U	0.0061 U	0.64 U	0.0059 U	0.0056 U	0.0060 U	0.0060 U	0.0070 U	0.0060 U
cis-1,3-Dichloropropene	- -	- -	mg/kg	0.63 U [0.66 U]	0.60 U	0.0061 U	0.64 U	0.0059 U	0.0056 U	0.0060 U	0.0060 U	0.0070 U	0.0060 U
Cyclohexane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	0.0030 J	0.0060 U	0.0070 U	0.0060 U
Dibromochloromethane	- -	- -	mg/kg	0.63 UJ [0.66 UJ]	0.60 UJ	0.0061 U	0.64 UJ	0.0059 U	0.0056 UJ	0.0060 U	0.0060 U	0.0070 U	0.0060 U
Dichlorodifluoromethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	0.0060 U	0.0030 J	0.0070 U	0.0060 U
Ethylbenzene	1 f	390	mg/kg	**9.8 [3.9]**	1.0	0.0048 U	**3.6**	0.0047 U	0.0045 U	0.046	0.0060 U	0.0070 U	0.0060 U
Isopropylbenzene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	0.010	0.0060 U	0.0070 U	0.0060 U
Methyl acetate	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	0.0060 U	0.0060 U	0.0070 U	0.0060 U
Methyl tert-butyl ether	0.93 f	500 b	mg/kg	0.63 U [0.66 U]	0.60 U	0.0061 UJ	0.64 U	0.0059 U	0.0056 UJ	0.0060 U	0.0060 U	0.0070 U	0.0060 U
Methylcyclohexane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	0.0020 J	0.0060 U	0.0070 U	0.0060 U
Methylene Chloride	0.05	500 b	mg/kg	0.38 UJ [0.40 UJ]	0.36 UJ	0.0036 U	0.38 UJ	0.0035 UJ	0.0034 UJ	0.0060 UJ	0.012 UJ	0.014 UJ	0.0080 UJ
Styrene	- -	- -	mg/kg	1.6 [0.62 J]	1.4	0.0061 U	0.64 UJ	0.0059 UJ	0.0056 UJ	0.0060 U	0.0060 U	0.0070 U	0.0060 U
Tetrachloroethene	1.3	150	mg/kg	0.13 U [0.13 U]	0.12 U	0.0012 U	0.13 U	0.0012 U	0.0011 U	0.0060 U	0.0060 U	0.0070 U	0.0060 U

See Notes on Page 10.

Table 2. Summary of Subsurface Soil Sample Analytical Results, Remedial Investigation, New York State Electric & Gas Corporation, Geneva (Wadsworth Street) Former MGP Site, Geneva, New York

Sample ID: Sample Depth (feet): Date Collected:	Unrestricted Use SCOs	Restricted Use SCOs Commercial	Units	SB-7 14 - 16.5 12/01/05	SB-7 20.5 - 21.3 12/01/05	SB-8 6 - 8 12/05/05	SB-8 14 - 16 12/05/05	SB-9 6 - 6.8 12/13/05	SB-10 9.2 - 10.7 12/14/05	SB-11 20 - 22 09/20/06	SB-11 38 - 40 09/20/06	SB-12 16 - 18 09/19/06	SB-12 38 - 40 09/19/06
VOCs (Cont'd.)													
Toluene	0.7	500 b	mg/kg	**6.6 [3.2]**	**4.4**	0.0061 U	0.64 U	0.0059 U	0.0024 J	0.0090	0.0060 U	0.0070 U	0.0060 U
trans-1,2-Dichloroethene	0.19 f	500 b	mg/kg	0.63 U [0.66 U]	0.60 U	0.0061 U	0.64 U	0.0059 U	0.0056 UJ	0.0060 U	0.0060 U	0.0070 U	0.0060 U
trans-1,3-Dichloropropene	- -	- -	mg/kg	0.63 U [0.66 U]	0.60 U	0.0061 U	0.64 U	0.0059 U	0.0056 U	0.0060 U	0.0060 U	0.0070 U	0.0060 U
Trichloroethene	0.47	200	mg/kg	0.13 U [0.13 U]	0.12 U	0.0012 UJ	0.13 U	0.0012 U	0.0011 U	0.0060 U	0.0060 U	0.0070 U	0.0060 U
Trichlorofluoromethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	0.0060 U	0.0060 U	0.0070 U	0.0060 U
Vinyl Chloride	0.02 f	13	mg/kg	0.63 U [0.66 U]	0.60 U	0.0061 U	0.64 U	0.0059 U	0.0056 U	0.012 U	0.012 U	0.015 U	0.012 U
Xylene (Total)	0.26	500 b	mg/kg	**56 [20]**	**5.1**	0.0061 U	**4.8 J**	0.0059 UJ	0.0018 J	0.075	0.018 U	0.022 U	0.018 U
Total BTEX	- -	- -	mg/kg	94 [42]	13	ND	9.0 J	0.0012	0.0057 J	0.20	ND	0.041	ND
Total VOCs	- -	- -	mg/kg	97 J [44 J]	14	ND	9.0 J	0.081	0.045 J	0.23 J	0.0090 J	0.052 J	ND
SVOCs													
1,2,4-Trichlorobenzene	- -	- -	mg/kg	1.1 U [0.44 U]	2.1 U	0.041 U	0.044 U	0.040 U	0.039 U	0.39 U	0.39 U	0.49 U	0.39 U
1,2-Dichlorobenzene	1.1 f	500 b	mg/kg	11 U [4.4 U]	21 U	0.41 U	0.44 U	0.40 U	0.39 U	0.39 U	0.39 U	0.49 U	0.39 U
1,3-Dichlorobenzene	2.4 f	280	mg/kg	11 U [4.4 U]	21 U	0.41 U	0.44 U	0.40 U	0.39 U	0.39 U	0.39 U	0.49 U	0.39 U
1,4-Dichlorobenzene	1.8	130	mg/kg	11 U [4.4 U]	21 U	0.41 U	0.44 U	0.40 U	0.39 U	0.39 U	0.39 U	0.49 U	0.39 U
2,4,5-Trichlorophenol	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	0.94 U	0.96 U	1.2 U	0.96 U
2,4,6-Trichlorophenol	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	0.39 U	0.39 U	0.49 U	0.39 U
2,4-Dichlorophenol	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	0.39 U	0.39 U	0.49 U	0.39 U
2,4-Dimethylphenol	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	0.39 U	0.39 U	0.49 U	0.39 U
2,4-Dinitrophenol	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	1.9 UJ	1.9 UJ	2.4 U	1.9 U
2,4-Dinitrotoluene	- -	- -	mg/kg	2.2 U [0.89 U]	4.2 U	0.082 U	0.087 U	0.080 U	0.078 U	0.39 U	0.39 U	0.49 U	0.39 U
2,6-Dinitrotoluene	- -	- -	mg/kg	2.2 U [0.89 U]	4.2 U	0.082 U	0.087 U	0.080 U	0.078 U	0.39 U	0.39 U	0.49 U	0.39 U
2-Chloronaphthalene	- -	- -	mg/kg	11 U [4.4 U]	21 U	0.41 U	0.44 U	0.40 U	0.39 U	0.39 U	0.39 U	0.49 U	0.39 U
2-Chlorophenol	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	0.39 U	0.39 U	0.49 U	0.39 U
2-Methylnaphthalene	- -	- -	mg/kg	57 [19]	14 J	0.41 U	0.12 J	0.12 J	0.020 J	0.39 U	0.39 U	0.10 J	0.035 J
2-Methylphenol	0.33 b, f	500 b	mg/kg	NA	NA	NA	NA	NA	NA	0.39 U	0.39 U	0.49 U	0.39 U
2-Nitroaniline	- -	- -	mg/kg	22 U [8.9 U]	42 U	0.82 U	0.87 U	0.80 U	0.78 U	1.9 U	1.9 U	2.4 U	1.9 U
2-Nitrophenol	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	0.39 U	0.39 U	0.49 U	0.39 U
3,3'-Dichlorobenzidine	- -	- -	mg/kg	22 UJ [8.9 UJ]	42 UJ	0.82 U	0.87 U	0.80 UJ	0.78 UJ	1.9 U	1.9 U	2.4 UJ	1.9 UJ
3-Nitroaniline	- -	- -	mg/kg	22 U [8.9 U]	42 U	0.82 U	0.87 U	0.80 U	0.78 U	1.9 U	1.9 U	2.4 U	1.9 U
4-Bromophenyl-phenylether	- -	- -	mg/kg	11 U [4.4 U]	21 U	0.41 U	0.44 U	0.40 U	0.39 U	0.39 U	0.39 U	0.49 U	0.39 U
4-Chloro-3-methylphenol	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	0.39 U	0.39 U	0.49 U	0.39 U
4-Chloroaniline	- -	- -	mg/kg	11 U [4.4 U]	21 U	0.41 UJ	0.44 UJ	0.40 U	0.39 U	0.39 U	0.39 U	0.49 U	0.39 U
4-Chlorophenyl-phenylether	- -	- -	mg/kg	11 U [4.4 U]	21 U	0.41 U	0.44 U	0.40 U	0.39 U	0.39 U	0.39 U	0.49 U	0.39 U
4-Methylphenol	0.33 b, f	500 b	mg/kg	NA	NA	NA	NA	NA	NA	0.39 U	0.39 U	0.49 U	0.39 U
4-Nitroaniline	- -	- -	mg/kg	22 U [8.9 U]	42 U	0.82 U	0.87 U	0.80 U	0.78 U	1.9 U	1.9 U	2.4 U	1.9 U
4-Nitrophenol	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	1.9 U	1.9 U	2.4 U	1.9 U
Acenaphthene	20	500 b	mg/kg	6.0 J [2.0 J]	18 J	0.014 J	0.036 J	0.41	0.043 J	0.39 U	0.39 U	0.030 J	0.39 U
Acenaphthylene	100 a, f	500 b	mg/kg	28 [9.2]	82	0.0086 J	0.44 U	0.93	0.025 J	0.39 U	0.39 U	0.36 J	0.39 U
Anthracene	100 a, f	500 b	mg/kg	30 [9.5]	76	0.032 J	0.0088 J	1.9 J	0.043 J	0.39 U	0.39 U	0.18 J	0.39 U
Benzo(a)anthracene	1 c, f	5.6	mg/kg	**19 [7.6]**	**45**	0.076	0.010 J	**5.2**	0.031 J	0.39 U	0.024 J	0.88	0.39 U

See Notes on Page 10.

Table 2. Summary of Subsurface Soil Sample Analytical Results, Remedial Investigation, New York State Electric & Gas Corporation, Geneva (Wadsworth Street) Former MGP Site, Geneva, New York

Sample ID: **Sample Depth (feet):** **Date Collected:**	**Unrestricted Use SCOs**	**Restricted Use SCOs Commercial**	**Units**	**SB-7** **14 - 16.5** **12/01/05**	**SB-7** **20.5 - 21.3** **12/01/05**	**SB-8** **6 - 8** **12/05/05**	**SB-8** **14 - 16** **12/05/05**	**SB-9** **6 - 6.8** **12/13/05**	**SB-10** **9.2 - 10.7** **12/14/05**	**SB-11** **20 - 22** **09/20/06**	**SB-11** **38 - 40** **09/20/06**	**SB-12** **16 - 18** **09/19/06**	**SB-12** **38 - 40** **09/19/06**
SVOCs (Cont'd.)													
Benzo(a)pyrene	1 c	1 f	mg/kg	**13 [7.0]**	**26**	0.079	0.044 U	**4.9**	0.019 J	0.39 U	0.39 U	**1.3**	0.39 U
Benzo(b)fluoranthene	1 c, f	5.6	mg/kg	**7.9 [3.1]**	**14**	0.060	0.044 U	**4.0**	0.0096 J	0.39 U	0.39 U	**1.1**	0.39 U
Benzo(g,h,i)perylene	100 f	500 b	mg/kg	3.6 J [1.9 J]	5.3 J	0.037 J	0.44 U	1.7 J	0.39 UJ	0.39 U	0.39 U	0.97	0.0080 J
Benzo(k)fluoranthene	0.8 c, f	56	mg/kg	**15 J [7.2 J]**	**28 J**	0.072	0.044 U	**3.7 J**	0.016 J	0.39 U	0.39 U	0.57	0.39 U
bis(2-Chloroethoxy)methane	- -	- -	mg/kg	11 U [4.4 U]	21 U	0.41 U	0.44 U	0.40 U	0.39 U	0.39 U	0.39 U	0.49 U	0.39 U
bis(2-Chloroethyl)ether	- -	- -	mg/kg	1.1 U [0.44 U]	2.1 U	0.041 UJ	0.044 UJ	0.040 UJ	0.039 UJ	0.39 U	0.39 U	0.49 U	0.39 U
bis(2-chloroisopropyl)ether	- -	- -	mg/kg	11 U [4.4 U]	21 U	0.41 U	0.44 U	0.40 U	0.39 U	0.39 U	0.39 U	0.49 U	0.39 U
bis(2-Ethylhexyl)phthalate	- -	- -	mg/kg	11 U [4.4 U]	21 U	0.23 J	0.44 U	0.40 U	0.39 UJ	0.39 U	0.39 U	0.49 U	0.11 J
Butylbenzylphthalate	- -	- -	mg/kg	11 U [4.4 U]	21 U	0.41 U	0.44 U	0.40 U	0.39 U	0.39 U	0.39 U	0.49 U	0.39 U
Carbazole	- -	- -	mg/kg	6.8 J [2.1 J]	5.1 J	0.41 U	0.016 J	0.54	0.39 U	0.39 U	0.39 U	0.026 J	0.39 U
Chrysene	1 c, f	56	mg/kg	**17 [7.2]**	**39**	0.095 J	0.015 J	**4.7**	0.025 J	0.39 U	0.39 U	0.77	0.39 U
Dibenz(a,h)anthracene	0.33 b, f	0.56	mg/kg	**1.6 [0.86]**	**2.3**	0.041 U	0.044 U	**0.76**	0.039 U	0.39 U	0.39 U	0.20 J	0.39 U
Dibenzofuran	7 f	350	mg/kg	**20 [7.0]**	**52**	0.010 J	0.021 J	0.46	0.016 J	0.025 J	0.029 J	0.033 J	0.39 U
Diethylphthalate	- -	- -	mg/kg	11 U [4.4 U]	21 U	0.41 U	0.44 U	0.40 U	0.39 U	0.39 U	0.39 U	0.49 U	0.39 U
Dimethylphthalate	- -	- -	mg/kg	11 U [4.4 U]	21 U	0.41 U	0.44 U	0.40 U	0.39 U	0.39 U	0.39 U	0.49 U	0.39 U
Di-n-butylphthalate	- -	- -	mg/kg	11 U [4.4 U]	21 U	0.41 U	0.44 U	0.40 UJ	0.39 UJ	0.39 U	0.39 U	0.49 U	0.39 U
Di-n-octylphthalate	- -	- -	mg/kg	11 U [4.4 U]	21 U	0.41 U	0.44 U	0.40 UJ	0.39 U	0.39 U	0.39 U	0.49 UJ	0.39 UJ
Fluoranthene	100 a, f	500 b	mg/kg	41 [15]	92	0.15 J	0.023 J	7.2 J	0.060 J	0.39 U	0.39 U	1.3	0.39 U
Fluorene	30	500 b	mg/kg	**35 [11]**	**99**	0.018 J	0.028 J	1.0	0.059 J	0.39 U	0.39 U	0.085 J	0.39 U
Hexachlorobenzene	0.33 b, f	6	mg/kg	1.1 U [0.44 U]	2.1 U	0.041 U	0.044 U	0.040 U	0.039 U	0.39 U	0.39 U	0.49 U	0.39 U
Hexachlorobutadiene	- -	- -	mg/kg	2.2 U [0.89 U]	4.2 U	0.082 U	0.087 U	0.080 U	0.078 U	0.39 U	0.39 U	0.49 U	0.39 U
Hexachlorocyclopentadiene	- -	- -	mg/kg	11 UJ [4.4 UJ]	21 UJ	0.41 UJ	0.44 UJ	0.40 U	0.39 U	0.39 UJ	0.39 UJ	0.49 UJ	0.39 UJ
Hexachloroethane	- -	- -	mg/kg	1.1 U [0.44 U]	2.1 U	0.041 U	0.044 U	0.040 U	0.039 U	0.39 U	0.39 U	0.49 U	0.39 U
Indeno(1,2,3-cd)pyrene	0.5 c, f	5.6	mg/kg	**3.8 [2.4]**	**6.1**	0.032 J	0.044 U	**2.1**	0.039 U	0.39 U	0.39 U	**0.75**	0.39 U
Isophorone	- -	- -	mg/kg	11 U [4.4 U]	21 U	0.41 U	0.44 U	0.40 U	0.39 U	0.39 U	0.39 U	0.49 U	0.39 U
Naphthalene	12 f	500 b	mg/kg	**160 [54]**	**29**	0.013 J	7.2	0.47	0.39 U	0.19 J	0.088 J	0.24 J	0.16 J
Nitrobenzene	- -	- -	mg/kg	1.1 UJ [0.44 UJ]	2.1 UJ	0.041 UJ	0.044 UJ	0.040 UJ	0.039 UJ	0.39 U	0.39 U	0.49 U	0.39 U
N-Nitroso-di-n-propylamine	- -	- -	mg/kg	1.1 U [0.44 U]	2.1 U	0.041 U	0.044 U	0.040 U	0.039 U	0.39 U	0.39 U	0.49 U	0.39 U
N-Nitrosodiphenylamine	- -	- -	mg/kg	11 U [4.4 U]	21 U	0.41 U	0.44 U	0.40 UJ	0.39 UJ	0.39 U	0.39 U	0.49 U	0.39 U
Pentachlorophenol	0.8 b	6.7	mg/kg	NA	NA	NA	NA	NA	NA	1.9 U	1.9 U	2.4 U	1.9 U
Phenanthrene	100 f	500 b	mg/kg	72 [25]	**180**	0.12 J	0.032 J	4.6	0.083 J	0.063 J	0.067 J	0.62	0.39 U
Phenol	0.33 b	500 b	mg/kg	NA	NA	NA	NA	NA	NA	0.39 U	0.39 U	0.49 U	0.39 U
Pyrene	100 f	500 b	mg/kg	29 [12]	65	0.15 J	0.017 J	6.7	0.046 J	0.39 U	0.39 U	1.4	0.39 U
Total PAHs	- -	- -	mg/kg	540 J [190 J]	820 J	0.96 J	7.5 J	50 J	0.48 J	0.25 J	0.18 J	11 J	0.20 J
Total SVOCs	- -	- -	mg/kg	570 J [200 J]	880 J	1.2 J	7.5 J	51 J	0.50 J	0.28 J	0.21 J	11 J	0.31 J
Inorganics													
Cyanide, Total	27 e, f	27 h	mg/kg	9.20 [13.8]	0.500 U	0.500 U	0.870	15.3	0.500 U	0.780 U	1.00 U	0.940 U	1.00 U

See Notes on Page 10.

Table 2. Summary of Subsurface Soil Sample Analytical Results, Remedial Investigation, New York State Electric & Gas Corporation, Geneva (Wadsworth Street) Former MGP Site, Geneva, New York

Sample ID: Sample Depth (feet): Date Collected:	Unrestricted Use SCOs	Restricted Use SCOs Commercial	Units	SB-13 16 - 18 09/19/06	SB-13 36 - 38 09/19/06	SB-14A 4 - 6.5 09/18/06	SB-14B 10 - 12 09/18/06	SB-14B 38 - 40 09/18/06	SB-15 4 - 5 09/20/06	SB-15 23.4 - 24 09/20/06	SB-15 38 - 40 09/20/06	TP-1 7 12/02/05	TP-2 6.2 12/02/05	TP-3 6 12/02/05
VOCs														
1,1,1-Trichloroethane	0.68 f	500 b	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0059 U	0.0061 U	0.0064 U
1,1,2,2-Tetrachloroethane	- -	- -	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0012 UJ	0.0012 UJ	0.0013 UJ
1,1,2-Trichloroethane	- -	- -	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0036 U	0.0037 U	0.0039 U
1,1-Dichloroethane	0.27 f	240	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	0.0059 U	0.0061 U	0.0064 U
1,1-Dichloroethene	0.33 f	500 b	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0024 UJ	0.0024 UJ	0.0026 UJ
1,2,4-Trichlorobenzene	- -	- -	mg/kg	4.2 UJ [3.6 UJ]	0.0060 U	4.8 UJ	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	NA	NA	NA
1,2-Dibromo-3-chloropropane	- -	- -	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	NA	NA	NA
1,2-Dibromoethane	- -	- -	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	NA	NA	NA
1,2-Dichlorobenzene	1.1 f	500 b	mg/kg	4.2 UJ [3.6 UJ]	0.0060 U	4.8 UJ	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	NA	NA	NA
1,2-Dichloroethane	0.02 c	30	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0024 U	0.0024 U	0.0026 U
1,2-Dichloropropane	- -	- -	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0012 U	0.0012 U	0.0013 U
1,3-Dichlorobenzene	2.4 f	280	mg/kg	4.2 UJ [3.6 UJ]	0.0060 U	4.8 UJ	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	NA	NA	NA
1,4-Dichlorobenzene	1.8	130	mg/kg	4.2 UJ [3.6 UJ]	0.0060 U	4.8 UJ	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	NA	NA	NA
2-Butanone	0.12	500 b	mg/kg	21 U [18 U]	0.030 U	24 U	0.032 U	0.030 U	0.030 U	0.013 J	0.029 U	0.0059 UJ	0.0061 UJ	0.0064 UJ
2-Hexanone	- -	- -	mg/kg	21 U [18 U]	0.030 U	24 U	0.032 U	0.030 U	0.030 U	0.030 U	0.029 U	0.0059 UJ	0.0061 UJ	0.0064 UJ
4-Methyl-2-Pentanone	- -	- -	mg/kg	21 U [18 U]	0.030 U	24 U	0.032 U	0.030 U	0.030 U	0.030 U	0.029 U	0.0059 UJ	0.0061 UJ	0.0064 UJ
Acetone	0.05	500 b	mg/kg	21 U [18 U]	0.030 U	24 U	0.015 J	0.030 U	0.0090 J	**0.057**	0.029 U	0.021 UJ	0.012 UJ	0.0064 UJ
Benzene	0.06	44	mg/kg	**240 [180]**	0.0050 J	**64**	0.0060 U	0.016	0.045	0.0040 J	0.0020 J	0.0014	0.0020	0.0017
Bromodichloromethane	- -	- -	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0012 U	0.0012 U	0.0013 U
Bromoform	- -	- -	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0048 U	0.0049 U	0.0052 U
Bromomethane	- -	- -	mg/kg	4.2 UJ [3.6 UJ]	0.0060 U	4.8 UJ	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0059 U	0.0061 U	0.0064 U
Carbon Disulfide	- -	- -	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0059 UJ	0.0061 UJ	0.0064 UJ
Carbon Tetrachloride	0.76 f	22	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0024 U	0.0024 U	0.0026 U
Chlorobenzene	1.1	500 b	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0059 U	0.0061 U	0.0064 U
Chloroethane	- -	- -	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0059 U	0.0061 U	0.0064 U
Chloroform	0.37	350	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0059 U	0.0061 U	0.0064 U
Chloromethane	- -	- -	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0059 U	0.0061 U	0.0064 U
cis-1,2-Dichloroethene	0.25 f	500 b	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0059 U	0.0061 U	0.0064 U
cis-1,3-Dichloropropene	- -	- -	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0059 U	0.0061 U	0.0064 U
Cyclohexane	- -	- -	mg/kg	4.2 U [3.6 U]	0.0060 U	44	0.0060 U	0.0060 U	0.0050 J	0.0060 U	0.0060 U	NA	NA	NA
Dibromochloromethane	- -	- -	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0059 U	0.0061 U	0.0064 U
Dichlorodifluoromethane	- -	- -	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 UJ	NA	NA	NA
Ethylbenzene	1 f	390	mg/kg	**42 [33]**	0.0060 U	**16**	0.0060 U	0.0060 U	0.024	0.0030 J	0.0060 U	0.0048 U	0.0049 U	0.0052 U
Isopropylbenzene	- -	- -	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0070	0.0060 U	0.0060 U	NA	NA	NA
Methyl acetate	- -	- -	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	NA	NA	NA
Methyl tert-butyl ether	0.93 f	500 b	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0059 U	0.0061 U	0.0064 U
Methylcyclohexane	- -	- -	mg/kg	6.4 [4.6]	0.0060 U	74	0.0060 U	0.0060 U	0.0030 J	0.0060 U	0.0060 U	NA	NA	NA
Methylene Chloride	0.05	500 b	mg/kg	4.2 UJ [3.6 UJ]	0.010 UJ	4.8 UJ	0.0060 UJ	0.0060 UJ	0.0060 UJ	0.0060 UJ	0.0080 UJ	0.0036 U	0.0037 U	0.0039 U
Styrene	- -	- -	mg/kg	30 [13]	0.0020 J	50	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0059 U	0.0061 U	0.0064 U
Tetrachloroethene	1.3	150	mg/kg	4.2 UJ [3.6 UJ]	0.0060 U	4.8 UJ	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0012 U	0.0012 U	0.0013 U

See Notes on Page 10.

Table 2. Summary of Subsurface Soil Sample Analytical Results, Remedial Investigation, New York State Electric & Gas Corporation, Geneva (Wadsworth Street) Former MGP Site, Geneva, New York

Sample ID: Sample Depth (feet): Date Collected:	Unrestricted Use SCOs	Restricted Use SCOs Commercial	Units	SB-13 16 - 18 09/19/06	SB-13 36 - 38 09/19/06	SB-14A 4 - 6.5 09/18/06	SB-14B 10 - 12 09/18/06	SB-14B 38 - 40 09/18/06	SB-15 4 - 5 09/20/06	SB-15 23.4 - 24 09/20/06	SB-15 38 - 40 09/20/06	TP-1 7 12/02/05	TP-2 6.2 12/02/05	TP-3 6 12/02/05
VOCs (Cont'd.)														
Toluene	0.7	500 b	mg/kg	**340 [220]**	0.0090	**76**	0.0060 U	0.0060 U	0.0060 U	0.023	0.0020 J	0.0014 J	0.0026 J	0.0020 J
trans-1,2-Dichloroethene	0.19 f	500 b	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0059 U	0.0061 U	0.0064 U
trans-1,3-Dichloropropene	- -	- -	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0059 U	0.0061 U	0.0064 U
Trichloroethene	0.47	200	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0012 UJ	0.0012 UJ	0.0013 UJ
Trichlorofluoromethane	- -	- -	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	NA	NA	NA
Vinyl Chloride	0.02 f	13	mg/kg	8.4 U [7.1 U]	0.012 U	9.6 U	0.013 U	0.012 U	0.012 U	0.012 U	0.012 U	0.0059 U	0.0061 U	0.0064 U
Xylene (Total)	0.26	500 b	mg/kg	**360 [230]**	0.012 J	**210**	0.019 U	0.018 U	0.0080 J	0.060	0.0050 J	0.0012 J	0.0019 J	0.0015 J
Total BTEX	- -	- -	mg/kg	980 [660]	0.026 J	370	ND	0.016	0.077 J	0.090 J	0.0090 J	0.0040 J	0.0065 J	0.0052 J
Total VOCs	- -	- -	mg/kg	1,000 [680]	0.028 J	530	0.015 J	0.016	0.10 J	0.16 J	0.0090 J	0.0040 J	0.0065 J	0.0052 J
SVOCs														
1,2,4-Trichlorobenzene	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 U	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	0.040 U	0.042 U	0.044 U
1,2-Dichlorobenzene	1.1 f	500 b	mg/kg	46 U [46 U]	0.40 U	6.3 U	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	0.40 U	0.42 U	0.44 U
1,3-Dichlorobenzene	2.4 f	280	mg/kg	46 U [46 U]	0.40 U	6.3 U	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	0.40 U	0.42 U	0.44 U
1,4-Dichlorobenzene	1.8	130	mg/kg	46 U [46 U]	0.40 U	6.3 U	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	0.40 U	0.42 U	0.44 U
2,4,5-Trichlorophenol	- -	- -	mg/kg	110 U [110 U]	0.97 U	15 UJ	1.0 U	0.96 U	0.95 U	0.93 U	0.95 U	NA	NA	NA
2,4,6-Trichlorophenol	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 UJ	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	NA	NA	NA
2,4-Dichlorophenol	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 UJ	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	NA	NA	NA
2,4-Dimethylphenol	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 UJ	0.42 U	0.39 U	0.095 J	0.38 U	0.39 U	NA	NA	NA
2,4-Dinitrophenol	- -	- -	mg/kg	220 U [220 U]	1.9 U	31 UJ	2.1 U	1.9 U	1.9 UJ	1.9 UJ	1.9 UJ	NA	NA	NA
2,4-Dinitrotoluene	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 U	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	0.080 U	0.084 U	0.087 U
2,6-Dinitrotoluene	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 U	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	0.080 U	0.084 U	0.087 U
2-Chloronaphthalene	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 U	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	0.40 U	0.42 U	0.44 U
2-Chlorophenol	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 UJ	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	NA	NA	NA
2-Methylnaphthalene	- -	- -	mg/kg	430 [520]	0.087 J	400 DJ	0.27 J	0.11 J	2.0	0.38 U	0.038 J	0.40 U	0.42 U	0.44 U
2-Methylphenol	0.33 b, f	500 b	mg/kg	**1.5 J [46 U]**	0.40 U	**3.6 J**	0.42 U	0.39 U	0.22 J	0.38 U	0.39 U	NA	NA	NA
2-Nitroaniline	- -	- -	mg/kg	220 U [220 U]	1.9 U	31 U	2.1 U	1.9 U	1.9 U	1.9 U	1.9 U	0.80 U	0.84 U	0.87 U
2-Nitrophenol	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 UJ	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	NA	NA	NA
3,3'-Dichlorobenzidine	- -	- -	mg/kg	220 UJ [220 UJ]	1.9 U	31 UJ	2.1 UJ	1.9 UJ	1.9 U	1.9 U	1.9 U	0.80 UJ	0.84 UJ	0.87 UJ
3-Nitroaniline	- -	- -	mg/kg	220 U [220 U]	1.9 U	31 U	2.1 U	1.9 U	1.9 U	1.9 U	1.9 U	0.80 U	0.84 U	0.87 U
4-Bromophenyl-phenylether	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 UJ	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	0.40 U	0.42 U	0.44 U
4-Chloro-3-methylphenol	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 UJ	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	NA	NA	NA
4-Chloroaniline	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 U	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	0.40 U	0.42 U	0.44 U
4-Chlorophenyl-phenylether	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 U	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	0.40 U	0.42 U	0.44 U
4-Methylphenol	0.33 b, f	500 b	mg/kg	**3.3 J [5.2 J]**	0.40 U	6.3 UJ	0.42 U	0.39 U	**0.53**	0.38 U	0.39 U	NA	NA	NA
4-Nitroaniline	- -	- -	mg/kg	220 U [220 U]	1.9 U	31 U	2.1 U	1.9 U	1.9 U	1.9 U	1.9 U	0.80 U	0.84 U	0.87 U
4-Nitrophenol	- -	- -	mg/kg	220 U [220 U]	1.9 U	31 UJ	2.1 U	1.9 U	1.9 U	1.9 U	1.9 U	NA	NA	NA
Acenaphthene	20	500 b	mg/kg	**40 J [47]**	0.021 J	6.3 U	0.041 J	0.39 U	0.20 J	0.38 U	0.39 U	0.011 J	0.42 U	0.44 U
Acenaphthylene	100 a, f	500 b	mg/kg	**180 [240]**	0.087 J	9.3	0.060 J	0.013 J	0.35 J	0.068 J	0.39 U	0.40 U	0.42 U	0.44 U
Anthracene	100 a, f	500 b	mg/kg	**190 [240]**	0.14 J	7.1 J	0.10 J	0.39 U	1.1	0.38 U	0.39 U	0.40 U	0.42 U	0.011 J
Benzo(a)anthracene	1 c, f	5.6	mg/kg	**100 [140]**	0.077 J	**22**	0.26 J	0.010 J	1.0	0.38 U	0.036 J	0.040 U	0.016 J	0.042 J

See Notes on Page 10.

Table 2. Summary of Subsurface Soil Sample Analytical Results, Remedial Investigation, New York State Electric & Gas Corporation, Geneva (Wadsworth Street) Former MGP Site, Geneva, New York

Sample ID: Sample Depth (feet): Date Collected:	Unrestricted Use SCOs	Restricted Use SCOs Commercial	Units	SB-13 16 - 18 09/19/06	SB-13 36 - 38 09/19/06	SB-14A 4 - 6.5 09/18/06	SB-14B 10 - 12 09/18/06	SB-14B 38 - 40 09/18/06	SB-15 4 - 5 09/20/06	SB-15 23.4 - 24 09/20/06	SB-15 38 - 40 09/20/06	TP-1 7 12/02/05	TP-2 6.2 12/02/05	TP-3 6 12/02/05
SVOCs (Cont'd.)														
Benzo(a)pyrene	1 c	1 f	mg/kg	**84 [110]**	0.056 J	6.3 U	0.31 J	0.39 U	0.59	0.38 U	0.39 U	0.040 U	0.030 J	0.048
Benzo(b)fluoranthene	1 c, f	5.6	mg/kg	**80 [100]**	0.063 J	6.3 U	0.36 J	0.39 U	0.72	0.38 U	0.021 J	0.040 U	0.013 J	0.026 J
Benzo(g,h,i)perylene	100 f	500 b	mg/kg	30 J [43 J]	0.030 J	6.3 U	0.24 J	0.39 U	0.30 J	0.38 U	0.39 U	0.40 U	0.016 J	0.030 J
Benzo(k)fluoranthene	0.8 c, f	56	mg/kg	**37 J [53 J]**	0.020 J	6.3 U	0.15 J	0.39 U	0.24 J	0.38 U	0.39 U	0.040 UJ	0.027 J	0.048 J
bis(2-Chloroethoxy)methane	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 U	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	0.40 U	0.42 U	0.44 U
bis(2-Chloroethyl)ether	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 U	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	0.040 U	0.042 U	0.044 U
bis(2-chloroisopropyl)ether	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 U	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	0.40 U	0.42 U	0.44 U
bis(2-Ethylhexyl)phthalate	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 U	0.42 U	0.39 U	0.39 U	0.38 U	0.14 J	0.40 U	0.42 U	0.44 U
Butylbenzylphthalate	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 U	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	0.40 U	0.42 U	0.44 U
Carbazole	- -	- -	mg/kg	38 J [53]	0.049 J	6.3 UJ	0.039 J	0.39 U	0.33 J	0.38 U	0.39 U	0.40 U	0.42 U	0.44 U
Chrysene	1 c, f	56	mg/kg	**90 [120]**	0.062 J	**21**	0.23 J	0.39 U	0.78	0.38 U	0.025 J	0.40 U	0.017 J	0.046 J
Dibenz(a,h)anthracene	0.33 b, f	0.56	mg/kg	**13 J [17 J]**	0.014 J	6.3 U	0.071 J	0.39 U	0.16 J	0.38 U	0.39 U	0.040 U	0.042 U	0.044 U
Dibenzofuran	7 f	350	mg/kg	**140 [170]**	0.081 J	6.3 U	0.039 J	0.39 U	0.82	0.049 J	0.39 U	0.40 U	0.42 U	0.44 U
Diethylphthalate	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 U	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	0.40 U	0.42 U	0.44 U
Dimethylphthalate	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 U	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	0.40 U	0.42 U	0.44 U
Di-n-butylphthalate	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 UJ	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	0.40 U	0.42 U	0.44 U
Di-n-octylphthalate	- -	- -	mg/kg	46 UJ [46 UJ]	0.40 U	6.3 UJ	0.42 UJ	0.39 UJ	0.39 U	0.38 U	0.39 U	0.40 U	0.42 U	0.44 U
Fluoranthene	100 a, f	500 b	mg/kg	**220 [270]**	0.16 J	6.3 UJ	0.49	0.39 U	2.0	0.38 U	0.39 U	0.40 U	0.020 J	0.066 J
Fluorene	30	500 b	mg/kg	**210 [270]**	0.15 J	**76**	0.070 J	0.016 J	1.2	0.38 U	0.39 U	0.40 U	0.42 U	0.44 U
Hexachlorobenzene	0.33 b, f	6	mg/kg	46 U [46 U]	0.40 U	6.3 UJ	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	0.040 U	0.042 U	0.044 U
Hexachlorobutadiene	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 U	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	0.080 U	0.084 U	0.087 U
Hexachlorocyclopentadiene	- -	- -	mg/kg	46 U [46 UJ]	0.40 U	6.3 UJ	0.42 UJ	0.39 UJ	0.39 UJ	0.38 UJ	0.39 UJ	0.40 UJ	0.42 UJ	0.44 UJ
Hexachloroethane	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 U	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	0.040 U	0.042 U	0.044 U
Indeno(1,2,3-cd)pyrene	0.5 c, f	5.6	mg/kg	**32 J [42 J]**	0.027 J	6.3 U	0.20 J	0.39 U	0.29 J	0.38 U	0.39 U	0.040 U	0.016 J	0.027 J
Isophorone	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 U	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	0.40 U	0.42 U	0.44 U
Naphthalene	12 f	500 b	mg/kg	**1,200 D [1,400 D]**	0.12 J	**3,100 D**	1.2	0.83	3.1	0.38 U	0.39 U	0.40 U	0.42 U	0.44 U
Nitrobenzene	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 U	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	0.040 UJ	0.042 UJ	0.044 UJ
N-Nitroso-di-n-propylamine	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 U	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	0.040 U	0.042 U	0.044 U
N-Nitrosodiphenylamine	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 UJ	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	0.40 U	0.42 U	0.44 U
Pentachlorophenol	0.8 b	6.7	mg/kg	220 U [220 U]	1.9 U	31 UJ	2.1 U	1.9 U	1.9 U	1.9 U	1.9 U	NA	NA	NA
Phenanthrene	100 f	500 b	mg/kg	**390 [460]**	0.31 J	99 J	0.36 J	0.011 J	3.2	0.38 U	0.086 J	0.40 U	0.010 J	0.025 J
Phenol	0.33 b	500 b	mg/kg	46 U [46 U]	0.40 U	**4.0 J**	0.42 U	0.39 U	0.20 J	0.38 U	0.39 U	NA	NA	NA
Pyrene	100 f	500 b	mg/kg	**170 [200]**	0.11 J	6.3 U	0.36 J	0.39 U	1.5	0.38 U	0.042 J	0.40 U	0.016 J	0.048 J
Total PAHs	- -	- -	mg/kg	3,500 J [4,300 J]	1.5 J	3,700 J	4.8 J	0.99 J	19 J	0.068 J	0.25 J	0.011 J	0.18 J	0.42 J
Total SVOCs	- -	- -	mg/kg	3,700 J [4,500 J]	1.7 J	3,700 J	4.9 J	0.99 J	20 J	0.12 J	0.39 J	0.011 J	0.18 J	0.42 J
Inorganics														
Cyanide, Total	27 e, f	27 h	mg/kg	26.7 [11.2]	1.00 U	**2,170**	1.10 U	1.10 U	0.900 U	0.850 U	1.10 U	0.500 U	0.500 U	1.70

See Notes on Page 10.

Table 2. Summary of Subsurface Soil Sample Analytical Results, Remedial Investigation, New York State Electric & Gas Corporation, Geneva (Wadsworth Street) Former MGP Site, Geneva, New York

Notes:

All concentrations reported in milligrams per Kilogram (mg/Kg); equivalent to parts per million (ppm).

[ ] Bracketed results represent the duplicate sample.

NA = Sample not analyzed for specified constituent/no criteria available.

Shaded values indicate the result exceeded the NYSDEC Part 375-6.5 Soil Cleanup Objectives (SCOs) for Protection of Public Health - Commercial Use, December 14, 2006.

Values in **bold** font indicate the result exceeded the NYSDEC SCO for Unrestricted Use.

Lab Qualifier Notes:

Qualifier Type	Lab Qualifiers	Definition
Inorganic	B =	Indicates an estimated value between the instrument detection limit and the Reporting Limit (RL).
Inorganic	J =	Indicates an estimated value.
Inorganic	U =	The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
Organic	D =	Compound quantitated using a secondary dilution.
Organic	J =	Indicates an estimated value.
Organic	ND =	None detected.
Organic	U =	The compound was analyzed for but not detected. The associated value is the compound quantitation limit.

Table 3. Comparison of Surface Soil Analytical Results to Ecological SCOs, Remedial Investigation, New York State Electric & Gas Corporation, Geneva (Wadsworth Street) Former MGP Site, Geneva, New York

Sample ID: Sample Depth (feet): Date Collected:	Unrestricted Use SCOs	Restricted Use SCOs Ecological	SS-1 0 - 0.2 12/07/05	SS-2 0 - 0.2 12/07/05	SS-3 0 - 0.2 12/07/05	SS-4 0 - 0.2 12/07/05	SS-5 0 - 0.2 12/07/05	SS-6 0 - 0.2 12/07/05
VOCs (mg/Kg)								
1,1,1-Trichloroethane	0.68	- -	0.0063 U	0.0058 U	0.0056 U	0.0062 U	0.0064 U	0.0063 U
1,1,2,2-Tetrachloroethane	- -	- -	0.0012 UJ	0.0012 U	0.0011 UJ	0.0012 UJ	0.0013 UJ	0.0012 UJ
1,1,2-Trichloroethane	- -	- -	0.0038 U	0.0035 U	0.0034 U	0.0037 U	0.0038 U	0.0038 U
1,1-Dichloroethane	0.27	- -	0.0063 UJ	0.0058 UJ	0.0056 UJ	0.0062 UJ	0.0064 UJ	0.0063 UJ
1,1-Dichloroethene	0.33	- -	0.0025 U	0.0023 U	0.0022 U	0.0025 U	0.0026 U	0.0025 U
1,2-Dichloroethane	0.02	10	0.0025 U	0.0023 U	0.0022 U	0.0025 U	0.0026 U	0.0025 U
1,2-Dichloropropane	- -	- -	0.0012 U	0.0012 U	0.0011 U	0.0012 U	0.0013 U	0.0012 U
2-Butanone	0.12	100	0.0063 UJ	0.0058 U	0.0056 UJ	0.0062 UJ	0.0064 UJ	0.0063 UJ
2-Hexanone	- -	- -	0.0063 UJ	0.0058 UJ	0.0056 UJ	0.0062 UJ	0.0064 UJ	0.0063 UJ
4-Methyl-2-Pentanone	- -	- -	0.0063 UJ	0.0058 U	0.0056 UJ	0.0062 UJ	0.0064 UJ	0.0063 UJ
Acetone	0.05	2.2	0.0063 U	0.032	**0.059**	0.0062 U	**0.20**	0.043
Benzene	0.06	70	0.0011 J	0.0011 J	0.00070 J	0.0012 U	0.0013 U	0.0018
Bromodichloromethane	- -	- -	0.0012 U	0.0012 U	0.0011 U	0.0012 U	0.0013 U	0.0012 U
Bromoform	- -	- -	0.0050 UJ	0.0046 UJ	0.0045 UJ	0.0049 UJ	0.0051 UJ	0.0050 UJ
Bromomethane	- -	- -	0.0063 U	0.0058 U	0.0056 U	0.0062 U	0.0064 U	0.0063 U
Carbon Disulfide	- -	- -	0.0063 U	0.0058 U	0.0056 U	0.0062 U	0.0064 U	0.0063 U
Carbon Tetrachloride	0.76	- -	0.0025 U	0.0023 U	0.0022 U	0.0025 U	0.0026 U	0.0025 U
Chlorobenzene	1.1	40	0.0063 UJ	0.0058 UJ	0.0056 UJ	0.0062 UJ	0.0064 UJ	0.0063 UJ
Chloroethane	- -	- -	0.0063 U	0.0058 U	0.0056 U	0.0062 U	0.0064 U	0.0063 U
Chloroform	0.37	12	0.0063 U	0.0058 U	0.0056 U	0.0062 U	0.0064 U	0.0063 U
Chloromethane	- -	- -	0.0063 U	0.0058 U	0.0056 U	0.0062 U	0.0064 U	0.0063 U
cis-1,2-Dichloroethene	0.25	- -	0.0063 U	0.0058 U	0.0056 U	0.0062 U	0.0064 U	0.0063 U
cis-1,3-Dichloropropene	- -	- -	0.0063 U	0.0058 U	0.0056 U	0.0062 U	0.0064 U	0.0063 U
Dibromochloromethane	- -	- -	0.0063 U	0.0058 U	0.0056 U	0.0062 U	0.0064 U	0.0063 U
Ethylbenzene	1	- -	0.0050 U	0.0046 U	0.0045 U	0.0049 U	0.0051 U	0.0050 U
Methyl tert-butyl ether	0.93	- -	0.0063 UJ	0.0058 UJ	0.0056 UJ	0.0062 UJ	0.0064 UJ	0.0063 UJ
Methylene Chloride	0.05	12	0.0038 UJ	0.0035 UJ	0.0034 UJ	0.0037 UJ	0.0038 UJ	0.0038 UJ
Styrene	- -	- -	0.0063 UJ	0.0058 UJ	0.0056 UJ	0.0062 UJ	0.0064 UJ	0.0063 UJ
Tetrachloroethene	1.3	2	0.0012 U	0.0012 U	0.0011 U	0.0012 U	0.0013 U	0.0012 U
Toluene	0.7	36	0.0063 U	0.00090 J	0.0056 U	0.0062 U	0.0064 U	0.0063 U
Total BTEX	- -	- -	0.0011 J	0.0020 J	0.00070 J	ND	ND	0.0018
Total VOCs	- -	- -	0.0011 J	0.034 J	0.060 J	ND	0.20	0.045
trans-1,2-Dichloroethene	0.19	- -	0.0063 U	0.0058 U	0.0056 U	0.0062 U	0.0064 U	0.0063 U
trans-1,3-Dichloropropene	- -	- -	0.0063 U	0.0058 U	0.0056 U	0.0062 U	0.0064 U	0.0063 U
Trichloroethene	0.47	2	0.0012 U	0.0012 U	0.0011 U	0.0012 U	0.0013 U	0.0012 U
Vinyl Chloride	0.02	- -	0.0063 U	0.0058 U	0.0056 U	0.0062 U	0.0064 U	0.0063 U
Xylene (Total)	0.26	0.26	0.0063 UJ	0.0058 UJ	0.0056 UJ	0.0062 UJ	0.0064 UJ	0.0063 UJ
SVOCs (mg/Kg)								
1,2,4-Trichlorobenzene	- -	- -	8.7 U	0.040 U	0.039 U	0.043 U	0.044 U	0.044 U
1,2-Dichlorobenzene	1.1	- -	87 U	0.40 U	0.39 U	0.43 U	0.44 U	0.44 U
1,3-Dichlorobenzene	2.4	- -	87 U	0.40 U	0.39 U	0.43 U	0.44 U	0.44 U
1,4-Dichlorobenzene	1.8	20	87 U	0.40 U	0.39 U	0.43 U	0.44 U	0.44 U
2,4-Dinitrotoluene	- -	- -	17 U	0.080 U	0.079 U	0.087 U	0.088 U	0.088 U
2,6-Dinitrotoluene	- -	- -	17 U	0.080 U	0.079 U	0.087 U	0.088 U	0.088 U
2-Chloronaphthalene	- -	- -	87 U	0.40 U	0.39 U	0.43 U	0.44 U	0.44 U
2-Methylnaphthalene	- -	- -	15 J	0.068 J	0.019 J	0.028 J	0.20 J	0.063 J
2-Nitroaniline	- -	- -	170 U	0.80 U	0.79 U	0.87 U	0.88 U	0.88 U
3,3'-Dichlorobenzidine	- -	- -	170 UJ	0.80 UJ	0.79 UJ	0.87 UJ	0.88 UJ	0.88 UJ
3-Nitroaniline	- -	- -	170 U	0.80 U	0.79 U	0.87 U	0.88 U	0.88 U
4-Bromophenyl-phenylether	- -	- -	87 U	0.40 U	0.39 U	0.43 U	0.44 U	0.44 U
4-Chloroaniline	- -	- -	87 U	0.40 U	0.39 U	0.43 U	0.44 U	0.44 U
4-Chlorophenyl-phenylether	- -	- -	87 U	0.40 U	0.39 U	0.43 U	0.44 U	0.44 U
4-Nitroaniline	- -	- -	170 U	0.80 U	0.79 U	0.87 U	0.88 U	0.88 U
Acenaphthene	20	20	**26 J**	0.077 J	0.015 J	0.036 J	0.15 J	0.060 J
Acenaphthylene	100	- -	**110**	0.15 J	0.030 J	0.026 J	0.58	0.17 J
Anthracene	100	- -	**190**	0.27 J	0.053 J	0.075 J	0.86	0.38 J
Benzo(a)anthracene	1	- -	**130**	0.76	0.21	0.32	**2.8**	**1.4**
Benzo(a)pyrene	1	2.6	**140**	0.84	0.34	0.50	**3.4**	**1.7**
Benzo(b)fluoranthene	1	- -	**66**	0.64	0.31	0.38	**3.0**	**1.3**
Benzo(g,h,i)perylene	100	- -	46 J	0.24 J	0.13 J	0.12 J	0.90	0.63

See Notes on Page 2.

Table 3. Comparison of Surface Soil Analytical Results to Ecological SCOs, Remedial Investigation, New York State Electric & Gas Corporation, Geneva (Wadsworth Street) Former MGP Site, Geneva, New York

Sample ID:	**Unrestricted Use SCOs**	**Restricted Use SCOs Ecological**	**SS-1**	**SS-2**	**SS-3**	**SS-4**	**SS-5**	**SS-6**
Sample Depth (feet):			**0 - 0.2**	**0 - 0.2**	**0 - 0.2**	**0 - 0.2**	**0 - 0.2**	**0 - 0.2**
Date Collected:			**12/07/05**	**12/07/05**	**12/07/05**	**12/07/05**	**12/07/05**	**12/07/05**
SVOCs (mg/Kg) (Cont'd.)								
Benzo(k)fluoranthene	0.8	- -	**98 J**	**0.86 J**	0.36 J	0.56 J	**3.4 J**	**1.8 J**
bis(2-Chloroethoxy)methane	- -	- -	87 U	0.40 U	0.39 U	0.43 U	0.44 U	0.44 U
bis(2-Chloroethyl)ether	- -	- -	8.7 U	0.040 U	0.039 U	0.043 U	0.044 U	0.044 U
bis(2-chloroisopropyl)ether	- -	- -	87 U	0.40 U	0.39 U	0.43 U	0.44 U	0.44 U
bis(2-Ethylhexyl)phthalate	- -	- -	87 U	0.091 J	0.091 J	0.089 J	0.51	0.44 U
Butylbenzylphthalate	- -	- -	87 U	0.40 U	0.39 U	0.43 U	0.44 U	0.44 U
Carbazole	- -	- -	87 U	0.094 J	0.041 J	0.044 J	0.32 J	0.11 J
Chrysene	1	- -	**140**	0.82	0.29 J	0.35 J	**3.1**	**1.5**
Dibenz(a,h)anthracene	0.33	- -	**1.8 J**	0.030 J	0.016 J	0.043 U	0.088	0.071
Dibenzofuran	7	- -	**30 J**	0.049 J	0.013 J	0.020 J	0.15 J	0.070 J
Diethylphthalate	- -	- -	87 U	0.40 U	0.39 U	0.43 U	0.44 U	0.44 U
Dimethylphthalate	- -	- -	87 U	0.40 U	0.39 U	0.43 U	0.44 U	0.44 U
Di-n-butylphthalate	- -	- -	87 U	0.40 U	0.39 U	0.43 U	0.44 U	0.44 U
Di-n-octylphthalate	- -	- -	87 U	0.40 U	0.39 U	0.43 U	0.44 U	0.44 U
Fluoranthene	100	- -	**360**	1.6	0.44	0.46	5.0	2.1
Fluorene	30	30	**120**	0.10 J	0.017 J	0.024 J	0.24 J	0.083 J
Hexachlorobenzene	0.33	- -	8.7 U	0.040 U	0.039 U	0.043 U	0.044 U	0.044 U
Hexachlorobutadiene	- -	- -	17 U	0.080 U	0.079 U	0.087 U	0.088 U	0.088 U
Hexachlorocyclopentadiene	- -	- -	87 UJ	0.40 UJ	0.39 UJ	0.43 UJ	0.44 UJ	0.44 UJ
Hexachloroethane	- -	- -	8.7 U	0.040 U	0.039 U	0.043 U	0.044 U	0.044 U
Indeno(1,2,3-cd)pyrene	0.5	- -	**37**	0.22	0.14	0.14	**1.0**	**0.66**
Isophorone	- -	- -	87 U	0.40 U	0.39 U	0.43 U	0.44 U	0.44 U
Naphthalene	12	- -	6.6 J	0.16 J	0.033 J	0.032 J	0.34 J	0.26 J
Nitrobenzene	- -	- -	8.7 UJ	0.040 UJ	0.039 UJ	0.043 UJ	0.044 UJ	0.044 UJ
N-Nitroso-di-n-propylamine	- -	- -	8.7 U	0.040 U	0.039 U	0.043 U	0.044 U	0.044 U
N-Nitrosodiphenylamine	- -	- -	87 U	0.40 U	0.39 U	0.43 U	0.44 U	0.44 U
Phenanthrene	100	- -	**720**	1.1	0.24 J	0.28 J	3.0	1.2
Pyrene	100	- -	**500**	1.5 J	0.41	0.42 J	5.2	1.8
Total PAHs	- -	- -	2,700 J	9.4 J	3.1 J	3.8 J	33 J	15 J
Total SVOCs	- -	- -	2,700 J	9.7 J	3.2 J	3.9 J	34 J	15 J
Inorganics (mg/Kg)								
Cyanide, Total	27	- -	1.40	0.500 U	0.500 U	0.500 U	2.90	0.500 U

Notes:

1. All concentrations reported in milligrams per kilogram (mg/kg).
2. Restricted Use SCOs Ecological are from NYSDEC Subpart 375-6: Remedial Program Soil Cleanup Objectives, effective December 14, 2006.
3. - - = No SCO given.
4. Shading indicates that the result exceeds the Restricted Use SCO Ecological.
5. Bolded values exceed NYSDEC PART 375 unrestricted use criteria.
6. Results have been validated in accordance with USEPA National Functional Guidelines of October 1999.

Data Qualifiers:

D = Compound quantitated using a secondary dilution.
J = The concentration given is an approximate value.
ND = Not Detected.
U = Not detected at or above the associated reporting limit.

Table 4. Comparison of Surface Soil Analytical Results to Commercial SCOs, Remedial Investigation, New York State Electric & Gas Corporation, Geneva (Wadsworth Street) Former MGP Site, Geneva, New York

Sample ID: Sample Depth (feet): Date Collected:	Unrestricted Use SCOs	Restricted Use SCOs Commercial	SS-1 0 - 0.2 12/07/05	SS-2 0 - 0.2 12/07/05	SS-3 0 - 0.2 12/07/05	SS-4 0 - 0.2 12/07/05	SS-5 0 - 0.2 12/07/05	SS-6 0 - 0.2 12/07/05
VOCs (mg/Kg)								
1,1,1-Trichloroethane	0.68	500	0.0063 U	0.0058 U	0.0056 U	0.0062 U	0.0064 U	0.0063 U
1,1,2,2-Tetrachloroethane	- -	- -	0.0012 UJ	0.0012 U	0.0011 UJ	0.0012 UJ	0.0013 UJ	0.0012 UJ
1,1,2-Trichloroethane	- -	- -	0.0038 U	0.0035 U	0.0034 U	0.0037 U	0.0038 U	0.0038 U
1,1-Dichloroethane	0.27	240	0.0063 UJ	0.0058 UJ	0.0056 UJ	0.0062 UJ	0.0064 UJ	0.0063 UJ
1,1-Dichloroethene	0.33	500	0.0025 U	0.0023 U	0.0022 U	0.0025 U	0.0026 U	0.0025 U
1,2-Dichloroethane	0.02	30	0.0025 U	0.0023 U	0.0022 U	0.0025 U	0.0026 U	0.0025 U
1,2-Dichloropropane	- -	- -	0.0012 U	0.0012 U	0.0011 U	0.0012 U	0.0013 U	0.0012 U
2-Butanone	0.12	500	0.0063 UJ	0.0058 U	0.0056 UJ	0.0062 UJ	0.0064 UJ	0.0063 UJ
2-Hexanone	- -	- -	0.0063 UJ	0.0058 UJ	0.0056 UJ	0.0062 UJ	0.0064 UJ	0.0063 UJ
4-Methyl-2-Pentanone	- -	- -	0.0063 UJ	0.0058 U	0.0056 UJ	0.0062 UJ	0.0064 UJ	0.0063 UJ
Acetone	0.05	500	0.0063 U	0.032	**0.059**	0.0062 U	**0.20**	0.043
Benzene	0.06	44	0.0011 J	0.0011 J	0.00070 J	0.0012 U	0.0013 U	0.0018
Bromodichloromethane	- -	- -	0.0012 U	0.0012 U	0.0011 U	0.0012 U	0.0013 U	0.0012 U
Bromoform	- -	- -	0.0050 UJ	0.0046 UJ	0.0045 UJ	0.0049 UJ	0.0051 UJ	0.0050 UJ
Bromomethane	- -	- -	0.0063 U	0.0058 U	0.0056 U	0.0062 U	0.0064 U	0.0063 U
Carbon Disulfide	- -	- -	0.0063 U	0.0058 U	0.0056 U	0.0062 U	0.0064 U	0.0063 U
Carbon Tetrachloride	0.76	22	0.0025 U	0.0023 U	0.0022 U	0.0025 U	0.0026 U	0.0025 U
Chlorobenzene	1.1	500	0.0063 UJ	0.0058 UJ	0.0056 UJ	0.0062 UJ	0.0064 UJ	0.0063 UJ
Chloroethane	- -	- -	0.0063 U	0.0058 U	0.0056 U	0.0062 U	0.0064 U	0.0063 U
Chloroform	0.37	350	0.0063 U	0.0058 U	0.0056 U	0.0062 U	0.0064 U	0.0063 U
Chloromethane	- -	- -	0.0063 U	0.0058 U	0.0056 U	0.0062 U	0.0064 U	0.0063 U
cis-1,2-Dichloroethene	0.25	500	0.0063 U	0.0058 U	0.0056 U	0.0062 U	0.0064 U	0.0063 U
cis-1,3-Dichloropropene	- -	- -	0.0063 U	0.0058 U	0.0056 U	0.0062 U	0.0064 U	0.0063 U
Dibromochloromethane	- -	- -	0.0063 U	0.0058 U	0.0056 U	0.0062 U	0.0064 U	0.0063 U
Ethylbenzene	1	390	0.0050 U	0.0046 U	0.0045 U	0.0049 U	0.0051 U	0.0050 U
Methyl tert-butyl ether	0.93	500	0.0063 UJ	0.0058 UJ	0.0056 UJ	0.0062 UJ	0.0064 UJ	0.0063 UJ
Methylene Chloride	0.05	500	0.0038 UJ	0.0035 UJ	0.0034 UJ	0.0037 UJ	0.0038 UJ	0.0038 UJ
Styrene	- -	- -	0.0063 UJ	0.0058 UJ	0.0056 UJ	0.0062 UJ	0.0064 UJ	0.0063 UJ
Tetrachloroethene	1.3	150	0.0012 U	0.0012 U	0.0011 U	0.0012 U	0.0013 U	0.0012 U
Toluene	0.7	500	0.0063 U	0.00090 J	0.0056 U	0.0062 U	0.0064 U	0.0063 U
Total BTEX	- -	- -	0.0011 J	0.0020 J	0.00070 J	ND	ND	0.0018
Total VOCs	- -	- -	0.0011 J	0.034 J	0.060 J	ND	0.20	0.045
trans-1,2-Dichloroethene	0.19	500	0.0063 U	0.0058 U	0.0056 U	0.0062 U	0.0064 U	0.0063 U
trans-1,3-Dichloropropene	- -	- -	0.0063 U	0.0058 U	0.0056 U	0.0062 U	0.0064 U	0.0063 U
Trichloroethene	0.47	200	0.0012 U	0.0012 U	0.0011 U	0.0012 U	0.0013 U	0.0012 U
Vinyl Chloride	0.02	13	0.0063 U	0.0058 U	0.0056 U	0.0062 U	0.0064 U	0.0063 U
Xylene (Total)	0.26	500	0.0063 UJ	0.0058 UJ	0.0056 UJ	0.0062 UJ	0.0064 UJ	0.0063 UJ
SVOCs (mg/Kg)								
1,2,4-Trichlorobenzene	- -	- -	8.7 U	0.040 U	0.039 U	0.043 U	0.044 U	0.044 U
1,2-Dichlorobenzene	1.1	500	87 U	0.40 U	0.39 U	0.43 U	0.44 U	0.44 U
1,3-Dichlorobenzene	2.4	280	87 U	0.40 U	0.39 U	0.43 U	0.44 U	0.44 U
1,4-Dichlorobenzene	1.8	130	87 U	0.40 U	0.39 U	0.43 U	0.44 U	0.44 U
2,4-Dinitrotoluene	- -	- -	17 U	0.080 U	0.079 U	0.087 U	0.088 U	0.088 U
2,6-Dinitrotoluene	- -	- -	17 U	0.080 U	0.079 U	0.087 U	0.088 U	0.088 U
2-Chloronaphthalene	- -	- -	87 U	0.40 U	0.39 U	0.43 U	0.44 U	0.44 U
2-Methylnaphthalene	- -	- -	15 J	0.068 J	0.019 J	0.028 J	0.20 J	0.063 J
2-Nitroaniline	- -	- -	170 U	0.80 U	0.79 U	0.87 U	0.88 U	0.88 U
3,3'-Dichlorobenzidine	- -	- -	170 UJ	0.80 UJ	0.79 UJ	0.87 UJ	0.88 UJ	0.88 UJ
3-Nitroaniline	- -	- -	170 U	0.80 U	0.79 U	0.87 U	0.88 U	0.88 U
4-Bromophenyl-phenylether	- -	- -	87 U	0.40 U	0.39 U	0.43 U	0.44 U	0.44 U
4-Chloroaniline	- -	- -	87 U	0.40 U	0.39 U	0.43 U	0.44 U	0.44 U
4-Chlorophenyl-phenylether	- -	- -	87 U	0.40 U	0.39 U	0.43 U	0.44 U	0.44 U
4-Nitroaniline	- -	- -	170 U	0.80 U	0.79 U	0.87 U	0.88 U	0.88 U
Acenaphthene	20	500	**26 J**	0.077 J	0.015 J	0.036 J	0.15 J	0.060 J
Acenaphthylene	100	500	**110**	0.15 J	0.030 J	0.026 J	0.58	0.17 J
Anthracene	100	500	**190**	0.27 J	0.053 J	0.075 J	0.86	0.38 J
Benzo(a)anthracene	1	5.6	**130**	0.76	0.21	0.32	**2.8**	**1.4**
Benzo(a)pyrene	1	1	**140**	0.84	0.34	0.50	**3.4**	**1.7**
Benzo(b)fluoranthene	1	5.6	**66**	0.64	0.31	0.38	**3.0**	**1.3**
Benzo(g,h,i)perylene	100	500	46 J	0.24 J	0.13 J	0.12 J	0.90	0.63

See Notes on Page 2.

Table 4. Comparison of Surface Soil Analytical Results to Commercial SCOs, Remedial Investigation, New York State Electric & Gas Corporation, Geneva (Wadsworth Street) Former MGP Site, Geneva, New York

Sample ID: Sample Depth (feet): Date Collected:	Unrestricted Use SCOs	Restricted Use SCOs Commercial	SS-1 0 - 0.2 12/07/05	SS-2 0 - 0.2 12/07/05	SS-3 0 - 0.2 12/07/05	SS-4 0 - 0.2 12/07/05	SS-5 0 - 0.2 12/07/05	SS-6 0 - 0.2 12/07/05
SVOCs (mg/Kg) (Cont'd.)								
Benzo(k)fluoranthene	0.8	56	**98 J**	**0.86 J**	0.36 J	0.56 J	**3.4 J**	**1.8 J**
bis(2-Chloroethoxy)methane	- -	- -	87 U	0.40 U	0.39 U	0.43 U	0.44 U	0.44 U
bis(2-Chloroethyl)ether	- -	- -	8.7 U	0.040 U	0.039 U	0.043 U	0.044 U	0.044 U
bis(2-chloroisopropyl)ether	- -	- -	87 U	0.40 U	0.39 U	0.43 U	0.44 U	0.44 U
bis(2-Ethylhexyl)phthalate	- -	- -	87 U	0.091 J	0.091 J	0.089 J	0.51	0.44 U
Butylbenzylphthalate	- -	- -	87 U	0.40 U	0.39 U	0.43 U	0.44 U	0.44 U
Carbazole	- -	- -	87 U	0.094 J	0.041 J	0.044 J	0.32 J	0.11 J
Chrysene	1	56	**140**	0.82	0.29 J	0.35 J	**3.1**	**1.5**
Dibenz(a,h)anthracene	0.33	0.56	**1.8 J**	0.030 J	0.016 J	0.043 U	0.088	0.071
Dibenzofuran	7	350	**30 J**	0.049 J	0.013 J	0.020 J	0.15 J	0.070 J
Diethylphthalate	- -	- -	87 U	0.40 U	0.39 U	0.43 U	0.44 U	0.44 U
Dimethylphthalate	- -	- -	87 U	0.40 U	0.39 U	0.43 U	0.44 U	0.44 U
Di-n-butylphthalate	- -	- -	87 U	0.40 U	0.39 U	0.43 U	0.44 U	0.44 U
Di-n-octylphthalate	- -	- -	87 U	0.40 U	0.39 U	0.43 U	0.44 U	0.44 U
Fluoranthene	100	500	**360**	1.6	0.44	0.46	5.0	2.1
Fluorene	30	500	**120**	0.10 J	0.017 J	0.024 J	0.24 J	0.083 J
Hexachlorobenzene	0.33	6	8.7 U	0.040 U	0.039 U	0.043 U	0.044 U	0.044 U
Hexachlorobutadiene	- -	- -	17 U	0.080 U	0.079 U	0.087 U	0.088 U	0.088 U
Hexachlorocyclopentadiene	- -	- -	87 UJ	0.40 UJ	0.39 UJ	0.43 UJ	0.44 UJ	0.44 UJ
Hexachloroethane	- -	- -	8.7 U	0.040 U	0.039 U	0.043 U	0.044 U	0.044 U
Indeno(1,2,3-cd)pyrene	0.5	5.6	**37**	0.22	0.14	0.14	**1.0**	**0.66**
Isophorone	- -	- -	87 U	0.40 U	0.39 U	0.43 U	0.44 U	0.44 U
Naphthalene	12	500	6.6 J	0.16 J	0.033 J	0.032 J	0.34 J	0.26 J
Nitrobenzene	- -	- -	8.7 UJ	0.040 UJ	0.039 UJ	0.043 UJ	0.044 UJ	0.044 UJ
N-Nitroso-di-n-propylamine	- -	- -	8.7 U	0.040 U	0.039 U	0.043 U	0.044 U	0.044 U
N-Nitrosodiphenylamine	- -	- -	87 U	0.40 U	0.39 U	0.43 U	0.44 U	0.44 U
Phenanthrene	100	500	**720**	1.1	0.24 J	0.28 J	3.0	1.2
Pyrene	100	500	**500**	1.5 J	0.41	0.42 J	5.2	1.8
Total PAHs	- -	- -	2,700 J	9.4 J	3.1 J	3.8 J	33 J	15 J
Total SVOCs	- -	- -	2,700 J	9.7 J	3.2 J	3.9 J	34 J	15 J
Inorganics (mg/Kg)								
Cyanide, Total	27	27	1.40	0.500 U	0.500 U	0.500 U	2.90	0.500 U

Notes:

1. All concentrations reported in milligrams per kilogram (mg/kg).
2. Restricted Use SCOs Commercial are from NYSDEC Subpart 375-6: Remedial Program Soil Cleanup Objectives, effective December 14, 2006.
3. - - = No SCO given.
4. Shading indicates that the result exceeds the Restricted Use SCO Commercial.
5. Bolded values exceed NYSDEC PART 375 unrestricted use criteria.
6. Results have been validated in accordance with USEPA National Functional Guidelines of October 1999.

Data Qualifiers:

D = Compound quantitated using a secondary dilution.
J = The concentration given is an approximate value.
U = Not detected at or above the associated reporting limit.
ND = Not Detected.

Table 5. Well Construction Details, Remedial Investigation, New York State Electric & Gas Corporation, Geneva (Wadsworth Street) Former MGP Site, Geneva, New York

Location ID	Date Completed	Northing Coordinate ft.	Easting Coordinate ft.	MP Elevation ft. AMSL	Ground Surface Elevation ft. AMSL	Well Diameter in.	Casing/Screen Type	Screen Slot Size in.	Screen Length ft.	Depth to Screened Interval ft. bgs	
										Top	Bottom
MW-1	12/7/05	1046600.56	714267.47	453.49	453.96	2	PVC	0.01	10.0	10.0	20.0
MW-2	12/7/05	1046504.03	714176.95	455.38	456.03	2	PVC	0.01	10.0	12.0	22.0
MW-3	12/8/05	1046407.59	714170.55	456.38	456.71	2	PVC	0.01	10.0	7.0	17.0
MW-4	12/12/05	1046358.79	714050.15	456.03	456.41	2	PVC	0.01	10.0	6.0	16.0
MW-5	12/9/05	1046379.83	714327.06	455.20	455.53	2	PVC	0.01	10.0	12.0	22.0
MW-6	12/8/05	1046294.00	714219.98	456.79	457.16	2	PVC	0.01	10.0	8.0	18.0
MW-7	9/21/06	1046283.18	714103.56	457.20	457.60	2	PVC	0.01	10.0	7.0	17.0
MW-8	9/21/06	1046681.37	714242.67	453.15	453.61	2	PVC	0.01	10.0	10.0	20.0
MW-9	9/18/06	1046576.36	714329.26	453.15	453.50	2	PVC	0.01	10.0	7.0	17.0

Notes:

1. Elevations given in feet above Mean Sea Level (ft. AMSL), 1929 National Geodetic Vertical Datum (NGVD); northing and easting coordinates on New York State Plane, NAD 83.
2. Depths given in feet below ground surface (ft. bgs).
3. Coordinates and elevations of wells surveyed by NYSEG.

MP = Measuring point.

NS = No sump installed at this location.

Table 6. Groundwater Elevation Data, Remedial Investigation, New York State Electric & Gas Corporation, Geneva (Wadsworth Street) Former MGP Site, Geneva, New York

Location ID	MP Elevation ft. AMSL	DTW 12/20/2005	Water Elevation (ft. AMSL) 12/20/2005	DTW 5/26/2006	Water Elevation (ft. AMSL) 5/26/2006	DTW 10/4/2006	Water Elevation (ft. AMSL) 10/4/2006
MW-1	453.49	7.48	446.01	7.31	446.18	10.13	443.36
MW-2	455.38	8.46	446.92	7.29	448.09	9.02	446.36
MW-3	456.38	7.65	448.73	7.77	448.61	7.43	448.95
MW-4	456.03	6.55	449.48	6.78	449.25	6.09	449.94
MW-5	455.20	7.05	448.15	7.36	447.84	8.76	446.44
MW-6	456.79	7.30	449.49	7.62	449.17	6.83	449.96
MW-7	453.15	NM	NM	NM	NM	9.75	443.40
MW-8	453.15	NM	NM	NM	NM	8.45	444.70
MW-9	457.20	NM	NM	NM	NM	7.00	450.20
SG-1	448.18	4.19	443.99	3.65	444.53	3.48	444.70

Notes:

1. MP = Measuring point. Measuring point elevations surveyed by NYSEG.
2. Elevations given in feet Above Mean Sea Level (AMSL), 1929 NGVD.
3. SG-1 represents the elevation of Seneca Lake near the site.
4. NM = Not measured (Well not installed at the time of gauging).

Table 7. Hydraulic Conductivity Values, Remedial Investigation, New York State Electric & Gas Corporation, Geneva (Wadsworth Street) Former MGP Site, Geneva, New York

Well Location	**Screened Interval (feet below grade)**	**Unit Screened**	**Hydraulic Conductivity (feet/day)**
MW-1	10 - 20	silt and clay and fine sand	5.02
MW-2	12 - 22	silt and clay and fine sand	0.11
MW-3	7 - 17	silt and clay	0.027
MW-4	6 - 16	fill and silt and clay	40.7
MW-5	12 - 22	silt and clay and fine sand	0.13
MW-6	8 - 18	silt and clay	13.10
MW-7	7 - 17	silt and clay and fine sand	5.89
MW-8	10 - 20	silt and clay	0.15
MW-9	7 - 17	silt and clay	0.68
Geometric Mean (Silt and Clay Only)			***1.08***
Geometric Mean (Silt and Clay and Fine Sand)			***0.81***
Overall Geometric Mean			***0.95***

Note:

Based on specific capacity test data measured during groundwater sampling.

Hydraulic conductivity values based on evaluation of specific capacity test data using Walton's method (1962).

Table 8. Groundwater Analytical Results, Remedial Investigation, New York State Electric & Gas Corporation, Geneva (Wadsworth Street) Former MGP Site, Geneva, New York

Sample ID:	**NYSDEC TOGS**	**MW-1**	**MW-1**	**MW-2**	**MW-2**	**MW-3**	**MW-3**	**MW-4**	**MW-4**	**MW-5**	**MW-5**	**MW-6**	**MW-6**	**MW-7**	**MW-8**	**MW-9**
Date Collected:		**12/20/05**	**10/05/06**	**12/20/05**	**10/05/06**	**12/20/05**	**10/05/06**	**12/20/05**	**10/04/06**	**12/20/05**	**10/05/06**	**12/20/05**	**10/04/06**	**10/04/06**	**10/05/06**	**10/04/06**
VOCs (ug/L)																
1,1,1-Trichloroethane	5	5.0 U	1.0 U	5.0 U	1.0 U	500 U [250 U]	1.0 U [1.0 U]	5.0 U	1.0 U	5.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,2,2-Tetrachloroethane	5	1.0 U	1.0 U	1.0 U	1.0 U	100 U [50 U]	1.0 U [1.0 U]	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,2-Trichloroethane	1	3.0 U	1.0 U	3.0 U	1.0 U	300 U [150 U]	1.0 U [1.0 U]	3.0 U	1.0 U	3.0 U	1.0 U	3.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethane	5	5.0 U	1.0 U	5.0 U	1.0 U	500 U [250 U]	1.0 U [1.0 U]	5.0 U	1.0 U	5.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethene	5	2.0 U	1.0 U	2.0 U	1.0 U	200 U [100 U]	1.0 U [1.0 U]	2.0 U	1.0 U	2.0 U	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2,4-Trichlorobenzene	5	NA	1.0 U	NA	1.0 U	NA	1.0 U [1.0 U]	NA	1.0 U	NA	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dibromo-3-chloropropane	0.04	NA	1.0 UJ	NA	1.0 UJ	NA	1.0 UJ [1.0 UJ]	NA	1.0 UJ	NA	1.0 UJ	NA	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ
1,2-Dibromoethane	5	NA	1.0 U	NA	1.0 U	NA	1.0 U [1.0 U]	NA	1.0 U	NA	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dichlorobenzene	3	NA	1.0 U	NA	1.0 U	NA	1.0 U [1.0 U]	NA	1.0 U	NA	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dichloroethane	0.6	2.0 U	1.0 U	2.0 U	1.0 U	200 U [100 U]	1.0 U [1.0 U]	2.0 U	1.0 U	2.0 U	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dichloropropane	1	1.0 U	1.0 U	1.0 U	1.0 U	100 U [50 U]	1.0 U [1.0 U]	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,3-Dichlorobenzene	3	NA	1.0 U	NA	1.0 U	NA	1.0 U [1.0 U]	NA	1.0 U	NA	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U
1,4-Dichlorobenzene	3	NA	1.0 U	NA	1.0 U	NA	1.0 U [1.0 U]	NA	1.0 U	NA	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U
2-Butanone	50	5.0 U	5.0 U	5.0 U	5.0 U	500 U [250 U]	2.7 J [3.1 J]	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	22
2-Hexanone	50	5.0 U	5.0 U	5.0 U	5.0 U	500 U [250 U]	5.0 U [5.0 U]	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Methyl-2-Pentanone	- -	5.0 U	5.0 U	5.0 U	5.0 U	500 U [250 U]	5.0 U [5.0 U]	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Acetone	50	5.0 UJ	5.0 U	5.0 UJ	5.0 U	500 UJ [250 UJ]	6.2 [7.5]	5.0 UJ	5.0 U	5.0 UJ	5.0 U	68 J	5.0 U	5.0 U	5.0 U	3.4 J
Benzene	1	1.0 U	1.0 U	1.0 U	1.0 U	7,100 [7,000]	1,600 D [1,900 D]	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Bromodichloromethane	50	1.0 U	1.0 U	1.0 U	1.0 U	100 U [50 U]	1.0 U [1.0 U]	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Bromoform	50	4.0 U	1.0 UJ	4.0 U	1.0 UJ	400 U [200 U]	1.0 UJ [1.0 UJ]	4.0 U	1.0 UJ	4.0 U	1.0 UJ	4.0 U	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ
Bromomethane	5	5.0 U	1.0 UJ	5.0 U	1.0 UJ	500 U [250 U]	1.0 UJ [1.0 UJ]	5.0 U	1.0 UJ	5.0 U	1.0 UJ	5.0 U	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ
Carbon Disulfide	60	5.0 U	1.0 U	5.0 U	1.0 U	500 U [250 U]	1.0 U [1.0 U]	5.0 U	1.0 U	5.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Carbon Tetrachloride	5	2.0 U	1.0 U	2.0 U	1.0 U	200 U [100 U]	1.0 U [1.0 U]	2.0 U	1.0 U	2.0 U	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chlorobenzene	5	5.0 U	1.0 U	5.0 U	1.0 U	500 U [250 U]	0.72 J [0.89 J]	5.0 U	1.0 U	5.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chloroethane	5	5.0 U	1.0 UJ	5.0 U	1.0 UJ	500 U [250 U]	1.0 UJ [1.0 UJ]	5.0 U	1.0 UJ	5.0 U	1.0 UJ	5.0 U	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ
Chloroform	7	5.0 U	1.0 U	5.0 U	1.0 U	500 U [250 U]	1.0 U [1.0 U]	5.0 U	1.0 U	5.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chloromethane	5	5.0 U	1.0 U	5.0 U	1.0 U	500 U [250 U]	1.0 U [1.0 U]	5.0 U	1.0 U	5.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U
cis-1,2-Dichloroethene	5	5.0 U	1.0 U	5.0 U	1.0 U	500 U [250 U]	1.0 U [1.0 U]	5.0 U	1.0 U	5.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U
cis-1,3-Dichloropropene	0.4	5.0 U	1.0 U	5.0 U	1.0 U	500 U [250 U]	1.0 U [1.0 U]	5.0 U	1.0 U	5.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Cyclohexane	- -	NA	1.0 U	NA	1.0 U	NA	3.4 [4.0]	NA	1.0 U	NA	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U
Dibromochloromethane	50	5.0 U	1.0 UJ	5.0 U	1.0 UJ	500 U [250 U]	1.0 UJ [1.0 UJ]	5.0 U	1.0 UJ	5.0 U	1.0 UJ	5.0 U	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ
Dichlorodifluoromethane	- -	NA	1.0 U	NA	1.0 U	NA	1.0 U [1.0 U]	NA	1.0 U	NA	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U
Ethylbenzene	5	4.0 U	1.0 U	4.0 U	1.0 U	680 [730]	220 D [260 D]	4.0 U	1.0 U	4.0 U	1.0 U	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Isopropylbenzene	- -	NA	1.0 U	NA	1.0 U	NA	6.4 [7.2]	NA	1.0 U	NA	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U
Methyl acetate	- -	NA	1.0 UJ	NA	1.0 UJ	NA	1.0 UJ [1.0 UJ]	NA	1.0 UJ	NA	1.0 UJ	NA	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ
Methyl tert-butyl ether	10	5.0 U	1.0 U	5.0 U	1.0 U	500 U [250 U]	1.0 U [1.0 U]	5.0 U	1.0 U	5.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Methylcyclohexane	- -	NA	1.0 U	NA	1.0 U	NA	3.2 [3.8]	NA	1.0 U	NA	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U
Methylene Chloride	5	3.0 U	1.0 UJ	3.0 U	1.0 UJ	300 U [150 U]	1.0 UJ [1.0 UJ]	3.0 U	1.0 UJ	3.0 U	1.0 UJ	3.0 U	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ
Styrene	5	5.0 U	1.0 U	5.0 U	1.0 U	320 J [360]	170 D [160 D]	5.0 U	1.0 U	5.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Tetrachloroethene	5	1.0 UJ	1.0 U	1.0 UJ	1.0 U	100 UJ [50 UJ]	1.0 U [1.0 U]	1.0 UJ	1.0 U	1.0 UJ	1.0 U	1.0 UJ	1.0 U	1.0 U	1.0 U	1.0 U

See Notes on Page 4.

Table 8. Groundwater Analytical Results, Remedial Investigation, New York State Electric & Gas Corporation, Geneva (Wadsworth Street) Former MGP Site, Geneva, New York

Sample ID: Date Collected:	NYSDEC TOGS	MW-1 12/20/05	MW-1 10/05/06	MW-2 12/20/05	MW-2 10/05/06	MW-3 12/20/05	MW-3 10/05/06	MW-4 12/20/05	MW-4 10/04/06	MW-5 12/20/05	MW-5 10/05/06	MW-6 12/20/05	MW-6 10/04/06	MW-7 10/04/06	MW-8 10/05/06	MW-9 10/04/06
VOCs (ug/L) (continued)																
Toluene	5	5.0 U	1.0 U	5.0 U	1.0 U	4,300 [4,300]	1,400 D [1,400 D]	5.0 U	1.0 U	5.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Total BTEX	- -	ND	ND	ND	ND	20,000 [20,000]	5,400 [6,100]	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total VOCs	- -	ND	ND	ND	ND	20,000 J [21,000]	5,600 J [6,300 J]	ND	ND	ND	ND	68 J	ND	ND	ND	25 J
trans-1,2-Dichloroethene	5	5.0 U	1.0 U	5.0 U	1.0 U	500 U [250 U]	1.0 U [1.0 U]	5.0 U	1.0 U	5.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U
trans-1,3-Dichloropropene	0.4	5.0 U	1.0 U	5.0 U	1.0 U	500 U [250 U]	1.0 U [1.0 U]	5.0 U	1.0 U	5.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Trichloroethene	5	1.0 U	1.0 U	1.0 U	1.0 U	100 U [50 U]	1.0 U [1.0 U]	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Trichlorofluoromethane	- -	NA	1.0 U	NA	1.0 U	NA	1.0 U [1.0 U]	NA	1.0 U	NA	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U
Vinyl Chloride	2	5.0 U	1.0 U	5.0 U	1.0 U	500 U [250 U]	1.0 U [1.0 U]	5.0 U	1.0 U	5.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Xylene (Total)	5	5.0 U	3.0 U	5.0 U	3.0 U	7,900 [8,100]	2,200 D [2,500 D]	5.0 U	3.0 U	5.0 U	3.0 U	5.0 U	3.0 U	3.0 U	3.0 U	3.0 U
SVOCs (ug/L)																
1,2,4-Trichlorobenzene	5	1.0 U	10 U	1.0 U	10 U	21 U [21 U]	10 U [98 U]	1.0 U	10 U	1.0 U	10 U	1.0 U	10 U	10 U	10 U	10 U
1,2-Dichlorobenzene	3	10 U	10 U	10 U	10 U	210 U [210 U]	10 U [98 U]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,3-Dichlorobenzene	3	10 U	10 U	10 U	10 U	210 U [210 U]	10 U [98 U]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,4-Dichlorobenzene	3	10 U	10 U	10 U	10 U	210 U [210 U]	10 U [98 U]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4,5-Trichlorophenol	1	NA	10 U	NA	10 U	NA	10 U [98 U]	NA	10 U	NA	10 U	NA	10 U	10 U	10 U	10 U
2,4,6-Trichlorophenol	1	NA	10 U	NA	10 U	NA	10 U [98 U]	NA	10 U	NA	10 U	NA	10 U	10 U	10 U	10 U
2,4-Dichlorophenol	1	NA	10 U	NA	10 U	NA	10 U [98 U]	NA	10 U	NA	10 U	NA	10 U	10 U	10 U	10 U
2,4-Dimethylphenol	1	NA	10 U	NA	10 U	NA	130 [190]	NA	10 U	NA	10 U	NA	10 U	10 U	10 U	10 U
2,4-Dinitrophenol	1	NA	48 U	NA	49 U	NA	48 U [490 U]	NA	49 U	NA	48 U	NA	49 U	50 U	49 U	51 U
2,4-Dinitrotoluene	5	2.1 U	10 U	2.1 U	10 U	42 U [41 U]	10 U [98 U]	2.1 U	10 U	2.1 U	10 U	2.0 U	10 U	10 U	10 U	10 U
2,6-Dinitrotoluene	5	2.1 U	10 U	2.1 U	10 U	42 U [41 U]	10 U [98 U]	2.1 U	10 U	2.1 U	10 U	2.0 U	10 U	10 U	10 U	10 U
2-Chloronaphthalene	10	10 U	10 U	10 U	10 U	210 U [210 U]	10 U [98 U]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Chlorophenol	1	NA	10 U	NA	10 U	NA	10 U [98 U]	NA	10 U	NA	10 U	NA	10 U	10 U	10 U	10 U
2-Methylnaphthalene	- -	10 U	10 U	10 U	10 U	290 [320]	130 [110]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Methylphenol	1	NA	10 U	NA	10 U	NA	110 [150]	NA	10 U	NA	10 U	NA	10 U	10 U	10 U	10 U
2-Nitroaniline	5	21 U	48 U	21 U	49 U	420 U [410 U]	48 U [490 U]	21 U	49 U	21 U	48 U	20 U	49 U	50 U	49 U	51 U
2-Nitrophenol	1	NA	10 U	NA	10 U	NA	10 U [98 U]	NA	10 U	NA	10 U	NA	10 U	10 U	10 U	10 U
3,3'-Dichlorobenzidine	5	21 U	19 U	21 U	20 U	420 U [410 U]	19 U [200 U]	21 U	20 U	21 U	19 U	20 U	20 U	20 U	20 U	20 U
3-Nitroaniline	5	21 U	48 U	21 U	49 U	420 U [410 U]	48 U [490 U]	21 U	49 U	21 U	48 U	20 U	49 U	50 U	49 U	51 U
4-Bromophenyl-phenylether	- -	10 U	10 U	10 U	10 U	210 U [210 U]	10 U [98 U]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chloro-3-methylphenol	1	NA	10 U	NA	10 U	NA	10 U [98 U]	NA	10 U	NA	10 U	NA	10 U	10 U	10 U	10 U
4-Chloroaniline	5	10 U	10 U	10 U	10 U	210 U [210 U]	10 U [98 U]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chlorophenyl-phenylether	- -	10 U	10 U	10 U	10 U	210 U [210 U]	10 U [98 U]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Methylphenol	1	NA	10 U	NA	10 U	NA	130 [160]	NA	10 U	NA	10 U	NA	10 U	10 U	10 U	10 U
4-Nitroaniline	5	21 U	48 U	21 U	49 U	420 U [410 U]	48 U [490 U]	21 U	49 U	21 U	48 U	20 U	49 U	50 U	49 U	51 U
4-Nitrophenol	1	NA	48 U	NA	49 U	NA	48 U [490 U]	NA	49 U	NA	48 U	NA	49 U	50 U	49 U	51 U
Acenaphthene	20	10 U	10 U	10 U	10 U	16 J [19 J]	6.0 J [6.0 J]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Acenaphthylene	- -	10 U	10 U	10 U	10 U	54 J [66 J]	50 [34 J]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Anthracene	50	10 U	10 U	10 U	10 U	210 U [11 J]	3.0 J [98 U]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U

See Notes on Page 4.

Table 8. Groundwater Analytical Results, Remedial Investigation, New York State Electric & Gas Corporation, Geneva (Wadsworth Street) Former MGP Site, Geneva, New York

Sample ID: Date Collected:	NYSDEC TOGS	MW-1 12/20/05	MW-1 10/05/06	MW-2 12/20/05	MW-2 10/05/06	MW-3 12/20/05	MW-3 10/05/06	MW-4 12/20/05	MW-4 10/04/06	MW-5 12/20/05	MW-5 10/05/06	MW-6 12/20/05	MW-6 10/04/06	MW-7 10/04/06	MW-8 10/05/06	MW-9 10/04/06
SVOCs (ug/L) (continued)																
Benzo(a)anthracene	0.002	1.0 U	10 U	1.0 U	10 U	21 U [21 U]	10 U [98 U]	1.0 U	10 U	1.0 U	10 U	1.0 U	10 U	10 U	10 U	10 U
Benzo(a)pyrene	ND	1.0 U	10 U	1.0 U	10 U	21 U [21 U]	10 U [98 U]	1.0 U	10 U	1.0 U	10 U	1.0 U	10 U	10 U	10 U	10 U
Benzo(b)fluoranthene	0.002	1.0 UJ	10 U	1.0 UJ	10 U	21 UJ [21 UJ]	10 U [98 U]	1.0 UJ	10 U	1.0 UJ	10 U	1.0 UJ	10 U	10 U	10 U	10 U
Benzo(g,h,i)perylene	- -	10 U	10 U	10 U	10 U	210 U [210 U]	10 U [98 U]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(k)fluoranthene	0.002	1.0 UJ	10 U	1.0 UJ	10 U	21 UJ [21 UJ]	10 U [98 U]	1.0 UJ	10 U	1.0 UJ	10 U	1.0 UJ	10 U	10 U	10 U	10 U
bis(2-Chloroethoxy)methane	5	10 U	10 U	10 U	10 U	210 U [210 U]	10 U [98 U]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
bis(2-Chloroethyl)ether	1	1.0 UJ	10 U	1.0 UJ	10 U	21 UJ [21 UJ]	10 U [98 U]	1.0 UJ	10 U	1.0 UJ	10 U	1.0 UJ	10 U	10 U	10 U	10 U
bis(2-chloroisopropyl)ether	5	10 U	10 U	10 U	10 U	210 U [210 U]	10 U [98 U]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
bis(2-Ethylhexyl)phthalate	5	2.8 J	10 U	10 U	10 U	210 U [210 U]	10 U [98 U]	3.3 J	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Butylbenzylphthalate	50	10 U	10 U	10 U	10 U	210 U [210 U]	10 U [98 U]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbazole	- -	10 U	10 U	10 U	10 U	88 J [100 J]	20 [7.0 J]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chrysene	0.002	10 U	10 U	10 U	10 U	210 U [210 U]	10 U [98 U]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dibenz(a,h)anthracene	- -	1.0 U	10 U	1.0 U	10 U	21 U [21 U]	10 U [98 U]	1.0 U	10 U	1.0 U	10 U	1.0 U	10 U	10 U	10 U	10 U
Dibenzofuran	- -	10 U	10 U	10 U	10 U	50 J [55 J]	14 [15 J]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Diethylphthalate	50	10 U	10 U	10 U	10 U	210 U [210 U]	10 U [98 U]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dimethylphthalate	50	10 U	10 U	10 U	10 U	210 U [210 U]	10 U [98 U]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Di-n-butylphthalate	50	10 U	10 U	10 U	10 U	210 U [210 U]	10 U [98 U]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	2.0 J
Di-n-octylphthalate	50	10 U	10 U	10 U	10 U	210 U [210 U]	10 U [98 U]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Fluoranthene	50	10 U	10 U	10 U	10 U	210 U [210 U]	1.0 J [98 U]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Fluorene	50	10 U	10 U	10 U	10 U	48 J [55 J]	15 [15 J]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorobenzene	0.04	1.0 U	10 U	1.0 U	10 U	21 U [21 U]	10 U [98 U]	1.0 U	10 U	1.0 U	10 U	1.0 U	10 U	10 U	10 U	10 U
Hexachlorobutadiene	0.5	2.1 U	10 U	2.1 U	10 U	42 U [41 U]	10 U [98 U]	2.1 U	10 U	2.1 U	10 U	2.0 U	10 U	10 U	10 U	10 U
Hexachlorocyclopentadiene	5	10 UJ	43 U	10 UJ	44 U	210 UJ [210 UJ]	43 U [440 U]	10 UJ	44 U	10 UJ	43 U	10 UJ	44 U	44 U	44 U	46 U
Hexachloroethane	5	1.0 U	10 U	1.0 U	10 U	21 U [21 U]	10 U [98 U]	1.0 U	10 U	1.0 U	10 U	1.0 U	10 U	10 U	10 U	10 U
Indeno(1,2,3-cd)pyrene	0.002	1.0 U	10 U	1.0 U	10 U	21 U [21 U]	10 U [98 U]	1.0 U	10 U	1.0 U	10 U	1.0 U	10 U	10 U	10 U	10 U
Isophorone	50	10 U	10 U	10 U	10 U	210 U [210 U]	10 U [98 U]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Naphthalene	10	10 U	10 U	10 U	10 U	3,600 [4,000]	1,200 DJ [580 J]	10 U	10 U	10 U	10 U	1.3 J	10 U	10 U	10 U	10 U
Nitrobenzene	0.4	1.0 U	10 U	1.0 U	10 U	21 U [21 U]	10 U [98 U]	1.0 U	10 U	1.0 U	10 U	1.0 U	10 U	10 U	10 U	10 U
N-Nitroso-di-n-propylamine	- -	1.0 U	10 U	1.0 U	10 U	21 U [21 U]	10 U [98 U]	1.0 U	10 U	1.0 U	10 U	1.0 U	10 U	10 U	10 U	10 U
N-Nitrosodiphenylamine	50	10 U	10 U	10 U	10 U	210 U [210 U]	10 U [98 U]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Pentachlorophenol	1	NA	48 U	NA	49 U	NA	48 U [490 U]	NA	49 U	NA	48 U	NA	49 U	50 U	49 U	51 U
Phenanthrene	50	10 U	10 U	10 U	10 U	28 J [30 J]	9.0 J [8.0 J]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Phenol	1	NA	10 U	NA	10 U	NA	38 [59 J]	NA	10 U	NA	10 U	NA	10 U	10 U	10 U	10 U
Pyrene	50	10 U	10 U	10 U	10 U	210 U [210 U]	1.0 J [98 U]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Total PAHs	- -	ND	ND	ND	ND	4,000 J [4,500 J]	1,400 J [750 J]	ND	ND	ND	ND	1.3 J	ND	ND	ND	ND
Total SVOCs	- -	2.8 J	ND	ND	ND	4,200 J [4,700 J]	1,500 J [780 J]	3.3 J	ND	ND	ND	1.3 J	ND	ND	ND	2.0 J
Inorganics (ug/L)																
Cyanide, Total	200	140	112 J	340	197 J	600 [580]	259 J [210 J]	10.0 U	48.6 J	10.0 U	10.0 UJ	10.0 U	10.0 UJ	114 J	46.4 J	10.0 UJ

See Notes on Page 4.

Table 8. Groundwater Analytical Results, Remedial Investigation, New York State Electric & Gas Corporation, Geneva (Wadsworth Street) Former MGP Site, Geneva, New York

Notes:

1. All concentrations reported in micrograms per liter (ug/L).
2. Samples were analyzed by Severn Trent Laboratories, Inc. (STL).
3. NYSDEC TOGS = New York State Department of Environmental Conservation Division of Water Technical and Operations Guidance Series (TOGS) No. 1.1.1. Revised March 12, 1998. Modified April 2000.
4. - - = No NYSDEC TOGS 1.1.1 Water Quality Standard or Guidance Value listed.
5. Shaded values indicate the result exceeds NYSDEC TOGS 1.1.1 Water Quality Standard or Guidance Value.
6. Field duplicate sample results are presented in brackets.
7. Results have been validated in accordance with USEPA National Functional Guidelines of October 1999.

Data Qualifiers:

D = Compound quantitated using a secondary dilution.
J = The concentration given is an approximate value.
NA = Not Analyzed.
ND = Not Detected.
U = Not detected at or above the associated reporting limit.

Table 9. Observed and Typical Biota Expected On Site or in the Vicinity of the Site, Remedial Investigation, New York State Electric & Gas Corporation, Geneva (Wadsworth Street) Former MGP Site, Geneva, New York

Common Name	**Scientific Name**
Mammals	
Shrews	*Sorex spp., Blarina spp.*
Raccoon	*Procyon lotor*
Muskrat	*Ondatra zibethicus*
Beaver	*Castor canadensis*
Opossum	*Didelphis marsupialis*
Chipmunk	*Tamias striatus*
Mice	*Peromyscus* spp., *Mus musculus*
Gray squirrel	*Sciurus carolinensis*
Norway rat	*Rattus norvegicus*
Eastern cottontail	*Sylvilagus floridanus*
Woodchuck*	*Marmota monax*
Birds	
Chickadee	*Parus atricapillus*
American crow*	*Corvus brachyrhynchos*
American robin*	*Turdus migratorius*
Barn swallow*	*Hirundo rustica*
Chimney swift*	*Chaetura pelagica*
Common grackle*	*Quiscalus quiscula*
Common goldeneye	*Bucephala clangula*
Mourning dove*	*Zenaida macroura*
Sparrow*	*Spizella* spp.
House sparrow*	*Passer domesticus*
European starling*	*Sturnus vulgaris*
Field sparrow*	*Spizella pusilla*
Goldfinch*	*Carduelis tristis*
Killdeer*	*Charadrius vociferus*
Pigeon*	*Columba livia*
Ring-billed gull*	*Larus delewarensis*
Rough-winged swallow*	*Stelgidopteryx serripennis*
Herring gull*	*Larus argentatus*
Canada goose*	*Branta canadensis*
Common merganser	*Mergus merganser*
Mallard*	*Anas platyrhynchos*
Herptiles	
Eastern garter snake	*Thamnophis sirtalis sirtalis*
American toad	*Bufo americanus*
Fish	
Carp*	*Cyprinus carpio*
White sucker	*Catostomus commersoni*
Brown bullhead	*Ictalurus nebulosus*
Bluntnose minnow*	*Pimephales notatus*
Channel catfish	*Ictalurus punctatus*

See Note on Page 2.

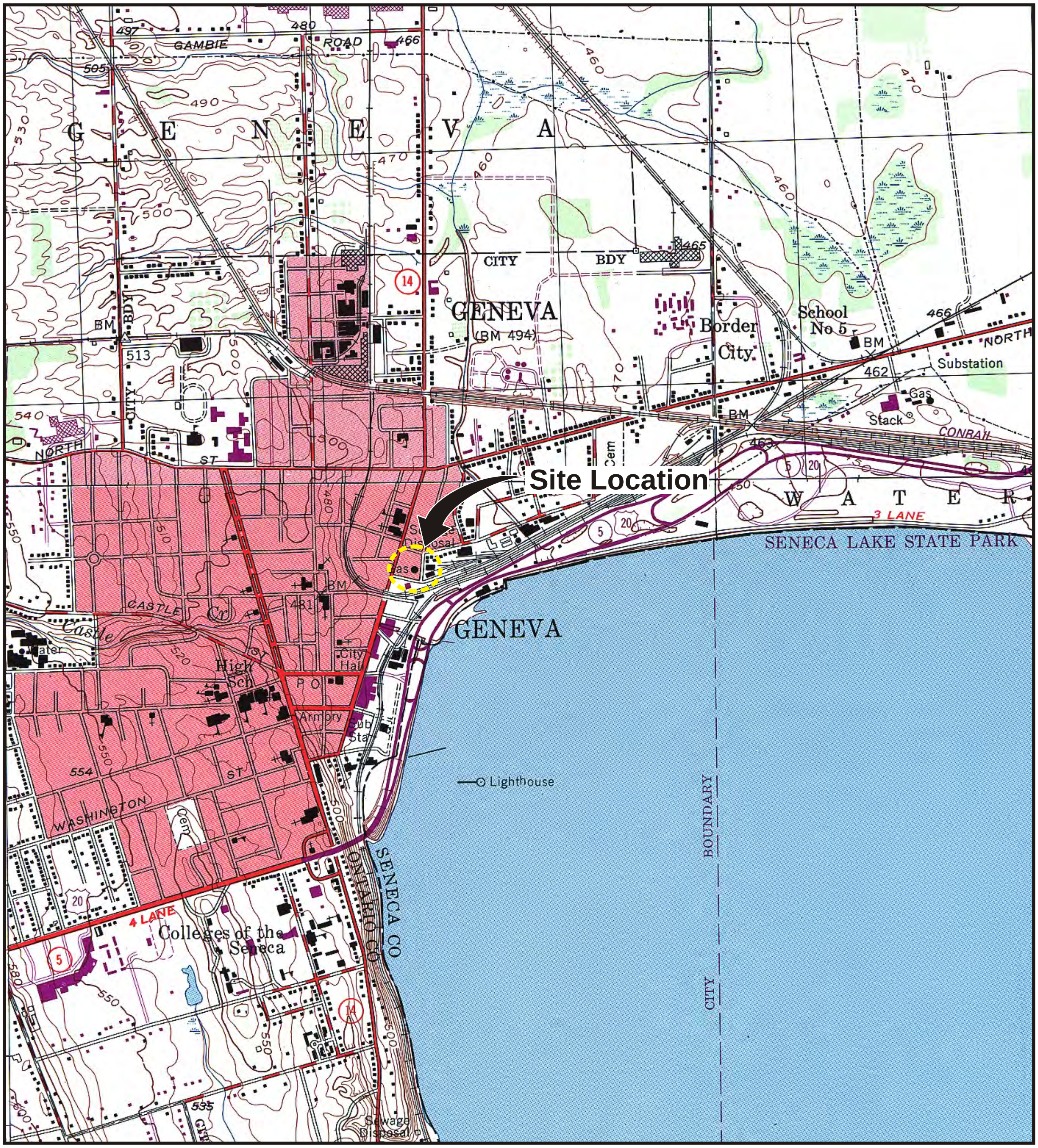
Table 9. Observed and Typical Biota Expected On Site or in the Vicinity of the Site, Remedial Investigation, New York State Electric & Gas Corporation, Geneva (Wadsworth Street) Former MGP Site, Geneva, New York

Common Name	Scientific Name
Fish (continued)	
Largemouth bass*	*Micropterus salmoides*
Lake trout	*Salvelinus namaycush*
Smallmouth bass*	*Micropterus dolomieui*
Yellow perch	*Perca flavescens*
Northern pike	*Esox lucius*
Walleye	*Sander vitreus*
Minnow spp.	*Cyprinidae*
Creek chub	*Semotilus artomaculatus*
Pumpkinseed	*Lepomis gibbosus*
Bluegill*	*Lepomis macrochirus*

Note:

* Observed during ARCADIS BBL's site visit on June 28, 2007. Observations included visual sighting, tracks, den, and/or scat.

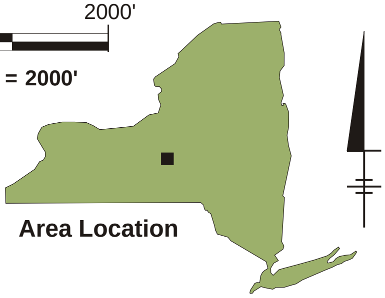
FIGURES



REFERENCE: BASE MAP USGS 7.5 MIN. QUAD., GENEVA S. & GENEVA N., NY, 1953, PHOTOREVISED 1978.

2000' 0 2000'

Approximate Scale: 1" = 2000'



Area Location

NEW YORK STATE ELECTRIC AND GAS
GENEVA (WADSWORTH ST.) FORMER MGP SITE

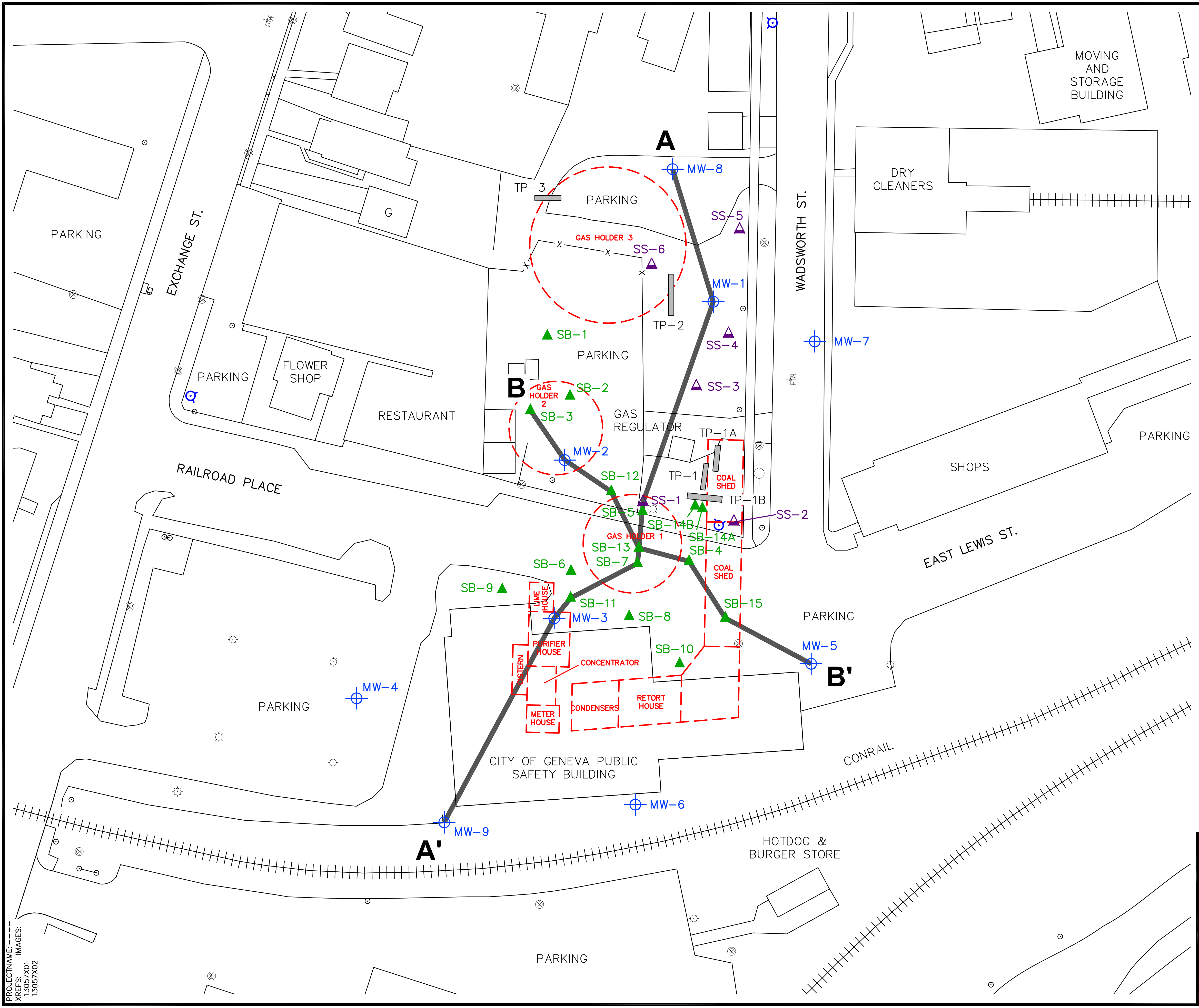
REMEDIAL IMVESTIGATION

SITE LOCATION MAP

ARCADIS BBL
Infrastructure, environment, facilities

FIGURE
1

10/15/07 SYR-D85-DJH
13057002/13057n01.cdr



LEGEND:

⌖	MONITORING WELL LOCATION
▲	SOIL BORING LOCATION
△	SURFACE SOIL LOCATION
▬	TEST PIT LOCATION
——x——	FENCE
┼┼┼┼┼┼┼┼	RAILROAD
–○–	UTILITY POLE W/ GUY
◎	POWER POLE
☼	LIGHT POLE
○ ○○	POST, SIGN
ʘ	HYDRANT
— — — —	FORMER MGP STRUCTURE
MH	MANHOLE
A ━━ A'	LINE OF CROSS SECTION

NOTE:

BASE MAP BASED ON SURVEYS COMPLETED BY NYSEG ON DECEMBER 14, 2005 AND OCTOBER 2006. ELEVATIONS IN REFERENCE TO NGVD 1929, HORIZONTAL DATUM IS NAD 83 STATEPLANE, NEW YORK CENTRAL.

0 60' 120'
GRAPHIC SCALE

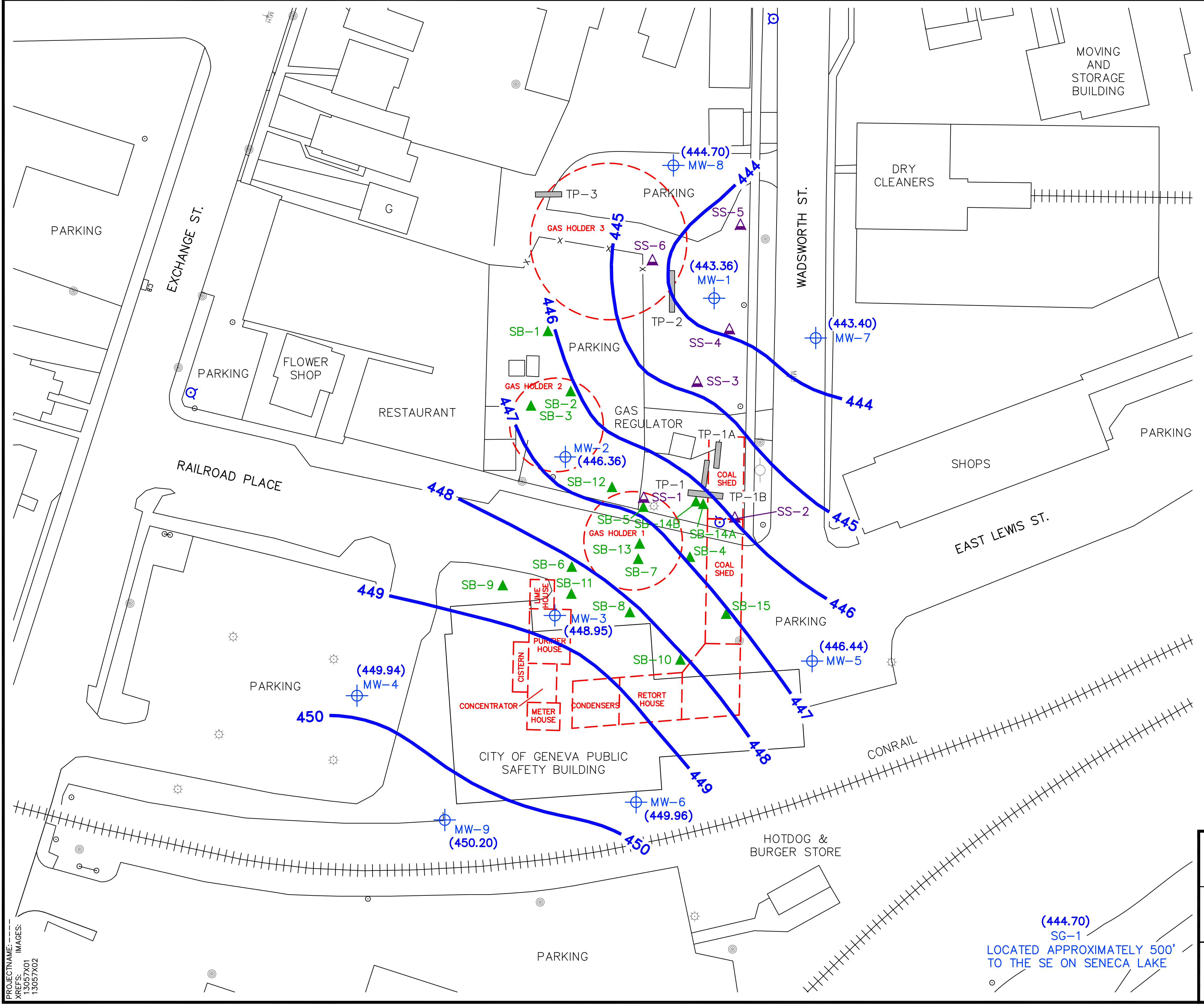
NEW YORK STATE ELECTRIC AND GAS
GENEVA (WADSWORTH ST.) FORMER MGP SITE
REMEDIAL INVESTIGATION

INVESTIGATION LOCATIONS

ARCADIS BBL
infrastructure, environment, facilities

FIGURE
2

[SYR-85-AMS] SYR-85-AMS JHR RCA LAYER: ON=*, OFF=REF, |BOUNDARY, |BOUND-CEN
G:\CAD\ACTIVE\-DWG\ACT\1305005\13057B01.DWG SAVED: 10/31/2007 11:35 AM LAYOUT: Layout PAGESETUP: ---- PENTABLE: PLTFULL.CTB PRINTED: 10/31/2007 11:35 AM BY: RALLEN
PROJECTNAME: ----
XREFS: IMAGES:
13057X01
13057X02



LEGEND:

⌖	MONITORING WELL LOCATION
▲	SOIL BORING LOCATION
△	SURFACE SOIL LOCATION
▬	TEST PIT LOCATION
——x——	FENCE
┼┼┼┼┼┼┼┼	RAILROAD
—○—	UTILITY POLE W/ GUY
◎	POWER POLE
☼	LIGHT POLE
⊙ ⊙⊙	POST, SIGN
⊙	HYDRANT
— — — —	FORMER MGP STRUCTURE
M/H	MANHOLE
446 ———	INFERRED GROUNDWATER ELEVATION CONTOUR
(446.36)	GROUNDWATER ELEVATION

NOTE:

BASE MAP BASED ON SURVEYS COMPLETED BY NYSEG ON DECEMBER 14, 2005 AND OCTOBER 2006. ELEVATIONS IN REFERENCE TO NGVD 1929, HORIZONTAL DATUM IS NAD 83 STATEPLANE, NEW YORK CENTRAL.

0 60' 120'
GRAPHIC SCALE

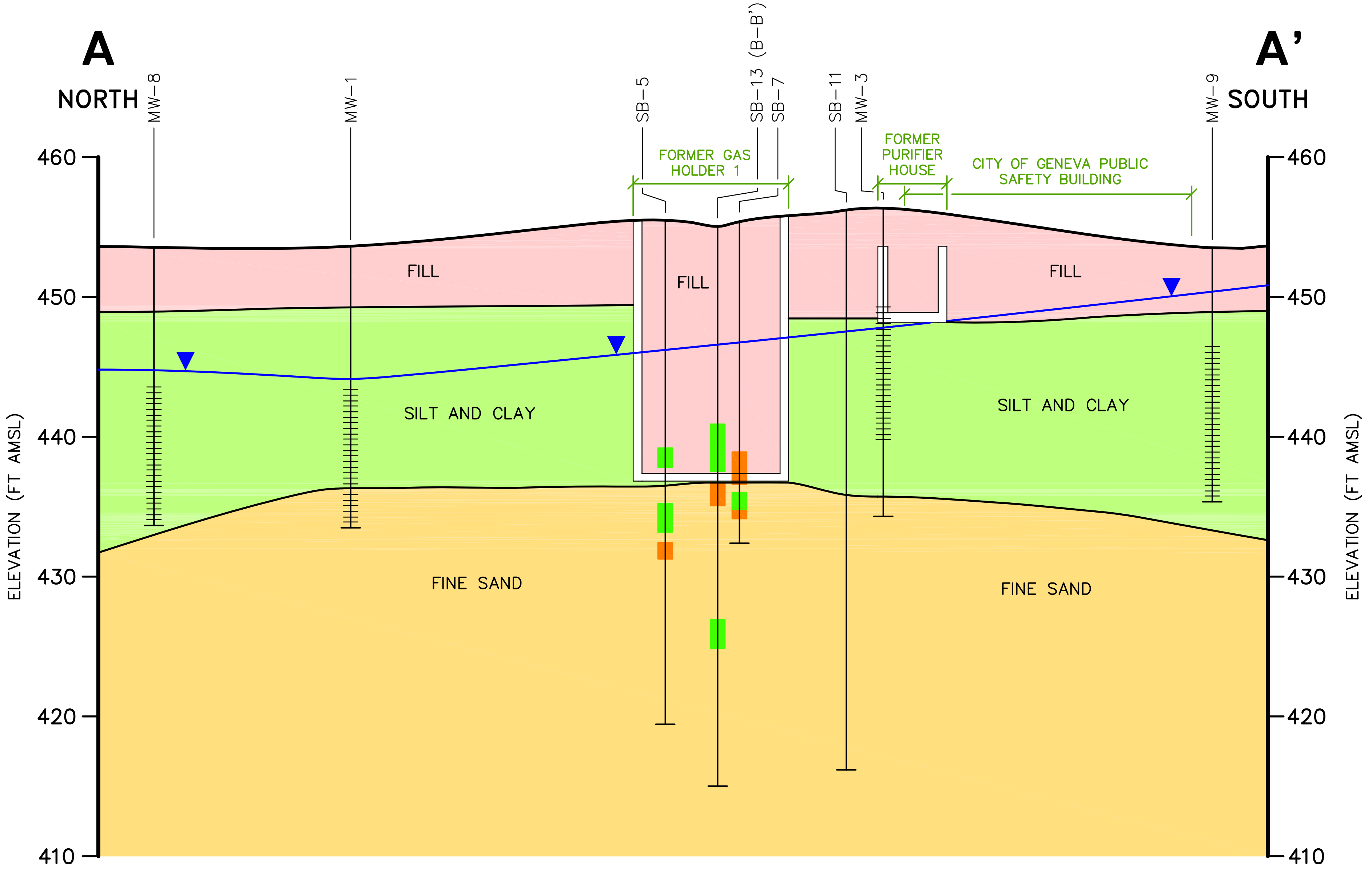
NEW YORK STATE ELECTRIC AND GAS
GENEVA (WADSWORTH ST.) FORMER MGP SITE
REMEDIAL INVESTIGATION

WATER TABLE ELEVATION CONTOURS
OCTOBER 4, 2006

ARCADIS BBL
Infrastructure, environment, facilities

FIGURE
3

[SYR-85-LEAD] SYR-85-AMS GMS RCA LAYER: ON=*, OFF=REF, |BOUNDARY, |BOUND-CEN
G:\CAD\ACTIVE\-DWG\ACT\1305005\13057W01.DWG SAVED:10/31/2007 11:40 AM LAYOUT:Layout PAGESETUP:---- PENTABLE:PLTFULL.CTB PRINTED:10/31/2007 11:41 AM BY:RALLEN
PROJECTNAME:----
XREFS: IMAGES:
13057X01
13057X02



LEGEND:

- MW-9 — WELL OR BORING ID
- GROUND SURFACE
- ▼ APPROXIMATE WATER TABLE
- LITHOLOGIC CONTACT (DASHED WHERE INFERRED)
- SCREEN
- BOTTOM OF BORING
- 🟩 SHEEN
- 🟧 NAPL
- FILL
- SILT AND CLAY
- FINE SAND

NOTE:

ELEVATIONS IN REFERENCE TO NGVD 1929, HORIZONTAL DATUM IS NAD 83 STATEPLANE, NEW YORK CENTRAL.

VERTICAL EXAGGERATION = 6X

0 10' 20'
VERTICAL SCALE

0 60' 120'
HORIZONTAL SCALE

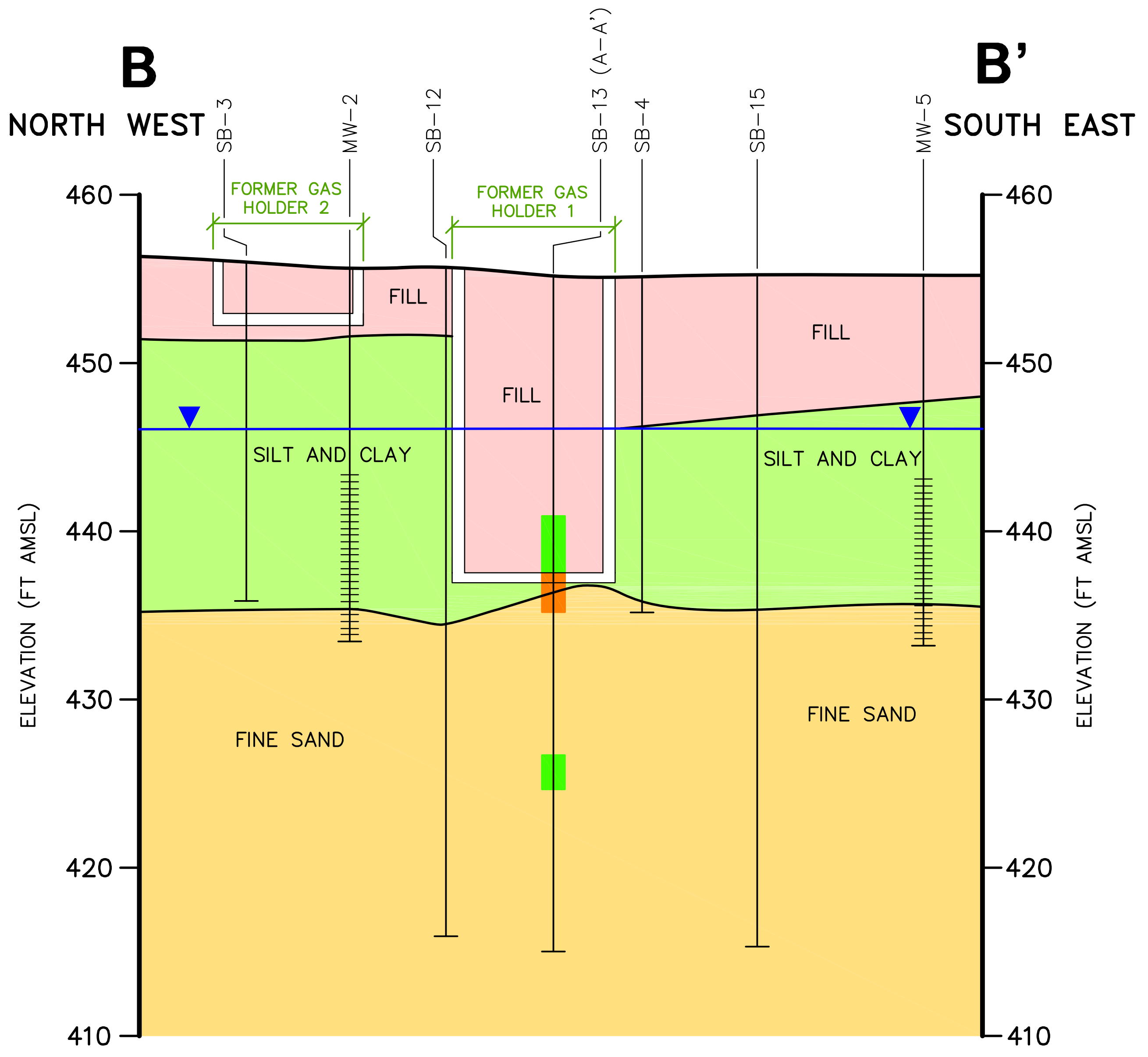
NEW YORK STATE ELECTRIC AND GAS
GENEVA (WADSWORTH ST.) FORMER MGP SITE
REMEDIAL INVESTIGATION

CROSS SECTION A - A'

ARCADIS BBL
infrastructure, environment, facilities

FIGURE
4

[SYR-85-LEAD] SYR-85-AMS JHR RCA LAYER: ON=*, OFF=REF, |BOUNDARY, |BOUND-CEN
G:\CAD\ACTIVE\-DWG\ACT\13057005\13057V01.DWG SAVED:10/18/2007 11:28 AM LAYOUT:Layout PAGESETUP:---- PENTABLE:PLTFULL.CTB PRINTED:10/18/2007 11:28 AM BY:RALLEN
PROJECTNAME:----
XREFS: IMAGES:
13057X01
13057X02



LEGEND:

MW-5 WELL OR BORING ID

GROUND SURFACE

▼ GROUNDWATER

LITHOLOGIC CONTACT (DASHED WHERE INFERRED)

SCREEN

BOTTOM OF BORING

🟩 SHEEN

🟧 NAPL

▨ FILL

▨ SILT AND CLAY

▨ FINE SAND

NOTE:

ELEVATIONS IN REFERENCE TO NGVD 1929, HORIZONTAL DATUM IS NAD 83 STATEPLANE, NEW YORK CENTRAL.

VERTICAL EXAGGERATION = 6X

0 10' 20'

VERTICAL SCALE

0 60' 120'

HORIZONTAL SCALE

NEW YORK STATE ELECTRIC AND GAS
GENEVA (WADSWORTH ST.) FORMER MGP SITE
REMEDIAL INVESTIGATION

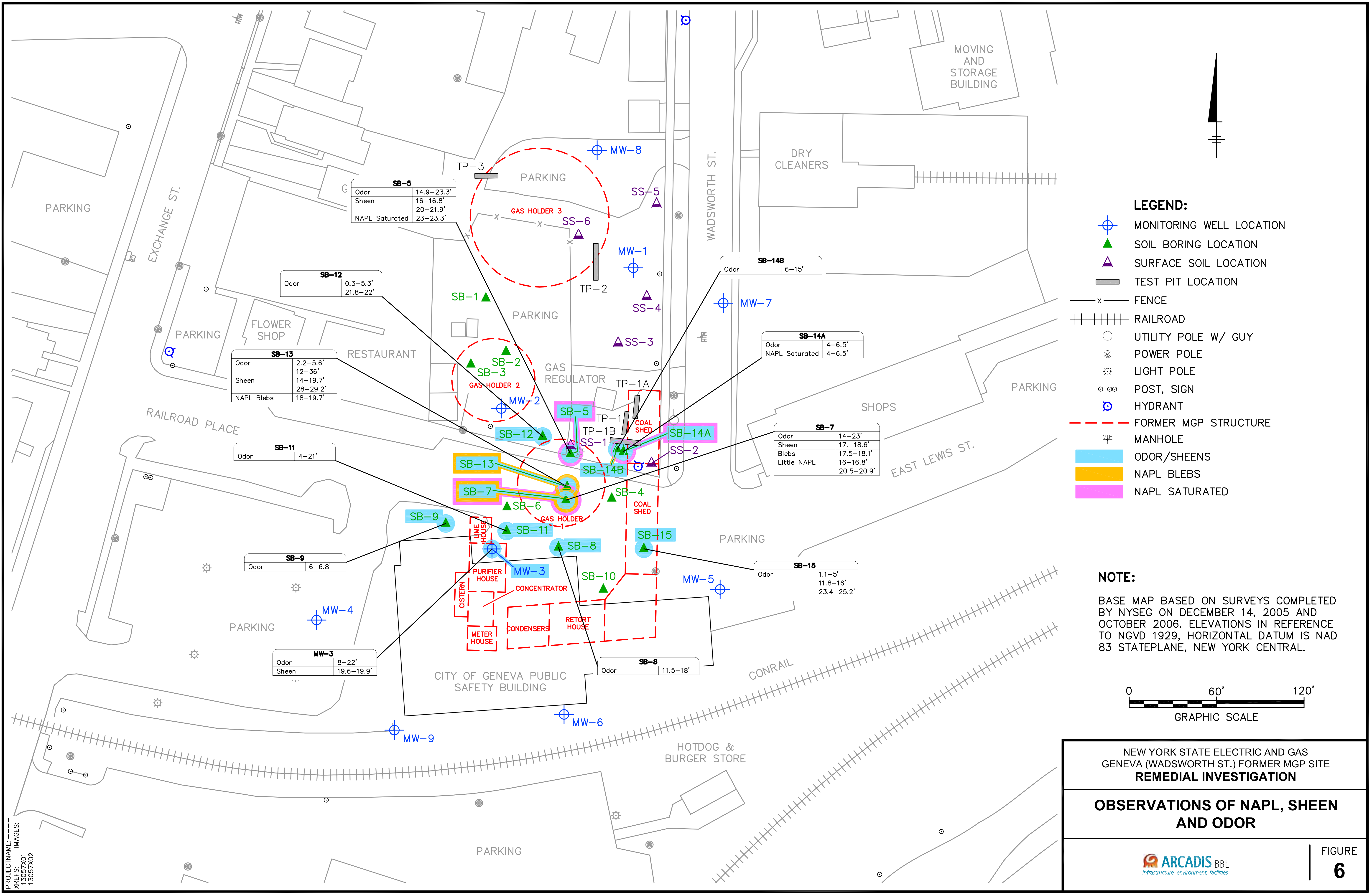
CROSS SECTION B - B'

ARCADIS BBL
infrastructure, environment, facilities

FIGURE
5

[SYR-85-AMS] SYR-85-AMS JHR RCA LAYER: ON=*, OFF=REF, |BOUNDARY, |BOUND-CEN
G:\CAD\ACTIVE\-DWG\ACT\13057005\13057V02.DWG SAVED:10/18/2007 11:31 AM LAYOUT:Layout PAGESETUP:---- PENTABLE:PLTFULL.CTB PRINTED:10/18/2007 11:31 AM BY:RALLEN

PROJECTNAME:----
XREFS: IMAGES:
13057X01
13057X02



SB–5	
Odor	14.9–23.3'
Sheen	16–16.8' 20–21.9'
NAPL Saturated	23–23.3'

SB–12	
Odor	0.3–5.3' 21.8–22'

SB–13	
Odor	2.2–5.6' 12–36'
Sheen	14–19.7' 28–29.2'
NAPL Blebs	18–19.7'

SB–11	
Odor	4–21'

SB–14B	
Odor	6–15'

SB–14A	
Odor	4–6.5'
NAPL Saturated	4–6.5'

SB–7	
Odor	14–23'
Sheen	17.–18.6'
Blebs	17.5–18.1'
Little NAPL	16–16.8' 20.5–20.9'

SB–9	
Odor	6–6.8'

MW–3	
Odor	8–22'
Sheen	19.6–19.9'

SB–8	
Odor	11.5–18'

SB–15	
Odor	1.1–5' 11.8–16' 23.4–25.2'

NOTE:

BASE MAP BASED ON SURVEYS COMPLETED BY NYSEG ON DECEMBER 14, 2005 AND OCTOBER 2006. ELEVATIONS IN REFERENCE TO NGVD 1929, HORIZONTAL DATUM IS NAD 83 STATEPLANE, NEW YORK CENTRAL.

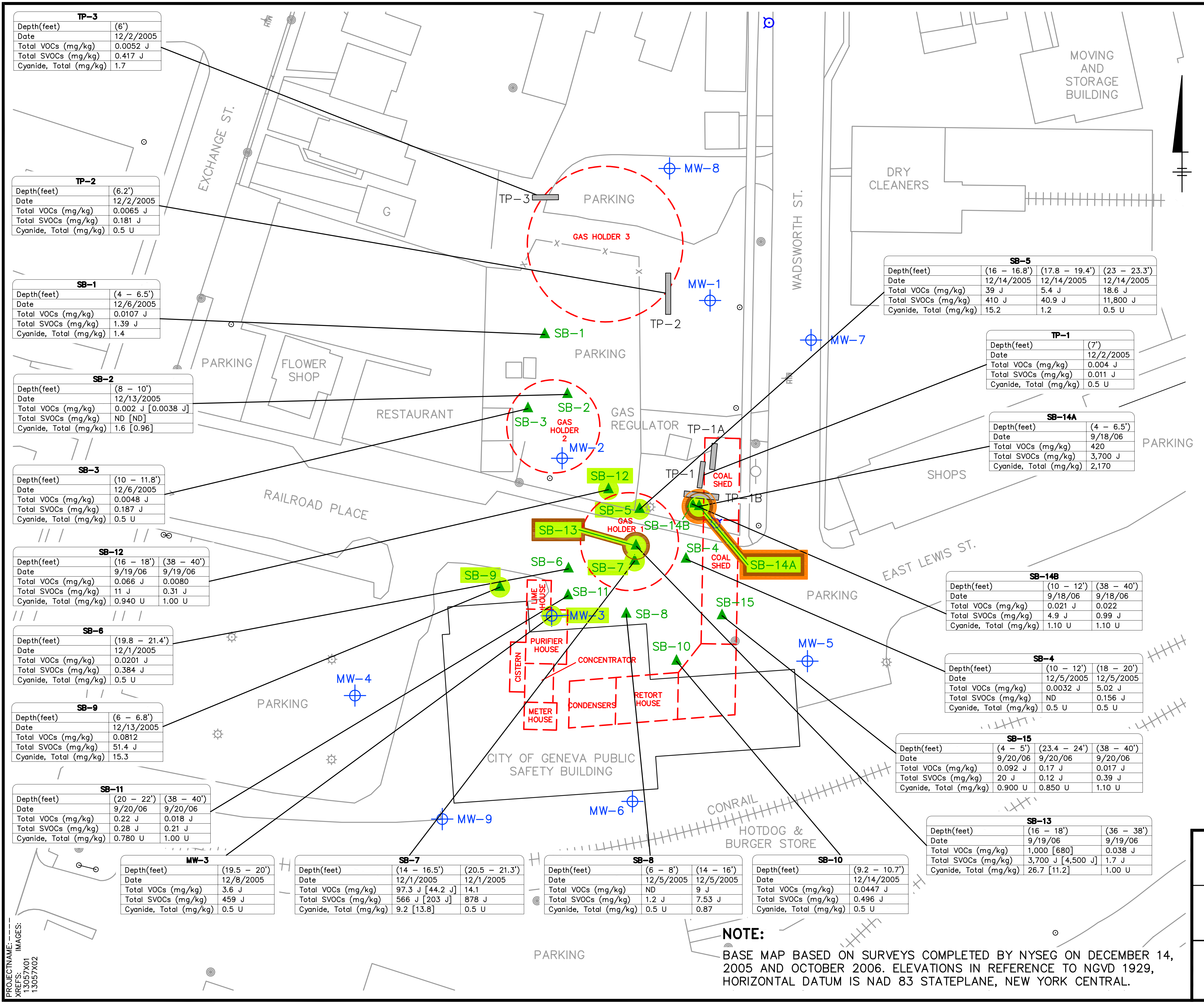
NEW YORK STATE ELECTRIC AND GAS
GENEVA (WADSWORTH ST.) FORMER MGP SITE
REMEDIAL INVESTIGATION

OBSERVATIONS OF NAPL, SHEEN AND ODOR

ARCADIS BBL
infrastructure, environment, facilities

FIGURE
6

[SYR-85-AMS] SYR-85-AMS JHR RCA LAYER: ON=*, OFF=REF, |BOUNDARY, |BOUND-CEN
G:\CAD\ACTIVE\-DWG\ACT\13057005\13057C01.DWG SAVED:10/31/2007 12:46 PM LAYOUT:Layout PAGESETUP:---- PENTABLE:PLTFULL.CTB PRINTED:10/31/2007 12:46 PM BY:RALLEN
PROJECTNAME:----
XREFS: IMAGES:
13057X01
13057X02



TP-3	
Depth(feet)	(6')
Date	12/2/2005
Total VOCs (mg/kg)	0.0052 J
Total SVOCs (mg/kg)	0.417 J
Cyanide, Total (mg/kg)	1.7

TP-2	
Depth(feet)	(6.2')
Date	12/2/2005
Total VOCs (mg/kg)	0.0065 J
Total SVOCs (mg/kg)	0.181 J
Cyanide, Total (mg/kg)	0.5 U

SB-1	
Depth(feet)	(4 – 6.5')
Date	12/6/2005
Total VOCs (mg/kg)	0.0107 J
Total SVOCs (mg/kg)	1.39 J
Cyanide, Total (mg/kg)	1.4

SB-2	
Depth(feet)	(8 – 10')
Date	12/13/2005
Total VOCs (mg/kg)	0.002 J [0.0038 J]
Total SVOCs (mg/kg)	ND [ND]
Cyanide, Total (mg/kg)	1.6 [0.96]

SB-3	
Depth(feet)	(10 – 11.8')
Date	12/6/2005
Total VOCs (mg/kg)	0.0048 J
Total SVOCs (mg/kg)	0.187 J
Cyanide, Total (mg/kg)	0.5 U

SB-12		
Depth(feet)	(16 – 18')	(38 – 40')
Date	9/19/06	9/19/06
Total VOCs (mg/kg)	0.066 J	0.0080
Total SVOCs (mg/kg)	11 J	0.31 J
Cyanide, Total (mg/kg)	0.940 U	1.00 U

SB-6	
Depth(feet)	(19.8 – 21.4')
Date	12/1/2005
Total VOCs (mg/kg)	0.0201 J
Total SVOCs (mg/kg)	0.384 J
Cyanide, Total (mg/kg)	0.5 U

SB-9	
Depth(feet)	(6 – 6.8')
Date	12/13/2005
Total VOCs (mg/kg)	0.0812
Total SVOCs (mg/kg)	51.4 J
Cyanide, Total (mg/kg)	15.3

SB-11		
Depth(feet)	(20 – 22')	(38 – 40')
Date	9/20/06	9/20/06
Total VOCs (mg/kg)	0.22 J	0.018 J
Total SVOCs (mg/kg)	0.28 J	0.21 J
Cyanide, Total (mg/kg)	0.780 U	1.00 U

MW-3	
Depth(feet)	(19.5 – 20')
Date	12/8/2005
Total VOCs (mg/kg)	3.6 J
Total SVOCs (mg/kg)	459 J
Cyanide, Total (mg/kg)	0.5 U

SB-7		
Depth(feet)	(14 – 16.5')	(20.5 – 21.3')
Date	12/1/2005	12/1/2005
Total VOCs (mg/kg)	97.3 J [44.2 J]	14.1
Total SVOCs (mg/kg)	566 J [203 J]	878 J
Cyanide, Total (mg/kg)	9.2 [13.8]	0.5 U

SB-8		
Depth(feet)	(6 – 8')	(14 – 16')
Date	12/5/2005	12/5/2005
Total VOCs (mg/kg)	ND	9 J
Total SVOCs (mg/kg)	1.2 J	7.53 J
Cyanide, Total (mg/kg)	0.5 U	0.87

SB-10	
Depth(feet)	(9.2 – 10.7')
Date	12/14/2005
Total VOCs (mg/kg)	0.0447 J
Total SVOCs (mg/kg)	0.496 J
Cyanide, Total (mg/kg)	0.5 U

SB-5			
Depth(feet)	(16 – 16.8')	(17.8 – 19.4')	(23 – 23.3')
Date	12/14/2005	12/14/2005	12/14/2005
Total VOCs (mg/kg)	39 J	5.4 J	18.6 J
Total SVOCs (mg/kg)	410 J	40.9 J	11,800 J
Cyanide, Total (mg/kg)	15.2	1.2	0.5 U

TP-1	
Depth(feet)	(7')
Date	12/2/2005
Total VOCs (mg/kg)	0.004 J
Total SVOCs (mg/kg)	0.011 J
Cyanide, Total (mg/kg)	0.5 U

SB-14A	
Depth(feet)	(4 – 6.5')
Date	9/18/06
Total VOCs (mg/kg)	420
Total SVOCs (mg/kg)	3,700 J
Cyanide, Total (mg/kg)	2,170

SB-14B		
Depth(feet)	(10 – 12')	(38 – 40')
Date	9/18/06	9/18/06
Total VOCs (mg/kg)	0.021 J	0.022
Total SVOCs (mg/kg)	4.9 J	0.99 J
Cyanide, Total (mg/kg)	1.10 U	1.10 U

SB-4		
Depth(feet)	(10 – 12')	(18 – 20')
Date	12/5/2005	12/5/2005
Total VOCs (mg/kg)	0.0032 J	5.02 J
Total SVOCs (mg/kg)	ND	0.156 J
Cyanide, Total (mg/kg)	0.5 U	0.5 U

SB-15			
Depth(feet)	(4 – 5')	(23.4 – 24')	(38 – 40')
Date	9/20/06	9/20/06	9/20/06
Total VOCs (mg/kg)	0.092 J	0.17 J	0.017 J
Total SVOCs (mg/kg)	20 J	0.12 J	0.39 J
Cyanide, Total (mg/kg)	0.900 U	0.850 U	1.10 U

SB-13		
Depth(feet)	(16 – 18')	(36 – 38')
Date	9/19/06	9/19/06
Total VOCs (mg/kg)	1,000 [680]	0.038 J
Total SVOCs (mg/kg)	3,700 J [4,500 J]	1.7 J
Cyanide, Total (mg/kg)	26.7 [11.2]	1.00 U

LEGEND:

⌖	MONITORING WELL LOCATION
▲	SOIL BORING LOCATION
▬	TEST PIT LOCATION
—x—	FENCE
┼┼┼┼┼┼	RAILROAD
─○─	UTILITY POLE W/ GUY
◎	POWER POLE
☼	LIGHT POLE
○ ⊖	POST, SIGN
⊙	HYDRANT
– – –	FORMER MGP STRUCTURE
MH	MANHOLE
🟩	SUBSURFACE SOIL SAMPLE FROM THIS LOCATION EXCEEDED THE PART 375 RESTRICTED USE SCOs FOR PROTECTION OF PUBLIC HEALTH–COMMERCIAL USE FOR ONE OR MORE SVOCs
🟫	SUBSURFACE SOIL SAMPLE FROM THIS LOCATION EXCEEDED THE PART 375 RESTRICTED USE SCOs FOR PROTECTION OF PUBLIC HEALTH–COMMERCIAL USE FOR ONE OR MORE VOCs
🟧	SUBSURFACE SOIL SAMPLE FROM THIS LOCATION EXCEEDED THE PART 375 RESTRICTED USE SCOs FOR PROTECTION OF PUBLIC HEALTH–COMMERCIAL USE FOR ONE OR MORE TOTAL CYANIDE

ANALYTICAL NOTES:

U= THE COMPOUND WAS NOT DETECTED AT THE INDICATED CONCENTRATION.

ND= NOT DETECTED.

NA= NOT ANALYZED.

J= DATA INDICATE THE PRESENCE OF A COMPOUND THAT MEETS THE IDENTIFICATION CRITERIA. THE CONCENTRATION GIVEN IS AN APPROXIMATE VALUE.

[ ]= DUPLICATE SAMPLE.

0 60' 120'

GRAPHIC SCALE

NOTE:

BASE MAP BASED ON SURVEYS COMPLETED BY NYSEG ON DECEMBER 14, 2005 AND OCTOBER 2006. ELEVATIONS IN REFERENCE TO NGVD 1929, HORIZONTAL DATUM IS NAD 83 STATEPLANE, NEW YORK CENTRAL.

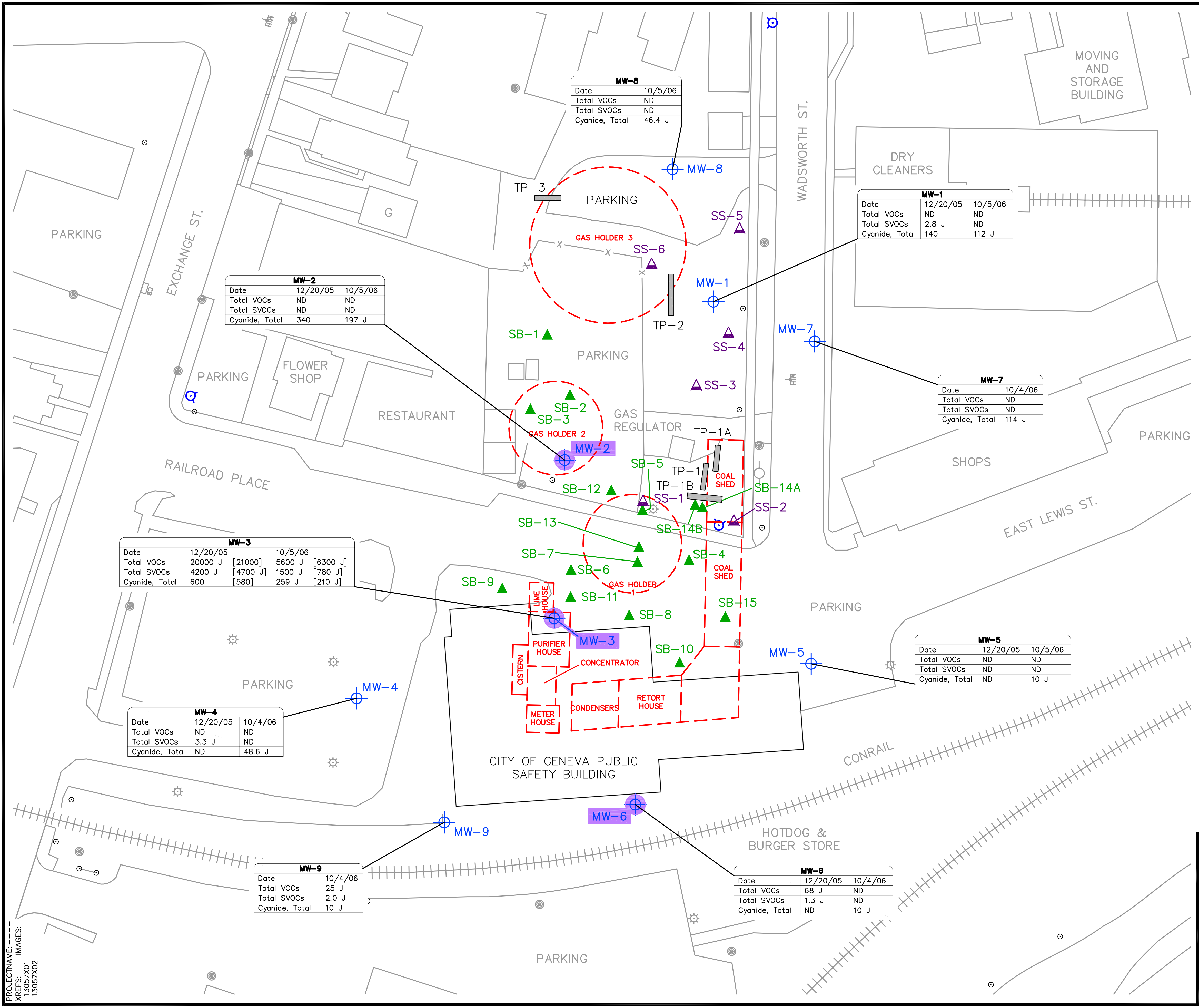
NEW YORK STATE ELECTRIC AND GAS
GENEVA (WADSWORTH ST.) FORMER MGP SITE
REMEDIAL INVESTIGATION

SUBSURFACE SOIL ANALYTICAL RESULTS

ARCADIS BBL
infrastructure, environment, facilities

FIGURE
7

[SYR-85-AMS] SYR-85-AMS JHR RCA LAYER: ON=*, OFF=REF, |BOUNDARY, |BOUND-CEN PAGESETUP:---- PENTABLE:PLTFULL.CTB PRINTED:10/31/2007 12:59 PM BY:RALLEN
G:\CAD\ACTIVE\-DWG\ACT\13057005\13057C02.DWG LAYOUT:Layout SAVED:10/31/2007 12:59 PM
PROJECTNAME:---- IMAGES:
XREFS: 13057X01 13057X02



MW-8	
Date	10/5/06
Total VOCs	ND
Total SVOCs	ND
Cyanide, Total	46.4 J

MW-1		
Date	12/20/05	10/5/06
Total VOCs	ND	ND
Total SVOCs	2.8 J	ND
Cyanide, Total	140	112 J

MW-2		
Date	12/20/05	10/5/06
Total VOCs	ND	ND
Total SVOCs	ND	ND
Cyanide, Total	340	197 J

MW-7	
Date	10/4/06
Total VOCs	ND
Total SVOCs	ND
Cyanide, Total	114 J

MW-3				
Date	12/20/05		10/5/06	
Total VOCs	20000 J	[21000]	5600 J	[6300 J]
Total SVOCs	4200 J	[4700 J]	1500 J	[780 J]
Cyanide, Total	600	[580]	259 J	[210 J]

MW-5		
Date	12/20/05	10/5/06
Total VOCs	ND	ND
Total SVOCs	ND	ND
Cyanide, Total	ND	10 J

MW-4		
Date	12/20/05	10/4/06
Total VOCs	ND	ND
Total SVOCs	3.3 J	ND
Cyanide, Total	ND	48.6 J

MW-9	
Date	10/4/06
Total VOCs	25 J
Total SVOCs	2.0 J
Cyanide, Total	10 J

MW-6		
Date	12/20/05	10/4/06
Total VOCs	68 J	ND
Total SVOCs	1.3 J	ND
Cyanide, Total	ND	10 J

LEGEND:

⊕	MONITORING WELL LOCATION
▲	SOIL BORING LOCATION
△	SURFACE SOIL LOCATION
▬	TEST PIT LOCATION
——x——	FENCE
++++++++	RAILROAD
-○-	UTILITY POLE W/ GUY
◎	POWER POLE
☼	LIGHT POLE
⊙ ⊙⊙	POST, SIGN
⊙	HYDRANT
— — —	FORMER MGP STRUCTURE
MH	MANHOLE
🟪	GROUNDWATER SAMPLE EXCEEDS THE NYSDEC CLASS GA GROUNDWATER STANDARD OR GUIDANCE VALUE (TOGS 1,1,1,) FOR ONE OR MORE VOC/SVOC CONSTITUENTS AND/OR TOTAL CYANIDE.

ANALYTICAL NOTES:

UNITS GIVEN IN ug/L

ND= NOT DETECTED.

J= THE CONCENTRATION GIVEN IS AN APPROXIMATE VALUE.

[ ]= DUPLICATE SAMPLING RESULTS.

NOTE:

BASE MAP BASED ON SURVEYS COMPLETED BY NYSEG ON DECEMBER 14, 2005 AND OCTOBER 2006. ELEVATIONS IN REFERENCE TO NGVD 1929, HORIZONTAL DATUM IS NAD 83 STATEPLANE, NEW YORK CENTRAL.

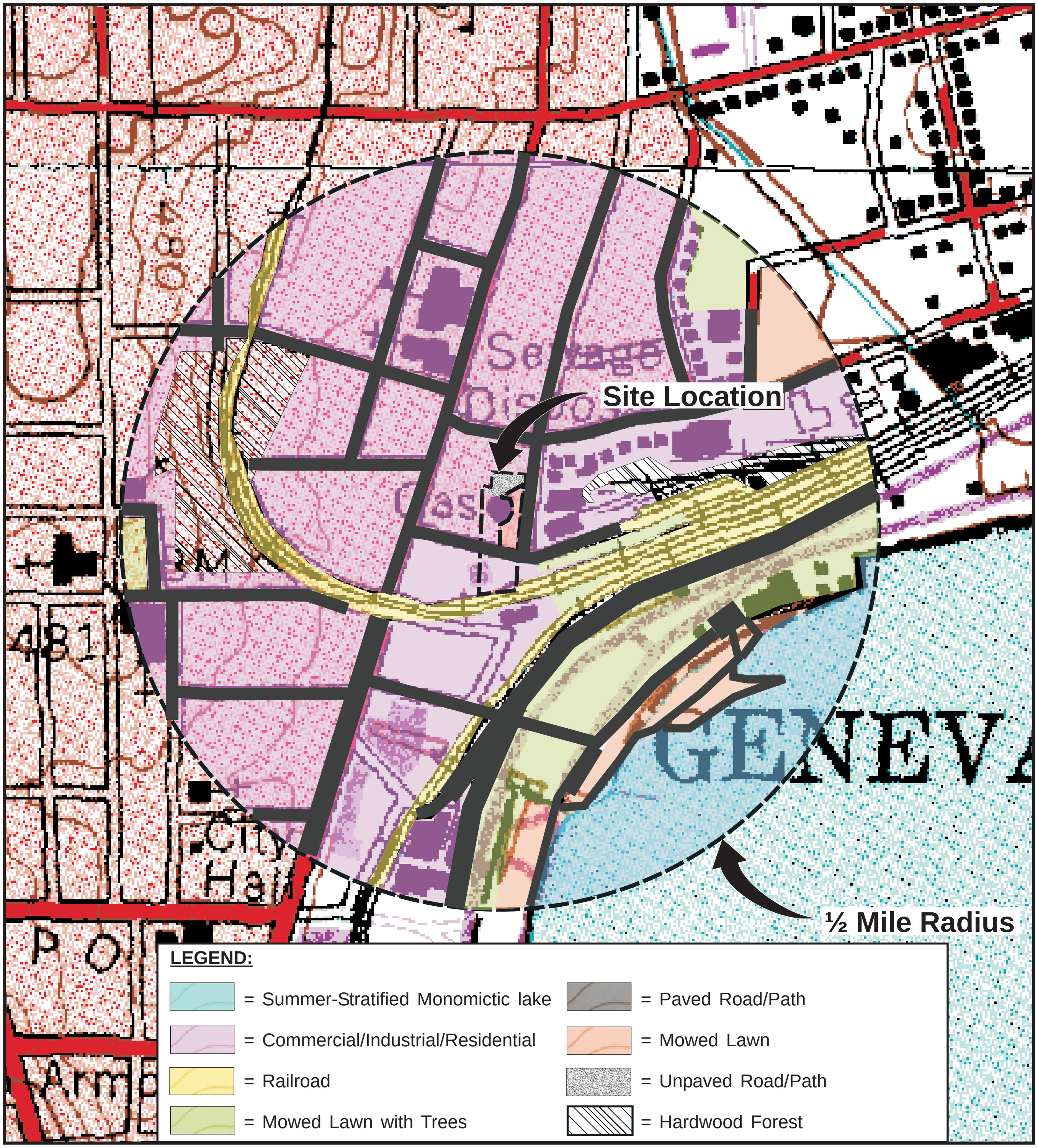
0 60' 120'
GRAPHIC SCALE

NEW YORK STATE ELECTRIC AND GAS
GENEVA (WADSWORTH ST.) FORMER MGP SITE
REMEDIAL INVESTIGATION

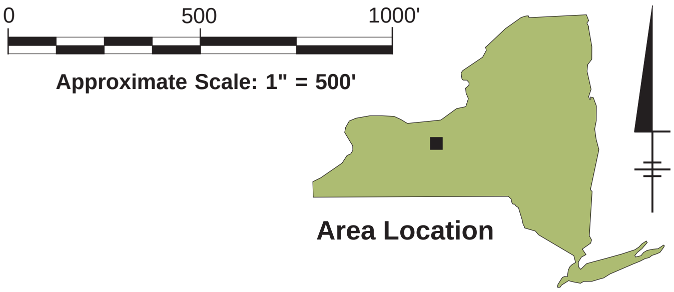
GROUNDWATER ANALYTICAL RESULTS

ARCADIS BBL
infrastructure, environment, facilities

FIGURE
8



REFERENCE: BASE MAP USGS 7.5 MIN. QUAD., GENEVA S. & GENEVA N., NY, 1953, PHOTOREVISED 1978.



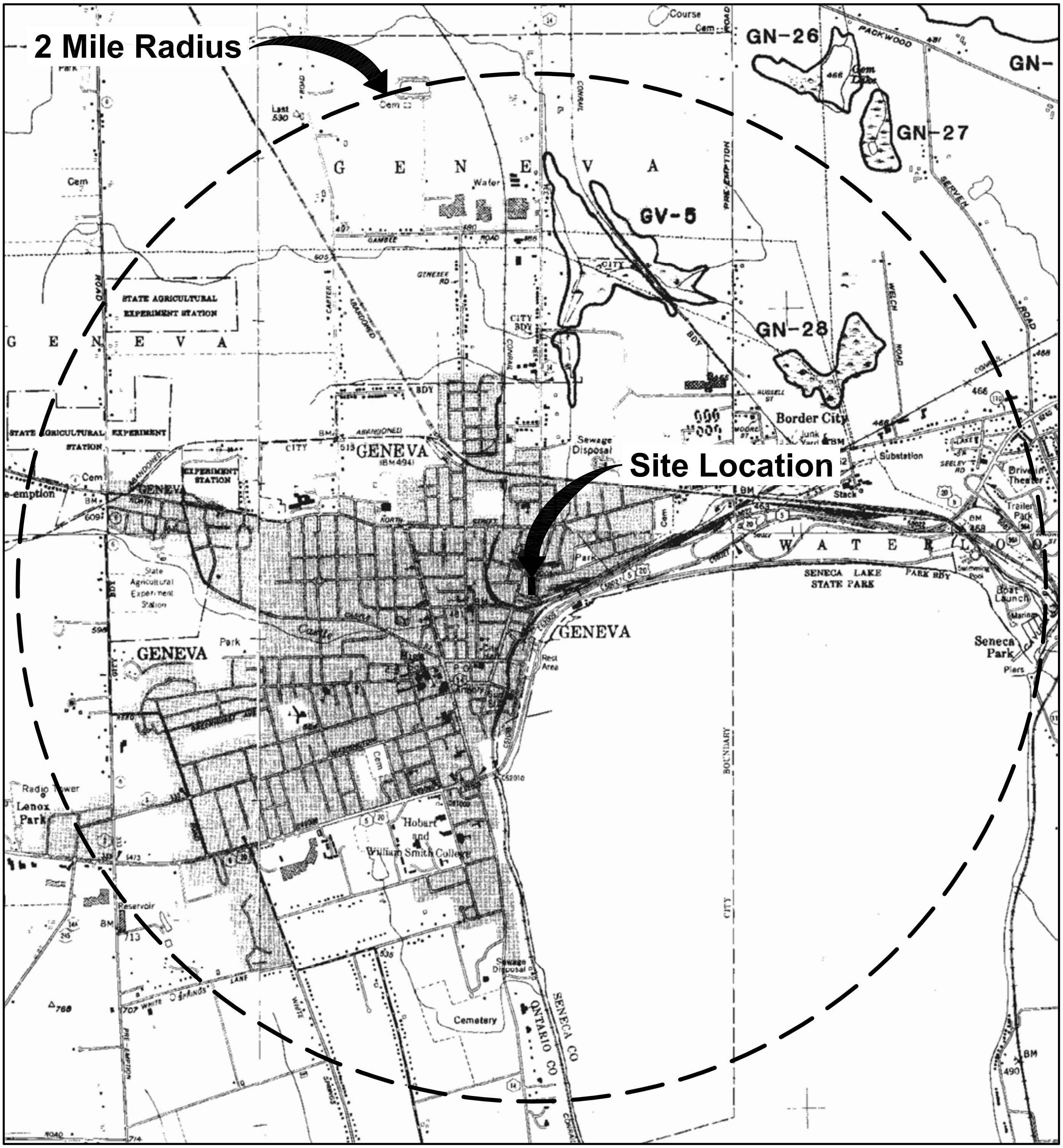
NEW YORK STATE ELECTRIC & GAS GENEVA (WADSWORTH ST.)
FORMER MGP SITE
GENEVA, NEW YORK
REMEDIAL INVESTIGATION

COVERTYPE MAP

ARCADIS BBL
Infrastructure, environment, facilities

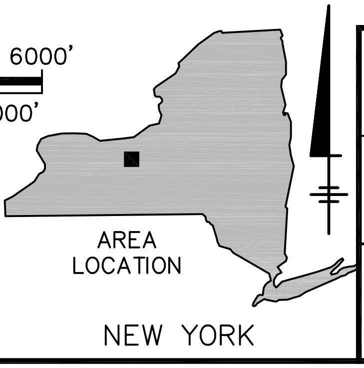
FIGURE
9

10/18/07 SYR-D85-DJH-KLS
13057004/13057n01.cdr



REFERENCE: BASE MAP USGS 7.5. MIN. TOPO. QUADS., GENEVA N. 1978, STANLEY 1979, AND PHELPS 1979, NEW YORK.

0 3000' 6000'
Approximate Scale: 1" = 3000'



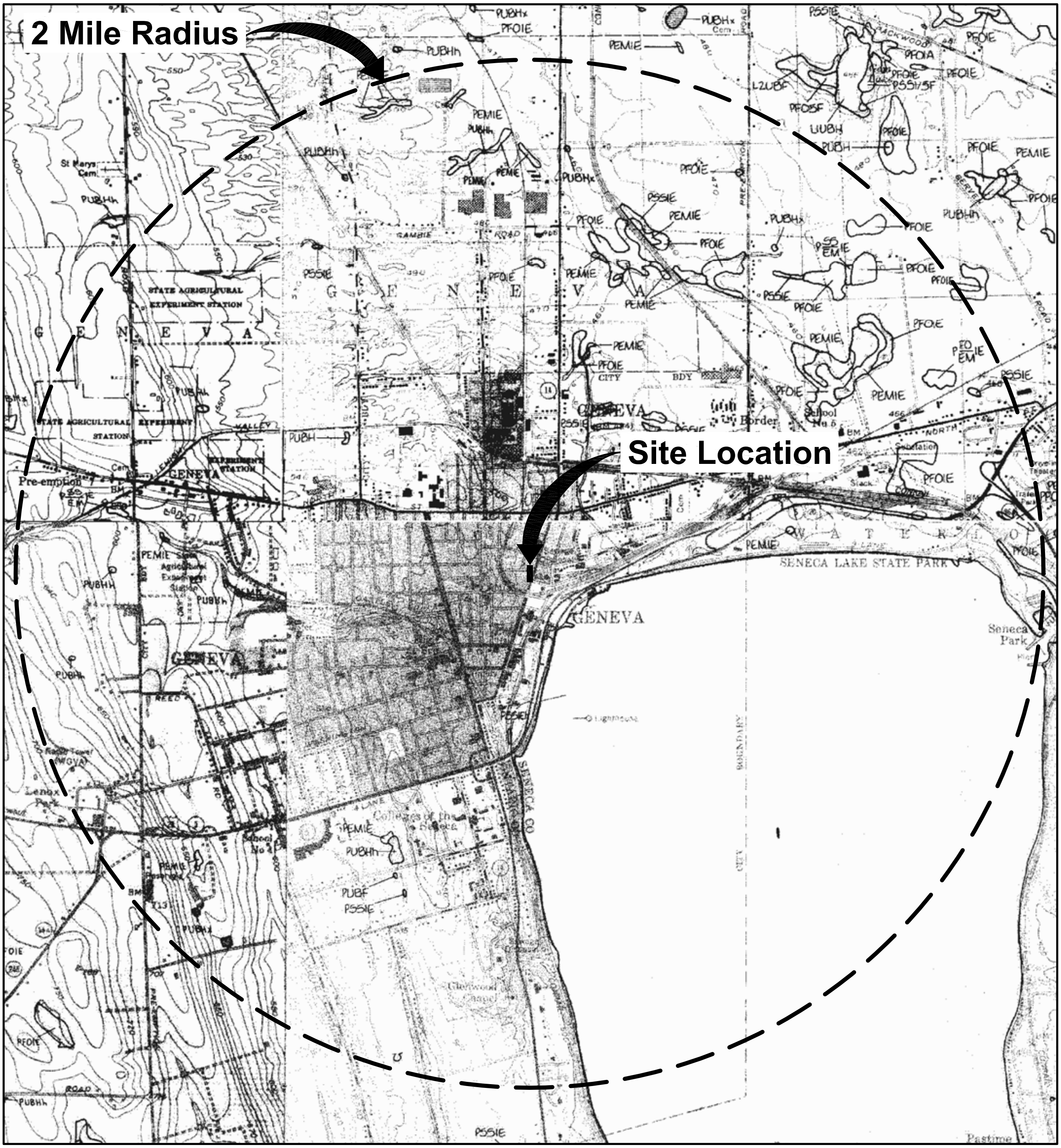
NEW YORK STATE ELECTRIC & GAS GENEVA
(WADSWORTH ST.) FORMER MGP SITE
GENEVA, NEW YORK
REMEDIAL INVESTIGATION

NEW YORK STATE FRESHWATER WETLANDS MAP

ARCADIS BBL
Infrastructure, environment, facilities

FIGURE
10

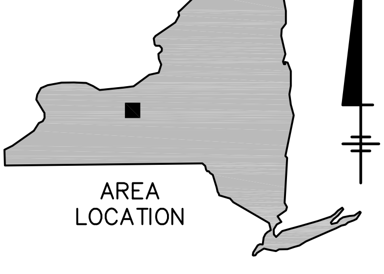
[SYR-85-KLS] SYR-85-KLS LAYER: ON=*; OFF=*REF*
G:\CAD\ACTIVE\-DWG\ACT\13057004\WETLANDS\13057N02.dwg SAVED:10/18/2007 9:12 AM LAYOUT:10 PAGESETUP:---- PENTABLE:PLTFULL.CTB PRINTED:10/18/2007 9:15 AM BY:KSARTORI
PROJECTNAME: ---- IMAGES: FIG-2.tif
XREFS:



2 Mile Radius

Site Location

REFERENCE: BASE MAP USGS 7.5. MIN. TOPO. QUAD., GENEVA S. 1978, GENEVA N. 1978, STANLEY 1979, AND PHELPS 1979, NEW YORK.



NEW YORK STATE ELECTRIC & GAS GENEVA
(WADSWORTH ST.) FORMER MGP SITE
GENEVA, NEW YORK

REMEDIAL INVESTIGATION

U.S. FISH AND WILDLIFE SERVICE NATIONAL WETLANDS INVENTORY MAP

ARCADIS BBL
Infrastructure, environment, facilities

FIGURE
11

[SYR-85-KLS] SYR-85-KLS LAYER: ON=*, OFF=*REF*
G:\CAD\ACTIVE\-DWG\ACT\13057004\WETLANDS\13057N03.DWG SAVED:10/18/2007 9:10 AM LAYOUT:11 PAGESETUP:---- PENTABLE:PLTFULL.CTB PRINTED:10/18/2007 9:10 AM BY:KSARTORI
PROJECTNAME: ----
XREFS: IMAGES: 13057X04.tif

APPENDICES

ARCADIS BBL

Appendix A

Test Pit, Soil Boring, and Monitoring Well Completion Logs

BBL®
BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists

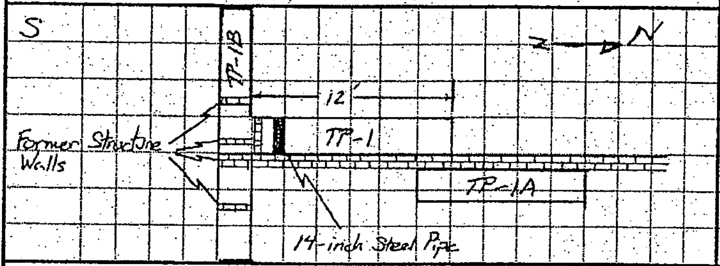
Test Pit Log

Test Pit ID: TP-1

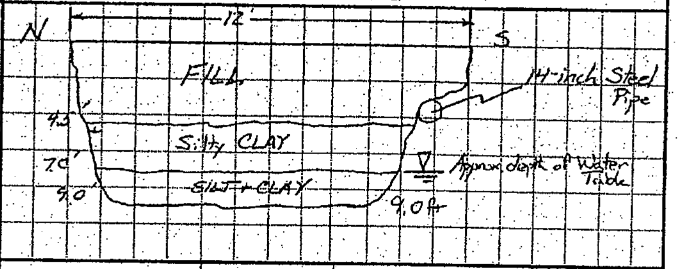
Client:	New York State Electric and Gas	**Date:**	12/2/05
Project:	Geneva Former MGP Site	**Weather:**	Overcast; Breezy; Trace amount of snow
Location:	Wadsworth Street, Geneva, New York	**Temperature:**	30°F
Project #:	13057.003	**NYSDEC Rep:**	Doug MacNeal
Geologist:	David Cornell	**Subcontractor:**	Lyon Drilling
Coordinates:	N: 1046494 E: 714262	**Equipment:**	Case Backhoe

Sketch of Test Pit Layout:

Plan View



Profile View



Test Pit Dimensions:	12' x 2.5'	**Total Depth:**	9.0'	**Depth to Water:**	7.0'

Depth Interval (feet)	PID Screening Result (ppm)	Description of Soil/Material	Samples Collected
0.0' – 4.5'	ND	FILL; (Brown-gray fine to medium SAND, some Brick, little Silt, Concrete, and Cinders). (moist; non-plastic)	None
4.5' – 7.0'	ND	Brown Silty CLAY; slightly mottled. (moist, moderately-plastic); Water table encountered at 7.0 feet bgs.	Soil sample collected at 7.0 ft bgs for VOCs, SVOCs, and Total Cyanide.
7.0' – 9.0'	ND	Gray-brown SILT and CLAY, trace fine Sand seams. (moist to wet, slightly plastic)	None

Notes:

bgs = below ground surface.
ND = Not Detectable.

Soil sample ID: *TP-1 (7.0')*

No noticeable odors observed during advancement of the test pit.

Large metal pipe encountered at the south end of the test pit approximately 3' bgs; running east-west.

Photograph Summary:

#1	TP-1(14inch pipe):14-inch pipe encountered @ TP-1.
#2	TP-1(below pipe): TP-1 southeast wall below pipe.
#3	TP-1 (NE): TP-1 east wall.
#4	TP-1(south): TP-1 looking south.
#5	TP-1(NW): TP-1 looking northwest.
#6	.TP-1: TP-1 looking north.
#7	TP-1A (west): TP-1A looking west.
#8	TP-1A: TP-1A looking north.
#9	TP-1B (wall): Wall encountered in TP-1B.
#10	TP-1B: Initiating TP-1B, looking north.

BBL®
BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists

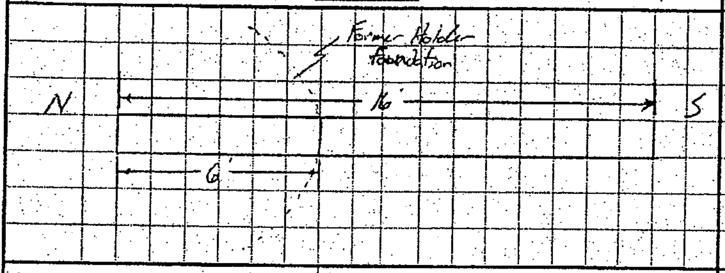
Test Pit Log

Test Pit ID: TP-2

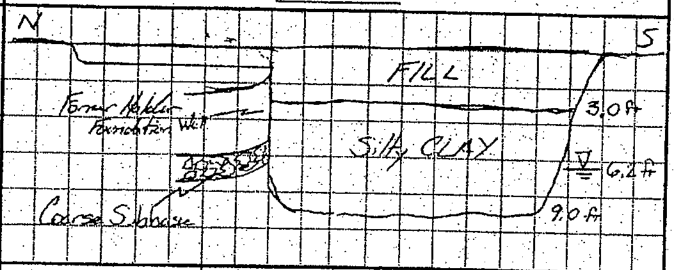
Client:	New York State Electric and Gas	**Date:**	12/2/05
Project:	Geneva Former MGP Site	**Weather:**	Overcast; Breezy; Trace amount of snow
Location:	Wadsworth Street, Geneva, New York	**Temperature:**	30°F
Project #:	13057.003	**NYSDEC Rep:**	Doug MacNeal
Geologist:	David Cornell	**Subcontractor:**	Lyon Drilling
Coordinates:	N: 1046604 E: 714242	**Equipment:**	Case Backhoe

Sketch of Test Pit Layout:

Plan View



Profile View



Test Pit Dimensions:	16' x 2.5'	**Total Depth:**	9.0'	**Depth to Water:**	6.2'

Depth Interval (feet)	PID Screening Result (ppm)	Description of Soil/Material	Samples Collected
0.0' – 3.0'	ND	FILL; (Brown-gray Silty fine SAND and CINDERS, little Slag and Ash-like material. (moist; non-plastic)	None
3.0' – 9.0'	ND	Brown Silty CLAY; slightly mottled. (moist, moderately-plastic); Water table encountered at 6.2 feet bgs. Former holder wall encountered between 1.0 and 5.0 feet bgs (concrete); Coarse gravel (subbase) between 5.0 and 6.2 feet bgs.	Soil sample collected at 6.2 ft bgs for VOCs, SVOCs, and Total Cyanide.

Notes:

bgs = below ground surface.
ND = Not Detectable.

Soil sample ID: *TP-2 (6.2')*

No noticeable odors observed during advancement of the test pit.

Holder wall encountered between 1.0 and 5.0 feet bgs.
Coarse gravel subbase located below holder.

Photograph Summary:

#1	TP-2: Trenching across holder slab, looking south.
#2	TP-2(SW): Trenching at TP-2 looking southwest.
#3	TP-2 (holder): Holder wall on north end of TP-2.
#4	TP-2(holder2): Water draining from coarse subbase below holder wall.
#5	TP-2(holder3): Holder wall and subbase at north end of TP-2.
#6	TP-2 (holder subbase): Coarse subbase below holder.
#7	TP-2 (holder subbase2): Water draining from coarse subbase below holder.

BBL®
BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists

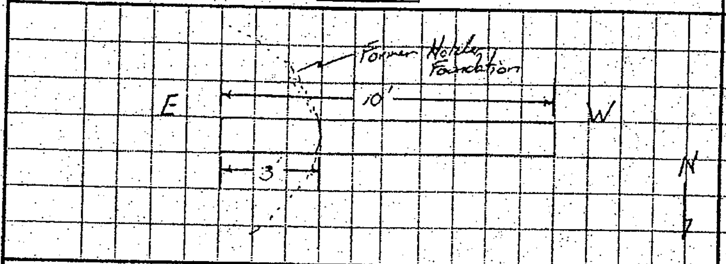
Test Pit Log

Test Pit ID: TP-3

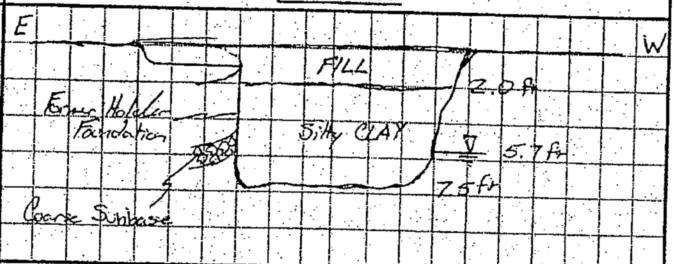
Client:	New York State Electric and Gas	**Date:**	12/2/05
Project:	Geneva Former MGP Site	**Weather:**	Overcast; Breezy; Trace amount of snow
Location:	Wadsworth Street, Geneva, New York	**Temperature:**	30°F
Project #:	13057.003	**NYSDEC Rep:**	Doug MacNeal
Geologist:	David Cornell	**Subcontractor:**	Lyon Drilling
Coordinates:	N: 1046664 E: 714167	**Equipment:**	Case Backhoe

Sketch of Test Pit Layout:

Plan View



Profile View



Test Pit Dimensions:	10' x 2.5'	**Total Depth:** 7.5'	**Depth to Water:** 5.7'

Depth Interval (feet)	PID Screening Result (ppm)	Description of Soil/Material	Samples Collected
0.0' – 2.0'	ND	FILL; (Brown-gray to black CINDERS and SLAG, some fine to coarse Sand, little Ash-like material. (moist; non-plastic)	None
3.0' – 9.0'	ND	Brown Silty CLAY; slightly mottled. (moist, moderately-plastic); Water table encountered at 5.7 feet bgs. Former holder wall encountered between 1.0 and 4.5 feet bgs (concrete); Coarse gravel (subbase) between 4.5 and 5.7 feet bgs.	Soil sample collected at 6.0 ft bgs for VOCs, SVOCs, and Total Cyanide.

Notes:

bgs = below ground surface.

ND = Not Detectable.

Soil sample ID: *TP-2 (6.0')*

No noticeable odors observed during advancement of the test pit.

Holder wall encountered between 1.0 and 4.5 feet bgs.
Coarse gravel subbase located below holder.

Photograph Summary:

#1	TP-3(water): Water encountered during TP-3.
#2	TP-3(holder): Holder wall and subbase in the east end of TP-3; looking east.
#3	TP-3 (holder subbase): Coarse subbase below holder.

Date Start/Finish: 12/6/05
Drilling Company: Lyon Drilling
Driller's Name: Harry Lyon, Cregg Brown
Drilling Method: Hollow Stem Auger
Sampling Method: 2-inch split spoon

Northing: 1046579.69
Easting: 714166.33
Casing Elevation: NA

Borehole Depth: 20' bgs
Surface Elevation: 456.12

Descriptions By: Dave Cornell

Well/Boring ID: **SB-1**

Client: New York State Electric and Gas Corporation

Location: Wadsworth St.
(Former MGP)
Geneva, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
0								ASPHALT and SUBBASE.	
	455	1	0.5-2	1.3	ND			SUBBASE. Brown fine SAND, little fine to coarse sub-rounded Gravel, non-plastic, moist.	
		2	2-4	1.5	ND			Brown-gray fine to medium SAND, some fine to coarse sub-angular Gravel, non-plastic, moist.	
5		3	4-6	0.3	ND				Borehole tremie grouted to grade.
	450	4	6-8	0.5	ND			Gray fine to medium SAND, trace fine to medium sub-rounded Gravel, non-plastic, saturated. (possible slough)	
		5	8-10	1.7	ND			Brown SILT, some Clay, trace Root scars, slightly plastic, wet. Trace fine SAND and SILT seams throughout, non-plastic, saturated.	
10	445	6	10-12	1.9	ND			Brown CLAY, trace Silt, plastic, wet, trace SILT seams throughout, non-plastic, wet.	
		7	12-14	2.0	ND			Brown-gray CLAY, trace Silt, plastic, saturated, trace fine SAND and SILT seams throughout, non-plastic, saturated.	
15		8	14-16	2.0	ND				

ARCADIS BBL
Infrastructure, environment, facilities

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect; WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

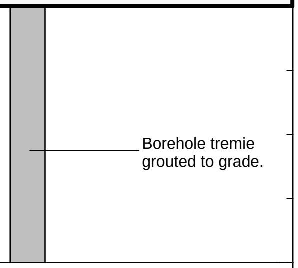
Client: New York State Electric and Gas Corporation

Well/Boring ID: **SB-1**

Borehole Depth: 20' bgs

Site Location:
Wadsworth St.
(Former MGP)
Geneva, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	440	9	16-18	1.6	ND			Brown-gray CLAY, trace Silt, plastic, saturated, trace fine SAND and SILT seams throughout, non-plastic, saturated.	
								Brown Silty fine SAND, trace medium Sand, non-plastic, saturated.	Borehole tremie grouted to grade.
		10	18-20	1.8	ND			Brown-gray Silty CLAY, plastic, saturated.	
20								Brown fine to medium SAND, trace Silt, non-plastic, saturated.	
	435								
25									
	430								
30									
	425								
35									



ARCADIS BBL
Infrastructure, environment, facilities

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect; WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

Date Start/Finish: 12/13/05
Drilling Company: Lyon Drilling
Driller's Name: Harry Lyon, Cregg Brown
Drilling Method: Hollow Stem Auger
Sampling Method: 2-inch split spoon

Northing: 1046543.09
Easting: 714180.19
Casing Elevation: NA

Borehole Depth: 21' bgs
Surface Elevation: 456.11

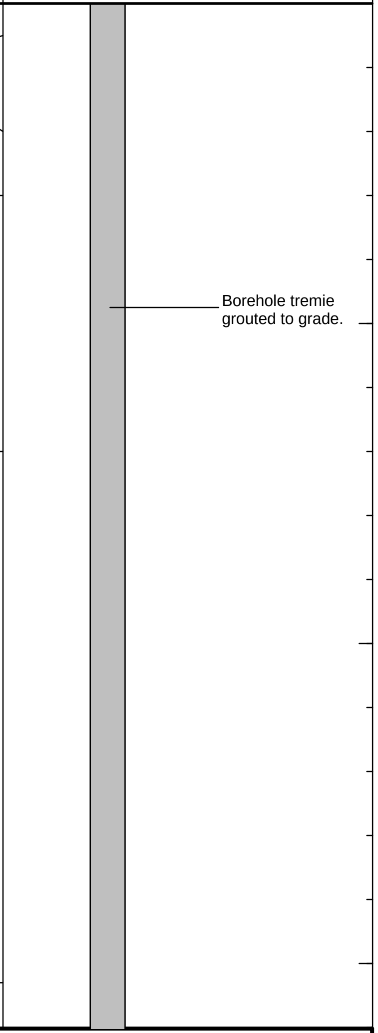
Descriptions By: Dave Cornell

Well/Boring ID: SB-2

Client: New York State Electric and Gas Corporation

Location: Wadsworth St.
(Former MGP)
Geneva, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
0								ASPHALT and SUBBASE.	
	455	1	0.5-2	0.2	ND			SUBBASE.	
		2	2-3	0.3	ND			Brown Silty fine SAND, some fine to medium sub-rounded Gravel, non-plastic, moist. Refusal at 2.3' bgs. Bottom of Holder floor at approximately 2.7' bgs.	
		3	3-5	1.3	ND			Brown Silty CLAY, trace fine Sand and fine Gravel, Concrete fragments in slough, moderately plastic, moist.	
5	450	4	5-7	1.8	ND				Borehole tremie grouted to grade.
		5	7-9	1.8	ND			Brown SILT and CLAY, slightly to moderately plastic, moist. 0.5mm-thick SILT and fine SAND seams throughout.	
10		6	9-11	2.0	ND				
	445	7	11-13	2.0	ND				
		8	13-15	2.0	ND			Color change to gray-brown at 13.6' bgs.	
15		9	15-17	1.9	ND			Gray-brown-pink Silty CLAY, plastic, saturated.	



ARCADIS BBL
Infrastructure, environment, facilities

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect;
WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

Client: New York State Electric and Gas Corporation

Well/Boring ID: SB-2

Site Location:
Wadsworth St.
(Former MGP)
Geneva, NY

Borehole Depth: 21' bgs

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	440	10	15-17	1.9	ND			Gray-brown-pink Silty CLAY, plastic, saturated.	
		11	17-19	2.0	ND			Silty fine SAND seams present below 18.1' bgs.	Borehole tremie grouted to grade.
20		12	19-21	1.2	ND			Gray-brown Silty fine SAND, non-plastic, saturated.	
	435								
25									
	430								
30									
	425								
35									

ARCADIS BBL
Infrastructure, environment, facilities

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect;
WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

Project: 13057.003
Data File:SB-2.dat

Template:G:\Div 11\Rockware\LogPlot 2001\LogFiles\13057\Wadsworth.ldf
Date:10/31/2007 SEK

Date Start/Finish: 12/5/05
Drilling Company: Lyon Drilling
Driller's Name: Harry Lyon, Cregg Brown
Drilling Method: Hollow Stem Auger
Sampling Method: 2-inch split spoon

Northing: 1046442.31
Easting: 714156.02
Casing Elevation: NA

Borehole Depth: 20' bgs
Surface Elevation: 456.08

Descriptions By: Dave Cornell

Well/Boring ID: **SB-3**

Client: New York State Electric and Gas Corporation

Location: Wadsworth St.
(Former MGP)
Geneva, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
0								ASPHALT and SUBBASE.	
	455	1	0.5-2	1.3	ND			Brown Silty fine SAND, some fine to coarse sub-rounded Gravel, little medium Sand, non-plastic, moist. Gray-brown Silty fine SAND, little Brick and medium Sand, trace Cinders, Slag and fine Gravel, non-plastic, moist.	
		2	2-4	0.5	ND			Holder floor from 2.5' - 3.5' bgs. Augered to 4.0' bgs. Dark brown-gray Silty fine SAND and fine to coarse GRAVEL, trace Clay, non-plastic, wet.	
5		3	4-6	1.0	ND			Brown Silty CLAY, moderately plastic, moist.	Borehole tremie grouted to grade.
	450	4	6-8	1.9	ND			Brown Silty CLAY with little Silty fine SAND seams, trace fine to medium sub-angular Gravel, slightly plastic, moist.	
		5	8-10	2.0	ND			Wet at 9.8' bgs.	
10	445	6	10-12	1.8	ND			Brown Silty CLAY, moderately plastic, wet. Silty fine SAND layer from 10.6' - 11.0' bgs, non-plastic, saturated.	
		7	12-14	1.9	ND			Brown CLAY, trace Silt, plastic, wet to saturated. trace fine Sandy SILT seams throughout, non-plastic, saturated. Color change to brown-gray below 13.2' bgs.	
15		8	14-16	1.8	ND			Gray-brown CLAY, trace Silt, plastic, saturated.	

ARCADIS BBL
Infrastructure, environment, facilities

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect; WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

Client: New York State Electric and Gas Corporation

Well/Boring ID: SB-3

Borehole Depth: 20' bgs

Site Location:
Wadsworth St.
(Former MGP)
Geneva, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	440	9	16-18	2.0	ND			Gray-brown CLAY, little Silt, moderately plastic, saturated.	
		10	18-20	1.7	ND			Silty fine SAND layer from 19.1' - 19.4' bgs.	Borehole tremie grouted to grade.
20									
	435								
25									
	430								
30									
	425								
35									

ARCADIS BBL
Infrastructure, environment, facilities

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect;
WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

Date Start/Finish: 12/1/05
Drilling Company: Lyon Drilling
Driller's Name: Harry Lyon, Cregg Brown
Drilling Method: Hollow Stem Auger
Sampling Method: 2-inch split spoon

Northing: 1046442.31
Easting: 714252.71
Casing Elevation: NA

Borehole Depth: 20' bgs
Surface Elevation: 455.12

Descriptions By: Jennifer Sandorf

Well/Boring ID: **SB-4**

Client: New York State Electric and Gas Corporation

Location: Wadsworth St.
(Former MGP)
Geneva, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
0	455							ASPHALT.	
								Light gray-tan fine to coarse SAND, little Silt, little fine to coarse Gravel, moderately loose, moist.	
		1	1-2	0.7	ND			Orange brown SILT, trace black Coal fragments, stiff, non-plastic, dry. Trace red Brick fragments below 2.0' bgs.	
		2	2-4	1.0	ND				
5	450	3	4-6	1.3	ND				Borehole tremie grouted to grade.
		4	6-8	1.6	ND			Trace fine Sand below 6.0' bgs.	
		5	8-10	1.0	ND			Trace red Brick fragments, trace medium to coarse Gravel below 8.0' bgs. Gray-brown Silty CLAY, medium soft, plastic, moist to wet.	
10	445	6	10-12	1.6	ND			Gray-brown SILT, trace Clay and fine Sand, trace dark gray to black mottling, moderately soft, medium plastic, wet.	
		7	12-14	1.4	ND			Pink-gray Silty CLAY, soft, plastic, wet.	
15	440	8	14-16	2.0	ND			1-2mm-thick lens of fine to medium Sand at 14.8' bgs.	

ARCADIS BBL
Infrastructure, environment, facilities

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect;
WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

Client: New York State Electric and Gas Corporation

Well/Boring ID: **SB-4**

Borehole Depth: 20' bgs

Site Location:
Wadsworth St.
(Former MGP)
Geneva, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
		9	16-18	2.0	ND			Pink-gray Silty CLAY, soft, plastic, wet.	Borehole tremie grouted to grade.
		10	18-20	1.6	ND			Brown fine SAND, little Silt, very slight odor, moderately loose, wet.	
20	435								
25	430								
30	425								
35	420								

ARCADIS BBL
Infrastructure, environment, facilities

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect; WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

Date Start/Finish: 12/14/05
Drilling Company: Lyon Drilling
Driller's Name: Harry Lyon, Cregg Brown
Drilling Method: Hollow Stem Auger
Auger Size: 3.25" ID
Rig Type: CME-55
Sampling Method: 2-inch split spoon

Northing: 1046472.76
Easting: 714224.35
Casing Elevation: NA

Borehole Depth: 30' bgs
Surface Elevation: 455.44

Descriptions By: Dave Cornell

Well/Boring ID: **SB-5**

Client: New York State Electric and Gas Corporation

Location: Wadsworth St.
(Former MGP)
Geneva, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
0	455	1	0-2	1.3	20 5 3 2	8	ND		Brown Silty fine SAND, little fine Gravel and Organics, non-plastic, moist.	
		2	2-4	1.4	2 3 3 3	6	ND		Dark gray-black Silty fine SAND, some Cinders, trace Brick and fine Gravel, non-plastic, moist.	
5	450	3	4-6	1.3	2 3 2 3	5	ND		Some Brick below 4.0' bgs.	Borehole tremie grouted to grade.
		4	6-8	0.9	2 2 1 2	3	ND		Very faint odor, wet below 6.0' bgs.	
		5	8-10	1.5	2 1 1 1	2	ND		Brown SILT and CLAY, trace Brick and Cinders, trace fine Sand and fire Brick, slightly plastic, saturated.	
10	445	6	10-12	0.8	1 1 1 1	2	ND		Gray-brown SILT and CLAY, trace fine Sand, slightly plastic, saturated.	
		7	12-14	0.7	2 2 2 1	4	ND			
15	440	8	14-16	1.4	1 3 8 14	11	8.7		Orange BRICK, little fine Gravel and Wood, faint odor, non-plastic, saturated.	

ARCADIS BBL
Infrastructure, environment, facilities

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect; WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

Client: New York State Electric and Gas Corporation

Well/Boring ID: SB-5

Borehole Depth: 30' bgs

Site Location:
Wadsworth St.
(Former MGP)
Geneva, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N - Value	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
		9	16-16.8	0.8	23 50/0.3	NA	232		Gray-brown SILT and BRICK fragments, little fine to medium sub-rounded Gravel, trace Wood and fine Sand, trace Sheen, faint to moderate MGP-like odor, non-plastic, saturated.	
									Auger through holder floor from 16.8' - 17.7' bgs.	
		10	17.8-20	1.7	5 7 7 10	14	5.0		Brown SILT and CLAY, trace fine Sand, faint odor, slightly plastic, saturated. Brown Silty fine SAND, faint odor, non-plastic, saturated.	Borehole tremie grouted to grade.
20	435	11	20-22	1.9	8 7 7 12	14	11.9		Color change to brown-gray, trace sheen below 20' bgs.	
		12	22-24	1.3	WOR WOR WOR 1	WOR	3.5 6.4		Brown-gray Silty CLAY, little fine Gravel, moderately plastic, saturated. Fine to medium SAND with viscous Tar, non-plastic, moist.	
25	430	13	24-26	1.5	1 4 7 16	11	ND		Brown Silty fine to medium SAND, non-plastic, saturated.	
		14	26-28	2.0	15 26 26 24	52	ND		Brown fine SAND, little medium Sand, slight banding, dense, non-plastic, saturated.	
		15	28-30	2.0	5 7 6 7	13	ND		Brown Silty fine SAND, non-plastic, saturated.	
30 35	425 420									

ARCADIS BBL
Infrastructure, environment, facilities

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect; WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

Project Number:13057.003
Data File:SB-5.dat

Template:G:\Div 11\Rockware\LogPlot 2001\LogFiles\13057\Wadsworth.ldf
Date:10/31/2007 SEK

Date Start/Finish: 12/1/05
Drilling Company: Lyon Drilling
Driller's Name: Harry Lyon, Cregg Brown
Drilling Method: Hollow Stem Auger
Auger Size: 3.25" ID
Rig Type: CME-55
Sampling Method: 2-inch split spoon

Northing: 104636.31
Easting: 714180.82
Casing Elevation: NA

Borehole Depth: 22' bgs
Surface Elevation: 455.95

Descriptions By: Dave Cornell

Well/Boring ID: **SB-6**

Client: New York State Electric and Gas Corporation

Location: Wadsworth St.
(Former MGP)
Geneva, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
0									ASPHALT.	
	455								BRICK.	
		1	1-2	1.0	12 10	NA	ND		Gray-brown fine to coarse SAND, some fine to coarse angular Gravel, non-plastic, moderate.	
		2	2-4	1.5	4 6 7 10	13	ND		Brown-gray SILT and CLAY, some Cinders, trace Brick, dense, non-plastic, moist. Orange BRICK.	
5	450	3	4-6	1.7	4 7 8 50/0.2	15	ND		Red-brown Silty fine SAND, some fine to coarse sub-angular Gravel, trace Clay, non-plastic, moist. Orange BRICK. Brown fine to coarse SAND, trace fine Gravel, non-plastic, moist.	Borehole tremie grouted to grade.
									Augered to 7.0' bgs, possible Brick.	
		4	7-9	1.3	1 2 1 2	3	ND		Gray-brown Silty CLAY, moderately plastic, wet.	
		5	9-10	0.5	2 2	NA	ND		Plastic below 9.0' bgs.	
10	445	6	10-12	1.4	1 2 2 3	4	ND		Saturated below 10' bgs.	
		7	12-14	1.8	2 2 2 2	4	ND			
15	440	8	14-16	2.0	WOR WOR WOR 1	WOR	ND		Trace Silty fine SAND seams below 14' bgs.	

ARCADIS BBL
Infrastructure, environment, facilities

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect; WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

Project Number:13057.003
Data File:SB-6.dat

Template:G:\Div 11\Rockware\LogPlot 2001\LogFiles\13057\Wadsworth.ldf
Date:10/31/2007 SEK

Client: New York State Electric and Gas Corporation

Well/Boring ID: **SB-6**

Borehole Depth: 22' bgs

Site Location:
Wadsworth St.
(Former MGP)
Geneva, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N - Value	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
		9	16-18	2.0	WOR 1 WOH 1	1	ND			Borehole tremie grouted to grade.
		10	18-20	2.0	1 3 7 7	10	ND			
20	435	11	20-22	1.4	3 7 9 8	16	ND		Brown-gray fine to medium SAND, faint odor, non-plastic, saturated.	
25	430									
30	425									
35	420									

ARCADIS BBL
Infrastructure, environment, facilities

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect;
WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

Date Start/Finish: 12/1/05
Drilling Company: Lyon Drilling
Driller's Name: Harry Lyon, Cregg Brown
Drilling Method: Hollow Stem Auger
Auger Size: 3.25" ID
Rig Type: CME-55
Sampling Method: 2-inch split spoon

Northing: 1046441.08
Easting: 714221.28
Casing Elevation: NA

Borehole Depth: 23' bgs
Surface Elevation: 455.47

Descriptions By: Dave Cornell

Well/Boring ID: **SB-7**

Client: New York State Electric and Gas Corporation

Location: Wadsworth St.
(Former MGP)
Geneva, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
0	455								ASPHALT. BRICK.	
		1	1.1-2	0.9	30 14	NA	ND		Gray-brown fine to medium SAND, some fine to coarse angular Gravel, non-plastic, moist. Dark gray SILT and CINDERS, little Brick fragments and fine Sand, non-plastic, moist.	
		2	2-4	1.9	4 7 4 4	11	ND		Dark gray-black CINDERS and SLAG, little Silt, fine Sand, and fine Gravel, non-plastic, moist. Brown Silty fine SAND, little Roots (possibly from topsoil), non-plastic, moist.	
5	450	3	4-6	1.5	4 4 5 5	9	ND		Dark gray-brown Clayey SILT and CINDERS, trace fine Sand and Coal, slightly plastic, moist. Black COAL, little Cinders, non-plastic, moist.	Borehole tremie grouted to grade.
		4	6-8	1.4	4 4 2 2	6	ND		Dark gray-brown SILT and CINDERS, little Coal, fine Sand and fine Gravel, trace Clay, non-plastic, moist.	
		5	8-10	2.0	1 2 1 1	3	ND		Brown Silty CLAY, trace Cinders, moderately plastic, moist. Dark gray-brown Silty fine to medium SAND, little Cinders and fine Gravel, trace Clay, non-plastic, wet to saturated.	
10	445	6	10-12	1.7	1 WOH 1 WOH	NA	ND		Gray-brown Silty CLAY, little Slag and Cinders, trace fine to medium subrounded Gravel, moderately plastic, saturated.	
		7	12-14	1.8	1 1 1 1	2	ND		Trace Organics, faint organic odor below 12' bgs.	
15	440	8	14-16	1.5	WOR 1 WOH 1	NA	45.3		Black Silty CLAY, little Organics, trace fine Sand, faint to moderate MGP-like odor, slightly plastic, saturated.	

ARCADIS BBL
Infrastructure, environment, facilities

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect; WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

Client: New York State Electric and Gas Corporation

Well/Boring ID: SB-7

Borehole Depth: 23' bgs

Site Location:
Wadsworth St.
(Former MGP)
Geneva, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N - Value	PID Headspace (ppm)
		9	16-16.8	0.8	1 50/0.3	NA	180
		10	17.5-19	1.3	2 2 2	NA	40.5
20	435	11	19-21	1.9	1 WOH 3 5	NA	ND 10.6
		12	21-23	1.7	5 10 10 8	20	7.2 ND
25	430						
30	425						
35	420						

Stratigraphic Description

Olive-brown to black SILT and CLAY, trace fine Sand and fine Gravel, little NAPL from 16.3' - 16.5' bgs, strong MGP-like odor, slightly plastic, wet.

Orange Brick (possible holder floor), little NAPL in Brick, non-plastic, moist.

Augered through Bottom of Holder from 16.8' - 17.5' bgs.

Brown Silty fine SAND, trace sheen and NAPL blebs, non-plastic, saturated.

Brown inter-bedded Clayey SILT layers (slightly palstic, saturated) with Silty fine SAND layers (non-plastic, saturated), faint odor, gray staining and trace sheen in Sand seams at 18.6' bgs.

Brown Silty fine SAND, faint odor, non-plastic, saturated.

Dark gray fine to medium SAND, faint to moderate odor, little viscous NAPL, non-plastic, saturated.

Gray to brown fine to medium SAND, faint odor below 21.3' bgs, non-plastic, saturated.

Well/Boring Construction

Borehole tremie grouted to grade.

ARCADIS BBL
Infrastructure, environment, facilities

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect; WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

Date Start/Finish: 12/5/05
Drilling Company: Lyon Drilling
Driller's Name: Harry Lyon, Cregg Brown
Drilling Method: Hollow Stem Auger
Auger Size: 3.25" ID
Rig Type: CME-55
Sampling Method: 2-inch split spoon

Northing: 1046408.68
Easting: 714216.17
Casing Elevation: NA

Borehole Depth: 20' bgs
Surface Elevation: 456.94

Descriptions By: Dave Cornell

Well/Boring ID: SB-8

Client: New York State Electric and Gas Corporation

Location: Wadsworth St.
(Former MGP)
Geneva, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Stratigraphic Description	Well/Boring Construction
0								ASPHALT.	
	455	1	1-2	0.4	4 8	NA	ND	Gray fine to coarse GRAVEL, some fine to coarse Sand, loose, damp.	
		2	2-4	1.3	5 6 6 6	12	ND	Orange-tan SILT, trace Clay, trace red Brick fragments, trace black Cinders, trace black Coal fragments, medium stiff, slightly plastic, moist.	
5		3	4-6	1.3	1 2 1 2	3	ND	Pinkish-gray Silty CLAY, medium stiff, plastic, moist.	Borehole tremie grouted to grade.
	450	4	6-8	1.7	2 4 4 6	8	ND	Gray grading to brown-gray SILT, little dark orange-brown mottling, trace to little Clay, stiff, very slightly plastic, moist.	
		5	8-10	1.7	7 10 8 8	18	ND		
10		6	10-12	1.9	3 6 9 7	15	ND	Brown fine SAND, little dark gray coloration, little Silt, slight odor, moderately loose, wet.	
	445	7	12-14	1.3	3 5 5 5	10	ND	Pinkish-gray CLAY, little to some Silt, trace fine Sand, stiff, plastic, wet.	
15		8	14-16	2.0	WOH WOH 1 1	1	ND	Moderately soft, plastic, faint odor below 14' bgs.	

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect;
WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

ARCADIS BBL
Infrastructure, environment, facilities

Client: New York State Electric and Gas Corporation

Well/Boring ID: SB-8

Borehole Depth: 20' bgs

Site Location:
Wadsworth St.
(Former MGP)
Geneva, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N - Value	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
	440	9	16-18	2.0	1 1 1 4	2	ND	▤	Pinkish-gray CLAY, little to some Silt, trace fine Sand, stiff, plastic, wet.	Borehole tremie grouted to grade.
20		10	18-20	2.0	1 3 5 7	8	ND	▤ ░	Pinkish-gray-brown fine SAND with inter-bedded 1mm- to 2mm-thick Silty Clay layers.	
	435									
25										
	430									
30										
	425									
35										

ARCADIS BBL
Infrastructure, environment, facilities

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect; WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

Project Number:13057.003
Data File:SB-8.dat

Template:G:\Div 11\Rockware\LogPlot 2001\LogFiles\13057\Wadsworth.ldf
Date:10/31/2007 SEK

Date Start/Finish: 12/13/05
Drilling Company: Lyon Drilling
Driller's Name: Harry Lyon, Cregg Brown
Drilling Method: Hollow Stem Auger
Auger Size: 3.25" ID
Rig Type: CME-55
Sampling Method: 2-inch split spoon

Northing: 1046425.08
Easting: 714138.81
Casing Elevation: NA

Borehole Depth: 22' bgs
Surface Elevation: 456.94

Descriptions By: Dave Cornell

Well/Boring ID: **SB-9**

Client: New York State Electric and Gas Corporation

Location: Wadsworth St.
(Former MGP)
Geneva, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
0	455	1	0-2	0.7	2 1 3 2	4	ND		Brown SILT and fine SAND, little Clay and Organics (grass), non-plastic, moist.	
		2	2-4	1.0	1 2 1 -	3	ND		Dark gray-black fine SAND, little Silt, trace Cinders, Coal and Brick, Concrete fragments in shoe, non-plastic, moist.	
5		3	4-6	1.6	4 2 2 2	4	ND		Brown-gray SILT, some Clay, little Ash-like material, little Cinders, trace Slag and Wood, trace Ceramic debris, non-plastic, moist to wet.	Borehole tremie grouted to grade.
	450	4	6-8	1.3	4 8 3 6	11	ND		Gray SILT, little Clay and Wood, trace fine Sand, trace Roots, trace Cinders and fine Gravel, possible faint odor, non-plastic, moist. Brown SILT and CLAY, trace fine Sand, slightly plastic, moist.	
		5	8-10	1.8	5 8 4 3	12	ND		Brown SILT and CLAY, mottling, moderately to slightly plastic, moist.	
10		6	10-12	1.8	2 4 8 12	12	ND		Trace Silty fine SAND seams, slightly plastic, saturated below 10' bgs. Brown Silty fine SAND, non-plastic, saturated.	
	445	7	12-14	2.0	1 5 6 8	11	ND		Brown CLAY, trace Silt, with SILT and fine SAND seams throughout, moderately plastic, wet to saturated.	
15		8	14-16	2.0	1 1 2 2	3	ND		Color change to gray-brown below 14.3' bgs.	

ARCADIS BBL
Infrastructure, environment, facilities

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect; WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

Client: New York State Electric and Gas Corporation

Well/Boring ID: **SB-9**

Borehole Depth: 22' bgs

Site Location:
Wadsworth St.
(Former MGP)
Geneva, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N - Value	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
	440	9	16-18	2.0	WOR WOH WOH 1	WOH	ND		Brown-gray-pink Silty CLAY, plastic, saturated. Color change to gray below 17.7' bgs.	Borehole tremie grouted to grade.
20		10	18-20	2.0	WOR WOH 2 4	2	ND		Gray SILT and fine SAND, trace Clay, non-plastic, saturated. Brown-gray Silty CLAY, little fine SAND, moderately plastic, saturated.	
	435	11	20-22	2.0	WOR 2 2 6	4	ND		Brown-gray Silty fine SAND, with trace Silty CLAY seams, non-plastic, saturated.	
25	430									
30	425									
35										

ARCADIS BBL
Infrastructure, environment, facilities

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect;
WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

Project Number:13057.003
Data File:SB-9.dat

Template:G:\Div 11\Rockware\LogPlot 2001\LogFiles\13057\Wadsworth.ldf
Date:10/31/2007 SEK

Date Start/Finish: 12/13/05
Drilling Company: Lyon Drilling
Driller's Name: Harry Lyon, Cregg Brown
Drilling Method: Hollow Stem Auger
Auger Size: 3.25" ID
Rig Type: CME-55
Sampling Method: 2-inch split spoon

Northing: 1046379.80
Easting: 714246.93
Casing Elevation: NA

Borehole Depth: 21' bgs
Surface Elevation: 456.03

Descriptions By: Dave Cornell

Well/Boring ID: **SB-10**

Client: New York State Electric and Gas Corporation

Location: Wadsworth St.
(Former MGP)
Geneva, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
0									ASPHALT and SUBBASE.	
	455	1	0.5-2	1.5	35 11 11	NA	ND		Brown-gray SILT and fine SAND, some Cinders, little Brick and fine to coarse angular Gravel, non-plastic, moist. Brown SILT and CLAY, trace fine Sand and Brick, slightly plastic, moist.	
		2	2-4	0.5	7 50/0.3 - -	NA	ND		Orange-brown BRICK and fire BRICK, Concrete in shoe. Fine SAND and weathered CONCRETE. Auger and spoon refusal at 4.6' bgs. Move to adjacent location.	
		3	4-5	0.6	5 50/0.1	NA	ND		Auger to 5.0' bgs.	Borehole tremie grouted to grade.
5	450	4	5-7	1.7	3 3 3 5	6	ND		Dark gray-brown SILT and CLAY, trace fine Sand, mottling, moderately plastic, moist.	
		5	7-9	1.7	5 7 8 8	15	ND			
10	445	6	9-11	1.7	2 2 3 3	5	ND		Brown-gray SILT and fine SAND, little Clay, non-plastic, saturated. Increasing Sand and decreasing Clay content with depth, little medium Sand and fine Gravel below 10' bgs.	
		7	11-13	1.5	5 5 7 9	12	ND		Brown Silty CLAY with SILT seams throughout, moderately plastic, moist.	
		8	13-15	2.0	1 2 3 3	5	ND		Saturated below 13' bgs.	
15		9	15-17	2.0	1 1	1	ND		Gray-brown-pink Silty CLAY, moderately plastic to plastic, saturated.	

ARCADIS BBL
Infrastructure, environment, facilities

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect; WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

Client: New York State Electric and Gas Corporation

Well/Boring ID: **SB-10**

Borehole Depth: 21' bgs

Site Location:
Wadsworth St.
(Former MGP)
Geneva, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N - Value	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
	440	9	15-17	2.0	1 1	1	ND		Gray-brown-pink Silty CLAY, moderately plastic to plastic, saturated.	
		10	17-19	2.0	1 1 1 2	2	ND			Borehole tremie grouted to grade.
20	435	11	19-21	2.0	5 7 16 16	23	ND		Brown-gray Silty fine SAND, trace Silty CLAY seams, non-plastic, saturated.	
25	430									
30	425									
35										

ARCADIS BBL
Infrastructure, environment, facilities

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect; WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

Date Start/Finish: 9/20/06
Drilling Company: Lyon Drilling
Driller's Name: Harry Lyon, Cregg Brown
Drilling Method: Hollow Stem Auger
Auger Size: 3.25" ID
Rig Type: CME-55
Sampling Method: 2-inch split spoon

Northing: 1046419.90
Easting: 714180.56
Casing Elevation: NA

Borehole Depth: 40' bgs
Surface Elevation: 456.18' AMSL

Descriptions By: Sara Klimek

Well/Boring ID: **SB-11**

Client: New York State Electric and Gas Corporation

Location: Wadsworth St.
Former MGP
Geneva, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
0									ASPHALT. BRICK.	
	455	1	1-2	0.4	5 8	13	ND		Brown fine to coarse SAND and gray fine to coarse angular GRAVEL, loose, dry.	
		2	2-4	1.0	8 5 4 4	9	ND		Brown Sandy CLAY, trace black staining, trace fine black Gravel, loose, dry. Orange BRICK.	
5		3	4-6	0.95	1 WOH 1 1	1	ND		Brown CLAY, some fine to coarse Sand, trace Silt and fine Gravel, trace black coloring, very slight odor, moderately loose, moist.	Borehole tremie grouted to grade.
	450	4	6-8	1.6	3 4 4 5	8	ND		Brown SILT grading to Silty CLAY at 6.85' bgs, trace fine Sand, moderately soft, non-plastic to plastic, wet.	
		5	8-10	1.6	6 7 7 7	14	ND		Brown gray Silty CLAY, slight odor, slightly plastic, wet.	
10	445	6	10-12	1.9	4 5 6 8	11	ND		Plastic below 10' bgs.	
		7	12-14	2.0	3 4 4 6	8	ND		Brown SILT and CLAY, black staining, strong MGP-like odor, very soft, wet. Brown gray Silty CLAY, slight odor, plastic, wet.	
15		8	14-16	2.0	1 2 2 1	4	1.3		Strong odor below 14' bgs.	

ARCADIS BBL
Infrastructure, environment, facilities

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect; WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

Client: New York State Electric and Gas Corporation

Well/Boring ID: **SB-11**

Borehole Depth: 40' bgs

Site Location:
Wadsworth St.
Former MGP
Geneva, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N - Value	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
	440	9	16-18	1.8	1 2 2 1	4	5.8		Brown gray very fine SAND, little Silt and Clay, slight odor, non-plastic, wet. Brown gray CLAY, slight odor, plastic, wet.	
		10	18-20	1.6	1 1 3 10	4	2.2			Borehole tremie grouted to grade.
20	435	11	20-22	2.0	4 4 3 5	7	5.9		Brown very fine SAND, some fine Sand, trace Silt and Clay, moderately loose, wet.	
		12	22-24	1.2	2 3 2 4	5	ND		Brown fine SAND, some medium Sand, moderately dense, wet.	
25		13	24-26	1.15	3 5 8 9	13	ND			
	430	14	26-28	1.5	7 8 7 8	15	ND			
		15	28-30	1.0	2 3 3 7	6	ND			
30	425	16	30-32	1.7	3 4 6 9	10	ND			
		17	32-34	1.9	3 5 5 5	10	ND			
35		18	34-36	1.2	2 2 3 4	5	ND			

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect; WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

ARCADIS BBL
Infrastructure, environment, facilities

Client: New York State Electric and Gas Corporation

Well/Boring ID: SB-11

Site Location:
Wadsworth St.
Former MGP
Geneva, NY

Borehole Depth: 40' bgs

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N - Value	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
	420	19	36-38	1.8	3 2 8 8	10	ND		Brown fine SAND, some medium Sand, moderately dense, wet. Brown CLAY and SILT, trace fine Sand. slightly plastic, wet.	Borehole tremie grouted to grade.
40		20	38-40	1.6	7 5 4 4	9	ND		Brown fine to medium SAND grading to fine SAND at 38.6' bgs, trace Silt, moderately dense, wet.	
	415									
45										
	410									
50										
	405									
55										

ARCADIS BBL
Infrastructure, environment, facilities

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect; WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

Date Start/Finish: 9/19/06
Drilling Company: Lyon Drilling
Driller's Name: Harry Lyon, Cregg Brown
Drilling Method: Hollow Stem Auger
Auger Size: 3.25" ID
Rig Type: CME-55
Sampling Method: 2-inch split spoon

Northing: 1046484.80
Easting: 714205.32
Casing Elevation: NA

Borehole Depth: 40' bgs
Surface Elevation: 455.93' AMSL

Descriptions By: Sara Klimek

Well/Boring ID: **SB-12**

Client: New York State Electric and Gas Corporation

Location: Wadsworth St.
Former MGP
Geneva, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
0					25				ASPHALT.	
	455	1	0-2	1.1	5 3 2	8	4.0		Maroon fine SAND and SILT, trace medium to coarse Sand, some black staining, slight odor, loose, dry. Brown CLAY, trace Silt and yellow Brick, little black staining, loose, dry.	
		2	2-4	0.3	2 3 3 6	6	4.0		Maroon fine SAND and SILT, trace medium to coarse Sand, some black staining, slight odor, loose, dry. Red BRICK.	
5	450	3	4-6	1.3	1 2 1 2	3	4.3		Brown gray CLAY, trace brown coloring, very strong odor, plastic, moist.	Borehole tremie grouted to grade.
		4	6-8	1.9	1 2 2 1	4	5.8		Gray brown CLAY, soft, plastic, moist to wet.	
		5	8-10	1.2	1 2 2 2	4	5.8			
10	445	6	10-12	1.5	WOR 1 1 1	2	ND			
		7	12-14	1.7	1 1 1 1	2	ND			
15	440	8	14-16	2.0	WOR 1 1 1	2	0.3			

ARCADIS BBL
Infrastructure, environment, facilities

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect; WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

Client: New York State Electric and Gas Corporation

Well/Boring ID: **SB-12**

Borehole Depth: 40' bgs

Site Location:
Wadsworth St.
Former MGP
Geneva, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N - Value	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
		9	16-18	2.0	1 WOH 1 1	1	ND		Gray brown to gray CLAY, very soft, very plastic.	
		10	18-20	2.0	1 2 2 2	4	ND			Borehole tremie grouted to grade.
20	435	11	20-22	2.0	1 WOH 5 6	5	ND		Dark gray fine SAND, slight odor, loose, non-plastic, wet.	
		12	22-24	2.0	4 5 5 6	10	ND		Gray brown CLAY, very soft, very plastic. (possible sluff) Dark gray fine SAND, slight odor, loose, non-plastic, wet. Brown very fine SAND, trace Silt, moderately dense, wet.	
25	430	13	24-26	0.9	1 3 5 8	8	0.6		Gray fine SAND, moderately dense, non-plastic, wet. Brown fine SAND, some Silt, trace medium Sand, moderately loose, non-plastic, wet.	
		14	26-28	2.0	8 10 10 14	20	ND		Gray brown fine to medium SAND, moderately loose non-plastic, wet. Trace Clay seams from 26.6' - 27.3' bgs. Grading to fine SAND, little Silt, moderately dense to moderately loose, non-plastic, wet.	
		15	28-30	2.0	2 2 2 6	4	0.2		Brown fine SAND, some medium Sand, trace Silt, moderately dense, non-plastic, wet.	
30	425	16	30-32	1.3	1 1 2 2	3	2.8		Brown fine SAND, some Silt, moderately dense to moderately loose, non-plastic, wet.	
		17	32-34	1.8	1 2 3 3	5	ND		Little Silt below 32' bgs.	
35	420	18	34-36	2.0	WOR 1 3 4	4	ND		Trace Silt below 34' bgs.	

ARCADIS BBL
Infrastructure, environment, facilities

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect;
WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

Client: New York State Electric and Gas Corporation

Well/Boring ID: **SB-12**

Site Location:
Wadsworth St.
Former MGP
Geneva, NY

Borehole Depth: 40' bgs

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N - Value	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
		19	36-38	2.0	3 3 2 2	5	ND		Brown gray fine SAND, trace Silt, moderately dense to moderately loose, non-plastic, wet.	Borehole tremie grouted to grade.
40		20	38-40	2.0	7 4 5 10	9	ND			
	415									
45										
	410									
50										
	405									
55										
	400									

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect; WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

ARCADIS BBL
Infrastructure, environment, facilities

Date Start/Finish: 9/19/06
Drilling Company: Lyon Drilling
Driller's Name: Harry Lyon, Cregg Brown
Drilling Method: Hollow Stem Auger
Auger Size: 3.25" ID
Rig Type: CME-55
Sampling Method: 2-inch split spoon

Northing: 1046450.38
Easting: 714222.12
Casing Elevation: NA

Borehole Depth: 40' bgs
Surface Elevation: 455.02' AMSL

Descriptions By: Sara Klimek

Well/Boring ID: **SB-13**

Client: New York State Electric and Gas Corporation

Location: Wadsworth St.
Former MGP
Geneva, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Stratigraphic Description	Well/Boring Construction
0	455							ASPHALT. CONCRETE.	
		1	1.5-2	0.3	5	5	ND	Gray broken CONCRETE, trace brown fine to coarse Sand, loose, dry.	
		2	2-4	1.4	2 3 5 6	8	ND	Brown CLAY and SILT, trace fine to coarse Sand, some black staining, slight odor, loose, dry.	
5	450	3	4-6	1.6	6 10 4 4	14	7.9	Black and orange BRICK, some fine to coarse Sand, slight odor, loose, dry.	Borehole tremie grouted to grade.
		4	6-8	1.0	3 2 2 1	4	ND	Trace gray fine sub-angular Gravel, moist below 6' bgs.	
		5	8-10	1.8	1 1 1 1	2	ND	Black grading to gray fine to coarse SAND, little yellow and orange Brick, trace Clay and Silt, loose, wet.	
10	445	6	10-12	0.9	WOH 1 WOH	1	ND	Black fine to coarse SAND, trace Clay and Silt, loose, wet. Gray fine to medium sub-angular GRAVEL, some fine to coarse Sand, trace Silt, loose, wet.	
		7	12-14	1.4	WOH 1	NA	ND	Dark gray CLAY, little fine to coarse Sand and fine Gravel, trace Silt, strong odor, plastic, soft, wet.	
15	440	8	14-16	1.6	1 WOH 1	NA	228	Dark gray CLAY, some Silt, trace fine to coarse Sand, trace sheen, very strong MGP-like odor, plastic, soft, wet.	

ARCADIS BBL
Infrastructure, environment, facilities

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect;
WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

Client: New York State Electric and Gas Corporation

Well/Boring ID: **SB-13**

Borehole Depth: 40' bgs

Site Location:
Wadsworth St.
Former MGP
Geneva, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N - Value	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
		9	16-18	1.7	2 50/ 0.2	NA	97.6		Dark gray CLAY, some Silt, trace fine to coarse Sand, trace sheen, very strong MGP-like odor, plastic, soft, wet. Orange BRICK.	
		10	18-20	1.7	1 3 2 3	5	17.4		Dark gray fine SAND, trace Silt and medium Sand, trace NAPL blebs, sheen, strong odor, loose wet. Black very fine SAND, strong odor, wet.	Borehole tremie grouted to grade.
20	435	11	20-22	0.4	1 1 2 2	3	ND		Brown very fine SAND, trace fine to medium Sand, moderately loose, strong odor, wet.	
		12	22-24	1.3	2 2 3 4	5	1.4			
25	430	13	24-26	1.6	WOR 2 6 8	8	ND		Slight odor below 24' bgs.	
		14	26-28	1.4	8 16 12 12	28	ND		Becoming dense below 26' bgs.	
		15	28-30	1.2	WOR 1 2 2	3	ND		Brown very fine SAND, trace fine Sand and Silt, strong odor, trace sheen, loose, wet.	
30	425	16	30-32	0.8	3 2 2 2	4	ND		No sheen below 30' bgs.	
		17	32-34	2.0	3 5 7 7	12	ND		Brown fine SAND, trace very fine and medium Sand, slight odor, loose, wet.	
35	420	18	34-36	2.0	2 1 1 2	2	ND		Brown very fine SAND, trace fine Sand and Silt, slight odor, loose, wet.	

ARCADIS BBL
Infrastructure, environment, facilities

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect;
WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

Client: New York State Electric and Gas Corporation

Well/Boring ID: **SB-13**

Borehole Depth: 40' bgs

Site Location:
Wadsworth St.
Former MGP
Geneva, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N - Value	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
		19	36-38	1.3	3 2 3 5	5	ND		Brown very fine SAND, trace fine Sand and Silt, slight odor, loose, wet.	Borehole tremie grouted to grade.
		20	38-40	0.7	1 2 3 4	5	ND		Grades to brown fine SAND and SILT, loose, saturated.	
40	415									
45	410									
50	405									
55	400									

ARCADIS BBL
Infrastructure, environment, facilities

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect; WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

Date Start/Finish: 9/18/06
Drilling Company: Lyon Drilling
Driller's Name: Harry Lyon, Cregg Brown
Drilling Method: Hollow Stem Auger
Auger Size: 3.25" ID
Rig Type: CME 55
Sampling Method: 2-inch split spoon

Northing: 1046476.05
Easting: 714256.40
Casing Elevation: NA

Borehole Depth: 40' bgs
Surface Elevation: 455.02' AMSL

Descriptions By: Sara Klimek

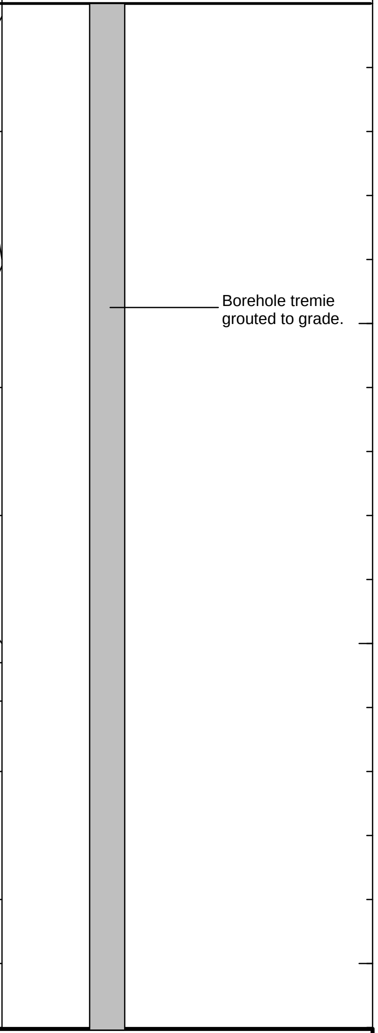
Well/Boring ID: **SB-14A/B**

Client: New York State Electric and Gas Corporation

Location: Wadsworth St.
(Former MGP)
Geneva, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Stratigraphic Description
0	455	1	0-2	0.8	2 3 2 3	5	1.5	Dark brown fine SAND, trace Silt, Roots and Grass, loose, non-plastic, moist. Brown gray fine to coarse SAND and fine to medium sub-rounded GRAVEL, loose, non-plastic, dry.
		2	2-4	0.9	2 3 2 4	5	10.0	Brown CLAY, some fine to coarse Sand, trace Silt, Brick, Roots, and black coloring, no odor, moist. First attempt (SB-14A) - Empty void from 4' - 6.5' bgs, perched water, black PEAT and fine to coarse SAND, trace fine to medium sub-rounded Gravel, very strong MGP-like odor, loose, saturated with black NAPL. Move 5' west. Second attempt - Brown black CLAY, trace red Brick, soft, plastic, moist.
5	450	3	4-6	0.9	1 3 2 5	5	NA	Brown CLAY, soft, plastic, moist.
		4	6-8	2.0	6 4 4 3	8	85.1	Black and brown WOOD, possible structural beam, trace Clay, strong odor.
		5	8-10	0.0	18 15 14 12	29	14.5	No Recovery, probably still wood, strong odor on split spoon. Gray brown CLAY, trace fine Sand and Silt, MGP-like odor, soft, plastic, wet.
10	445	6	10-12	1.3	3 4 5 6	9	11.4	Black WOOD, strong MGP-like odor, wet. Gray brown CLAY, trace fine Sand and Silt, MGP-like odor, soft, plastic, wet.
		7	12-14	2.0	5 4 5 5	9	19.2	Gray brown CLAY and WOOD SPLINTERS, up to 0.9' in size, moderate odor, plastic, wet.
		8	14-15	1.0	NA	NA	12.3	Black WOOD, strong odor.
15	440	9	15-16	1.0	1 WOH	NA	33.5	Brown gray CLAY, no odor, soft, very plastic, wet.

Well/Boring Construction



ARCADIS BBL
Infrastructure, environment, facilities

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect; WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

Client: New York State Electric and Gas Corporation

Well/Boring ID: **SB-14A/B**

Borehole Depth: 40' bgs

Site Location:
Wadsworth St.
(Former MGP)
Geneva, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N - Value	PID Headspace (ppm)	Stratigraphic Description	Well/Boring Construction
		10	16-18	2..0	WOR 1 1	NA	36.0	Brown gray CLAY, no odor, soft, very plastic, wet.	
20	435	11	18-20	2.0	1 2 4 2	6	18.5	Trace fine to medium Sand below 19.8' bgs. Trace Wood splinters up to 3" in size, below 20' bgs.	Borehole tremie grouted to grade.
		12	20-22	1.8	2 3 2 2	5	4.6	Gray fine SAND and SILT, non-plastic, wet.	
		13	22-24	2.0	1 1 1 3	2	16.0	WOOD, trace Clay. Gray brown fine to medium SAND, some Silt, moderately dense, non-plastic, wet.	
25	430	14	24-26	1.0	6 4 2 4	6	12.4		
		15	26-28	1.1	4 4 5 4	9	14.0	Color change to brown below 26' bgs.	
30	425	16	28-30	0.6	1 2 1 2	3	11.7		
		17	30-32	2.0	1 2 3 4	5	ND	Black WOOD, trace Clay, odor.	
		18	32-34	1.8	13 17 20 20	37	4.0	Brown fine SAND, some medium Sand, trace Silt, moderately loose, non-plastic, wet.	
35	420	19	34-36	1.1	3 1 2 2	3	8.3		

ARCADIS BBL
Infrastructure, environment, facilities

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect; WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

Client: New York State Electric and Gas Corporation

Well/Boring ID: **SB-14A/B**

Borehole Depth: 40' bgs

Site Location:
Wadsworth St.
(Former MGP)
Geneva, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N - Value	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
		20	36-38	1.4	3 2 3 4	5	10.7		Brown fine SAND, some medium Sand, trace Silt, moderately loose, non-plastic, wet.	Borehole tremie grouted to grade.
		21	38-40	2.0	WOR 2 4	NA	12.4		Trace Clay below 38' bgs.	
40	415									
45	410									
50	405									
55	400									

ARCADIS BBL
Infrastructure, environment, facilities

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect; WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

Project Number:13057.003
Data File:

Template:G:\Div 11\Rockware\LogPlot 2001\LogFiles\13057\Wadsworth.ldf
Date:10/31/2007 SEK

Date Start/Finish: 9/20/06
Drilling Company: Lyon Drilling
Driller's Name: Harry Lyon, Cregg Brown
Drilling Method: Hollow Stem Auger
Auger Size: 3.25" ID
Rig Type: CME-55
Sampling Method: 2-inch split spoon

Northing: 1046407.68
Easting: 714274.377
Casing Elevation: NA

Borehole Depth: 40' bgs
Surface Elevation: 455.31' AMSL

Descriptions By: Sara Klimek

Well/Boring ID: **SB-15**

Client: New York State Electric and Gas Corporation

Location: Wadsworth St.
Former MGP
Geneva, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Stratigraphic Description	Well/Boring Construction
0	455							ASPHALT.	
		1	0.5-2	0.7	6 8 3 4	11	36.9	Brown fine to coarse SAND and gray fine to coarse angular GRAVEL, loose, dry. Red BRICK. Black fine SAND, strong odor, loose, dry.	
		2	2-4	0.8	1 2 2 3	4	2.6	Brown CLAY, little Silt, strong MGP-like odor, plastic, moist.	
5	450	3	4-6	1.0	1 2 3 4	5	3.9	Gray CLAY, black coloring, strong MGP-like odor, plastic, moist.	Borehole tremie grouted to grade.
		4	6-8	1.25	2 4 5 7	9	4.0	Trace brown mottling below 6' bgs.	
		5	8-10	0.9	6 6 5 4	11	4.0	0.1" thick Brick layer at 8' bgs.	
10	445	6	10-12	2.0	1 1 2 3	3	ND	Gray Sandy CLAY, loose, wet. Brown gray CLAY, plastic, stiff, wet. Gray fine SAND, trace Silt and Clay, strong odor, wet.	
		7	12-14	1.2	2 1 2 2	3	ND	Gray Sandy CLAY, odor, very plastic, soft, wet.	
15	440	8	14-16	2.0	WOR 1 WOH	NA	ND	Brown gray CLAY, slight odor, plastic, soft, wet, 0.1" sand seam at 14.4' bgs.	

ARCADIS BBL
Infrastructure, environment, facilities

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect; WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

Client: New York State Electric and Gas Corporation

Well/Boring ID: **SB-15**

Borehole Depth: 40' bgs

Site Location:
Wadsworth St.
Former MGP
Geneva, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N - Value	PID Headspace (ppm)	Stratigraphic Description
		9	16-18	2.0	1 WOH 1 1	NA	ND	Brown gray CLAY, slight odor, plastic, soft, wet, 0.1" sand seam at 14.4' bgs.
		10	18-20	2.0	1 2 3 10	58	ND	Sand seams 0.4' thick at 18.5' bgs and 19.4' bgs.
20	435	11	20-22	2.0	7 9 3 6	12	ND	Brown gray fine SAND, trace Silt and Clay, moderately dense, wet.
		12	22-24	2.0	2 4 4 4	8	ND	Black gray fine to medium SAND, strong MGP-like odor, loose, wet.
25	430	13	24-26	1.2	2 3 3 3	6	ND	Brown fine SAND, slight odor, moderately loose, wet.
		14	26-28	1.5	2 1 3 3	4	ND	Brown fine to medium SAND, trace Silt, no odor, moderately dense, wet.
		15	28-30	0.9	WOR 1 1 3	2	ND	
30	425	16	30-32	1.5	1 6 8 15	14	ND	Little coarse Sand from 30' - 34' bgs.
		17	32-34	2.0	1 6 6 5	12	ND	
35	420	18	34-36	0.9	1 1 3 4	4	ND	

Well/Boring Construction

Borehole tremie grouted to grade.

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect; WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

ARCADIS BBL
Infrastructure, environment, facilities

Client: New York State Electric and Gas Corporation

Well/Boring ID: **SB-15**

Borehole Depth: 40' bgs

Site Location:
Wadsworth St.
Former MGP
Geneva, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N - Value	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
		19	36-38	1.6	4 3 2 2	5	ND		Brown fine to medium SAND, trace Silt, no odor, moderately dense, wet.	Borehole tremie grouted to grade.
		20	38-40	1.5	WOR 2 3 3	5	ND			
40										
	415									
45										
	410									
50										
	405									
55										
	400									

ARCADIS BBL
Infrastructure, environment, facilities

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect; WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

Date Start/Finish: 12/7/05
Drilling Company: Lyon Drilling
Driller's Name: Harry Lyon, Cregg Brown
Drilling Method: Hollow Stem Auger
Bit Size: 8-inch
Auger Size: 4.25" ID
Rig Type: CME-55
Sampling Method: 2-inch split spoon

Northing: 1046600.56
Easting: 714267.47
Casing Elevation: 453.49

Borehole Depth: 20' bgs
Surface Elevation: 453.96

Geologist: Dave Cornell

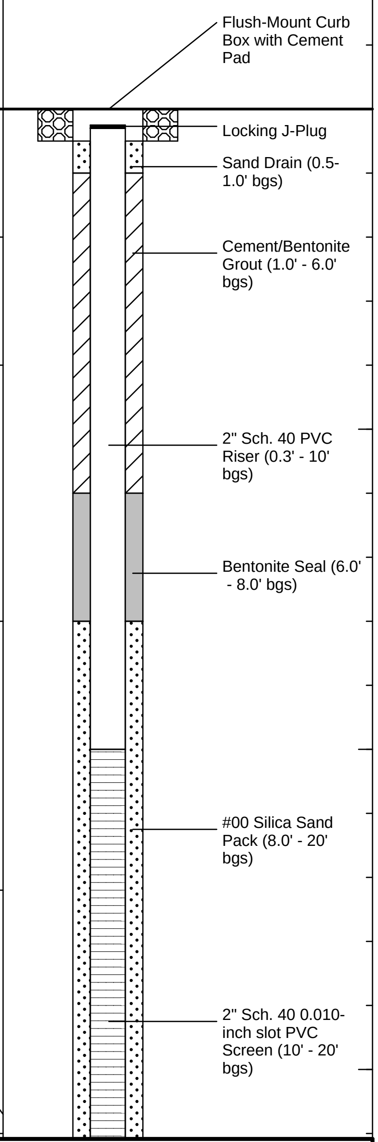
Well/Boring ID: MW-1

Client: New York State Electric and Gas Corporation

Location: Wadsworth St.
(Former MGP)
Geneva, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N - Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
	455									
0		1	0-2	0.7	1 5 8 4	13	ND			Dark brown SILT and fine SAND, some Organics (grass, roots), trace fine Gravel, non-plastic, moist. [Topsoil]
		2	2-4	0.8	2 6 2 1	8	ND			Dark gray Silty fine SAND, some Cinders, little fine to coarse angular Gravel, trace Coal and Ash-like material, non-plastic, moist.
5	450	3	4-6	1.8	3 4 6 7	10	ND			Brown SILT and CLAY, trace Organics, slight mottling, moderately to slightly plastic, moist.
		4	6-8	1.6	7 7 7 8	14	ND			
	445	5	8-10	1.9	2 4 4 7	8	ND			Brown Silty CLAY, moderately plastic, wet, 0.5mm-thick fine Sandy SILT seams throughout, non-plastic, wet to saturated.
10		6	10-12	2.0	5 8 6 7	14	ND			
	440	7	12-14	2.0	3 2 1 3	3	ND			Brown-gray Silty CLAY, trace fine Sand, moderately plastic, saturated.
15		8	14-16	1.9	WOH WOH 1 1	1	ND			Gray-brown Silty fine SAND, non-plastic, saturated.

Well/Boring Construction



BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect; WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

Client:
New York State Electric and Gas Corporation

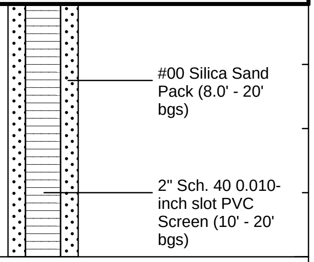
Site Location:
Wadsworth St.
(Former MGP)
Geneva, NY

Well/Boring ID: MW-1

Borehole Depth: 20' bgs

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N - Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
		9	16-18	2.0	WOH 3 5 4	8	ND		▤ ⠿	Brown-gray Silty CLAY, trace fine Sand, plastic, saturated. Gray fine to medium SAND, non-plastic, saturated.
	435	10	18-20	2.0	1 1 3 3	4	ND		⠿	
20										
	430									
25										
	425									
30										
	420									
35										

Well/Boring Construction



BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect; WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

Project: 13057.003
Data File: MW-1.dat

Template: G:\Div 11\Rockware\LogPlot 2001\LogFiles\13057\Wadsworth 2006.ldf
Date: 1/30/06

Date Start/Finish: 12/7/05
Drilling Company: Lyon Drilling
Driller's Name: Harry Lyon, Cregg Brown
Drilling Method: Hollow Stem Auger
Bit Size: 8-inch
Auger Size: 4.25" ID
Rig Type: CME-55
Sampling Method: 2-inch split spoon

Northing: 1046504.03
Easting: 714176.95
Casing Elevation: 455.38

Borehole Depth: 22' bgs
Surface Elevation: 456.03

Geologist: Dave Cornell

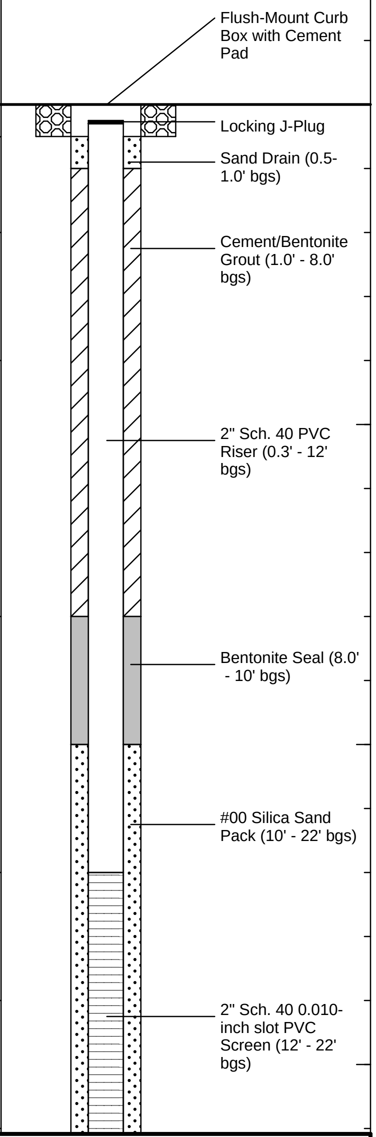
Well/Boring ID: **MW-2**

Client: New York State Electric and Gas Corporation

Location: Wadsworth St.
(Former MGP)
Geneva, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N - Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
0										ASPHALT and SUBBASE.
	455	1	0.5-2	1.2	4 3 4	NA	ND			Dark gray Silty fine SAND, little Cinders, trace Brick and fine to medium Gravel, non-plastic, moist.
										Possible Holder at 2.3' bgs to 3.3' bgs. Auger to 4.0' bgs.
5		2	4-6	1.7	3 3 4 5	7	ND			Brown SILT and CLAY, trace Organics and fine Sand, slightly plastic, moist.
	450	3	6-8	2.0	5 6 7 8	13	ND			Trace Silt and Sand seams below 6.0' bgs.
		4	8-10	1.9	6 7 7 9	14	ND			Brown SILT and CLAY, moderately plastic, saturated.
10	445	5	10-12	1.7	3 3 8 6	11	ND			SILT and SAND layer from 10.8' - 11.3' bgs, non-plastic, saturated.
		6	12-14	2.0	3 6 5 4	11	ND			Brown Silty CLAY with little 0.5mm thick SILT and fine SAND seams throughout, moderately plastic, saturated.
15	440	7	14-16	1.8	1 1 1 1	2	ND			Brown-gray CLAY, little to trace Silt, plastic, saturated.

Well/Boring Construction



BBL®
BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect; WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

Client:
New York State Electric and Gas Corporation

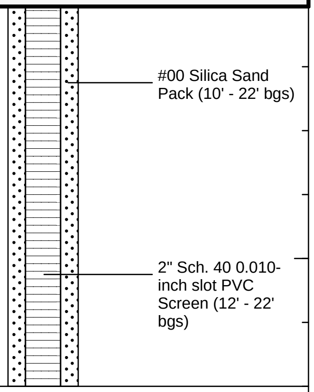
Site Location:
Wadsworth St.
(Former MGP)
Geneva, NY

Well/Boring ID: **MW-2**

Borehole Depth: 22' bgs

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N - Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
		8	16-18	1.9	WOH 1 WOH 1	1	ND			Brown-gray CLAY, little to trace Silt, plastic, saturated.
		9	18-20	1.5	2 1 2 3	3	ND			Trace fine Sand below 18.0' bgs.
20	435	10	20-22	0.7	1 3 5 7	8	ND			Brown-gray fine SAND, little Silt, trace medium Sand, non-plastic, saturated.
25	430									
30	425									
35										

Well/Boring Construction



BBL®
BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect; WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

Date Start/Finish: 12/8/05
Drilling Company: Lyon Drilling
Driller's Name: Harry Lyon, Cregg Brown
Drilling Method: Hollow Stem Auger
Bit Size: 8-inch
Auger Size: 4.25" ID
Rig Type: CME-55
Sampling Method: 2-inch split spoon

Northing: 1046407.59
Easting: 714170.55
Casing Elevation: 456.38

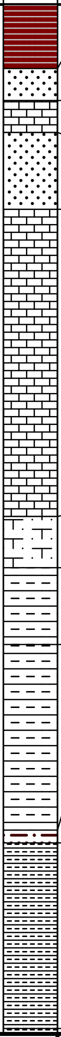
Borehole Depth: 22' bgs
Surface Elevation: 456.71

Geologist: Dave Cornell

Well/Boring ID: **MW-3**

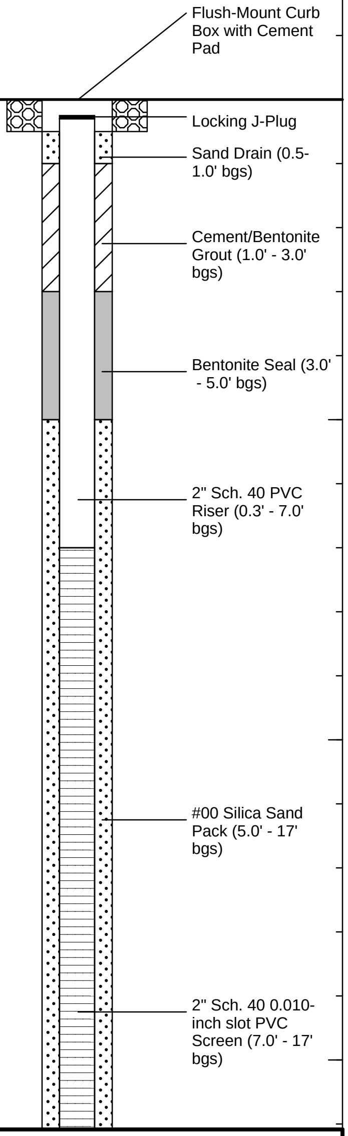
Client: New York State Electric and Gas Corporation

Location: Wadsworth St.
(Former MGP)
Geneva, NY



DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N - Value	PID Headspace (ppm)	Analytical Sample	Stratigraphic Description
0									ASPHALT and SUBBASE.
	455	1	1-2	0.8	7 6	NA	ND		Brown-gray fine to medium SAND, some fine sub-rounded Gravel, non-plastic, moist. BRICK, non-plastic, moist.
		2	2-4	1.0	7 8 50/0.2 -	NA	ND		Gray to dark gray Silty fine to medium SAND, trace Brick, Concrete in tip of spoon shoe, very faint odor, non-plastic, moist. BRICK and CONCRETE.
		3	4-4.4	0.4	50/0.4	NA	ND		
5	450								Retrieved Concrete in shoe, possibly drilling through wall. Possibly through wall at 7.4' bgs. Auger to 8.0' bgs.
		4	8-10	1.0	3 3 3 5	6	2.8		Gray Silty fine SAND, little fine sub-rounded Gravel, moderate MGP-like odor, non-plastic, wet. Brown SILT and CLAY, slightly plastic, moist.
10	445	5	10-12	2.0	5 7 9 11	16	26.6 41.6		Gray-brown SILT and CLAY, little fine Sand, moderate to faint odor, moderately plastic, wet. Color change to brown, faint odor, decreased Sand content below 11' bgs.
		6	12-14	2.0	7 9 12 9	21	39.8 42 22		Dark gray (staining) SILT and fine SAND, trace Clay, moderate odor, non-plastic, saturated. Brown Silty CLAY, faint odor, moderately plastic, moist, 0.5mm-thick fine Sandy SILT seams throughout (around 0.07' apart), non-plastic, moist.
15		7	14-16	1.9	2 2 3 4	5	18 7.1		Color change to brown-gray, faint odor below 14' bgs.

Well/Boring Construction



BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect; WOR/H = Weight of Rod/Hammer.
Elevations references to NGVD 1929.
Northings and Eastings in NY State Plane Central.

Client:
New York State Electric and Gas Corporation

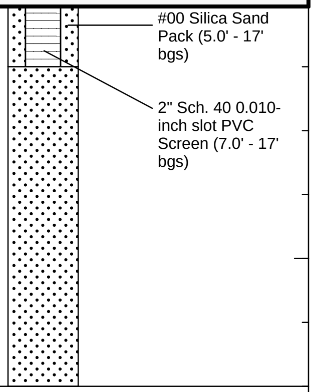
Site Location:
Wadsworth St.
(Former MGP)
Geneva, NY

Well/Boring ID: MW-3

Borehole Depth: 22' bgs

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N - Value	PID Headspace (ppm)	Analytical Sample	Stratigraphic Description
	440	8	16-18	2.0	2 1 2 2	3	0.5 ND		Brown-gray Silty CLAY, faint odor, moderately plastic, moist, 0.5mm-thick fine Sandy SILT seams throughout (around 0.07' apart), non-plastic, moist. Gray-brown CLAY, trace Silt, faint odor, plastic, saturated.
		9	18-20	2.0	1 1 1 2	2	ND 0.5	☒	Trace fine Sandy SILT seam at 18.7' bgs. Black Silty fine SAND, trace sheen, faint odor, non-plastic, saturated.
20		10	20-22	2.0	4 4 4 7	8	ND ND		Brown Silty CLAY, plastic, saturated. Brown Silty fine SAND, trace Clay, trace medium Sand, faint odor, non-plastic, saturated.
	435								
25									
	430								
30									
	425								
35									

Well/Boring Construction



BBL®
BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect; WOR/H = Weight of Rod/Hammer.
Elevations references to NGVD 1929.
Northings and Eastings in NY State Plane Central.

Project: 13057.003
Data File:MW-3.dat
Template:G:\Div 11\Rockware\LogPlot 2001\LogFiles\13057\Wadsworth 2006.ldf
Date: 1/30/06

Date Start/Finish: 12/12/05
Drilling Company: Lyon Drilling
Driller's Name: Harry Lyon, Cregg Brown
Drilling Method: Hollow Stem Auger
Bit Size: 8-inch
Auger Size: 4.25" ID
Rig Type: CME-55
Sampling Method: 2-inch split spoon

Northing: 1046358.79
Easting: 714050.15
Casing Elevation: 456.03

Borehole Depth: 20' bgs
Surface Elevation: 456.41

Geologist: Dave Cornell

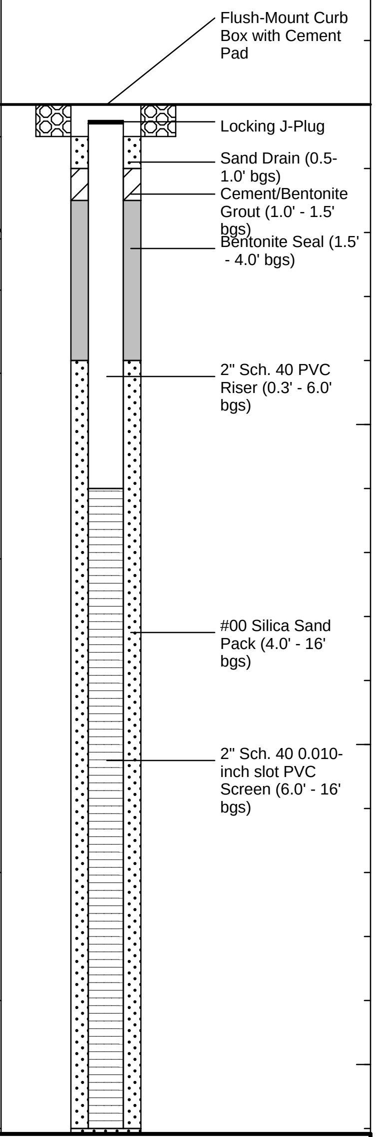
Well/Boring ID: MW-4

Client: New York State Electric and Gas Corporation

Location: Wadsworth St.
(Former MGP)
Geneva, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N - Value	PID Headspace (ppm)	Analytical Sample	Stratigraphic Description
0									ASPHALT and SUBBASE.
	455	1	0.5-2	1.2	15 11 10	11	ND		Dark gray Silty fine SAND, some Cinders, trace Brick, Slag and fine to medium Gravel, little Wood in spoon shoe, non-plastic, moist. Dark gray WOOD.
		2	2-4	1.5	5 5 5 8	10	ND		Brown Silty fine SAND, little medium Sand, non-plastic, moist. Dark gray to gray fine SAND, some Cinders and Ash-like material, trace Slag and Silt, non-plastic, moist.
5		3	4-6	1.5	2 2 3 3	5	ND		Gray to dark gray Clayey SILT, little to trace fine Sand, slightly plastic, wet.
	450	4	6-8	1.7	3 4 5 7	9	ND		Little fine Sand, mottling, slightly plastic, moist to wet below 6.0' bgs. Gray-brown SILT and fine SAND, trace Clay, non-plastic, wet.
		5	8-10	1.6	6 6 4 4	10	ND		Saturated below 8.0' bgs.
10	445	6	10-12	1.7	1 3 5 6	8	ND		Color change to gray below 10' bgs. Silty CLAY seams below 11.3' bgs.
		7	12-14	1.4	5 8 7 8	15	ND		Brown-gray SILT and fine SAND, some fine to coarse sub-rounded Gravel, little Clay, non-plastic, saturated.
15		8	14-16	1.1	4 4 4 5	8	ND		Brown-gray-pink Silty CLAY, little Silty fine SAND seams, moderately plastic, moist to wet.

Well/Boring Construction



BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect; WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

Client:
New York State Electric and Gas Corporation

Site Location:
Wadsworth St.
(Former MGP)
Geneva, NY

Well/Boring ID: MW-4

Borehole Depth: 20' bgs

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N - Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	440	9	16-18	1.6	5 7 8 11	15	ND			Brown CLAY, little Silt, trace fine Sand, plastic, wet.	
		10	18-20	1.7	4 3 3 12	6	ND			Brown Silty fine SAND, non-plastic, saturated.	
20											
	435										
25											
	430										
30											
	425										
35											

BBL®
BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect; WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

Project: 13057.003
Data File: MW-4.dat
Template: G:\Div 11\Rockware\LogPlot 2001\LogFiles\13057\Wadsworth 2006.ldf
Date: 1/30/06

Date Start/Finish: 12/9/05
Drilling Company: Lyon Drilling
Driller's Name: Harry Lyon, Cregg Brown
Drilling Method: Hollow Stem Auger
Bit Size: 8-inch
Auger Size: 4.25" ID
Rig Type: CME-55
Sampling Method: 2-inch split spoon

Northing: 1046379.83
Easting: 714327.06
Casing Elevation: 455.20

Borehole Depth: 22' bgs
Surface Elevation: 455.53

Geologist: Dave Cornell

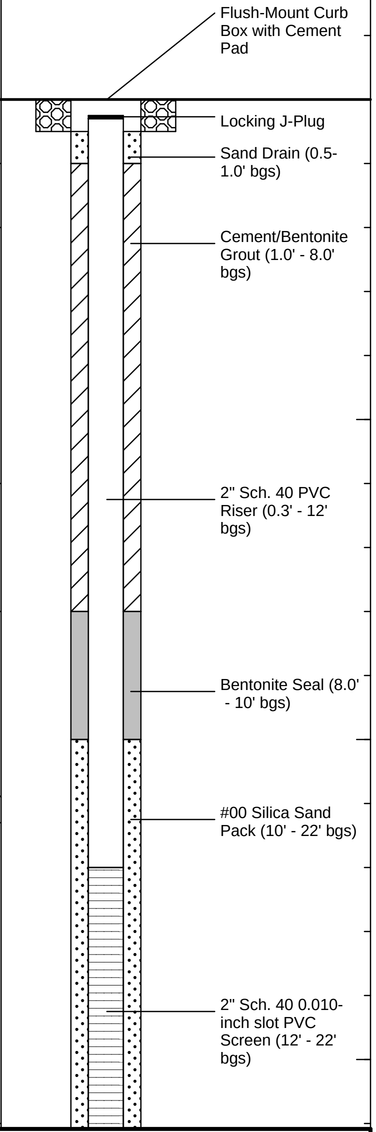
Well/Boring ID: **MW-5**

Client: New York State Electric and Gas Corporation

Location: Wadsworth St.
(Former MGP)
Geneva, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N - Value	PID Headspace (ppm)	Analytical Sample	Stratigraphic Description
0	455								ASPHALT and SUBBASE.
		1	1-2	0.6	4 5	NA	ND		Brown Silty fine to medium SAND, little fine Gravel, non-plastic, moist.
		2	2-3	0.2	50/0.5	NA	ND		Gray-brown Silty fine SAND, little Brick, trace Cinders and fine Gravel, non-plastic, moist.
		3	3-4	0.8	6 4	NA	ND		
5	450	4	4-6	0.9	7 8 3 3	11	ND		Faint organic odor, moist to wet below 4.0' bgs.
		5	6-8	1.3	3 2 1 1	3	ND		Gray fine Sandy SILT, little Clay, trace fine Gravel, slightly plastic, wet.
		6	8-10	1.8	1 3 3 5	6	ND		Brown SILT and CLAY, trace Silty fine SAND seams, mottling, moderately plastic, wet to saturated.
10	445	7	10-12	1.9	4 7 7 5	14	ND		Brown-gray Silty fine SAND, non-plastic, saturated. Brown Silty CLAY, plastic, saturated, 0.5mm-thick SILT and fine SAND seams throughout, non-plastic, saturated.
		8	12-14	2.0	3 3 2 3	5	ND		
15	440	9	14-16	2.0	WOH WOH WOH 1	WOH	ND		Fine SAND seams below 14.5' bgs.

Well/Boring Construction



BBL®
BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect; WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

Client:
New York State Electric and Gas Corporation

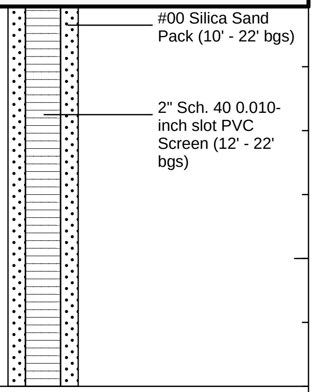
Site Location:
Wadsworth St.
(Former MGP)
Geneva, NY

Well/Boring ID: MW-5

Borehole Depth: 22' bgs

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N - Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
		10	16-18	2.0	1 1 1 1	2	ND			Gray-pink-brown Silty CLAY, plastic, saturated.
		11	18-20	1.5	1 4 7 10	11	ND			Brown Silty fine SAND, non-plastic, saturated. Little Silty CLAY seams below 20' bgs.
20	435	12	20-22	2.0	2 2 4 3	6	ND			
25	430									
30	425									
35	420									

Well/Boring Construction



BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect; WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

Date Start/Finish: 12/8/05
Drilling Company: Lyon Drilling
Driller's Name: Harry Lyon, Cregg Brown
Drilling Method: Hollow Stem Auger
Bit Size: 8-inch
Auger Size: 4.25" ID
Rig Type: CME-55
Sampling Method: 2-inch split spoon

Northing: 1046294.00
Easting: 714219.98
Casing Elevation: 456.79

Borehole Depth: 20' bgs
Surface Elevation: 457.16

Geologist: Dave Cornell

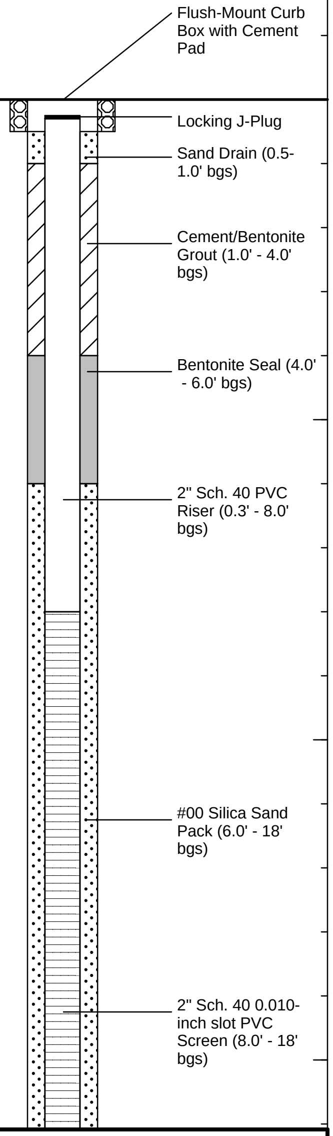
Well/Boring ID: **MW-6**

Client: New York State Electric and Gas Corporation

Location: Wadsworth St.
(Former MGP)
Geneva, NY

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N - Value	PID Headspace (ppm)	Analytical Sample	Stratigraphic Description
460								
0	1	0-2	1.6	3 5 5 7	10	ND		Brown fine Sandy SILT, little Organics (grass, roots), trace fine Gravel, non-plastic, moist. Dark-gray Silty fine SAND, little to some fine to medium sub-rounded Gravel, little Cinders, trace Brick, non-plastic, moist.
455	2	2-4	1.6	11 14 11 15	25	ND		Brown SILT, some Clay, little fine Sand, trace fine Gravel, non-plastic, moist.
5	3	4-6	1.5	3 3 4 5	7	ND		Slight mottling, slightly plastic below 4.0' bgs.
450	4	6-8	1.7	5 5 6 6	11	ND		Brown-gray SILT and CLAY, little to trace fine Sand, mottling, slightly plastic, moist.
	5	8-10	2.0	1 4 5 4	9	ND		
10	6	10-12	1.2	2 2 2 4	4	ND		Brown-gray SILT and fine SAND, trace Clay, non-plastic, saturated.
445	7	12-14	1.0	2 1 6 12	7	ND		Brown Silty fine SAND, little medium Sand and fine to medium sub-rounded Gravel, non-plastic, saturated.
15	8	14-16	1.3	7 9 5 6	14	ND		Gray-brown CLAY, little Silt, 0.5mm-thick SILT and fine SAND seams throughout, plastic, saturated.

Well/Boring Construction



BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect; WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

Client:
New York State Electric and Gas Corporation

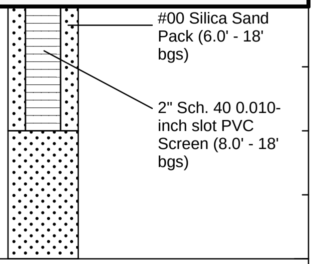
Site Location:
Wadsworth St.
(Former MGP)
Geneva, NY

Well/Boring ID: **MW-6**

Borehole Depth: 20' bgs

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N - Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
	440	9	16-18	0.3	6 7 9 11	16	ND			Gray-brown CLAY, little Silt, 0.5mm-thick SILT and fine SAND seams throughout, plastic, saturated.
		10	18-20	2.0	4 8 10 10	18	ND			Brown-gray CLAY, little Silt, plastic, saturated.
20										
	435									
25										
	430									
30										
	425									
35										

Well/Boring Construction



BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect; WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

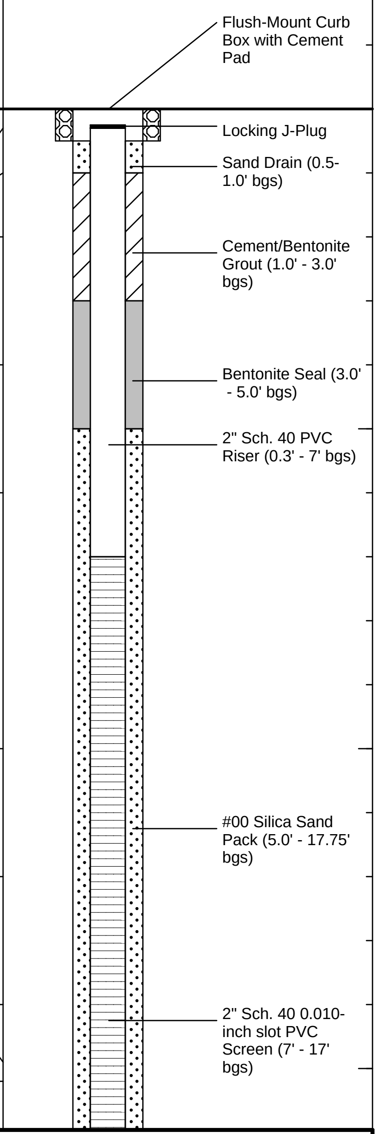
Project: 13057.003
Data File:MW-6.dat

Template:G:\Div 11\Rockware\LogPlot 2001\LogFiles\13057\Wadsworth 2006.ldf
Date: 1/30/06

Date Start/Finish: 9/21/06 **Drilling Company:** Lyon Drilling **Driller's Name:** Harry Lyon, Cregg Brown **Drilling Method:** Hollow Stem Auger **Bit Size:** 8-inch **Auger Size:** 4.25" ID **Rig Type:** CME-55 **Sampling Method:** 2-inch split spoon	**Northing:** 1046283.18 **Easting:** 714103.56 **Casing Elevation:** 457.20' AMSL **Borehole Depth:** 18' bgs **Surface Elevation:** 457.60' AMSL **Geologist:** Sara Klimek	**Well/Boring ID:** MW-7 **Client:** New York State Electric and Gas Corporation **Location:** Wadsworth St. Former MGP Geneva, NY

DEPTH ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N - Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
460									
0	1	0-2	0.8	11 9	20	ND			ASPHALT. Red BRICK. Brown fine to coarse SAND and gray fine to medium angular GRAVEL, trace Ash, no odor, loose, dry.
455	2	2-4	0.4	10 9 5 8	14	ND			Black SILT and red BRICK fragments, no odor, loose, non-plastic.
5	3	4-6	1.45	1 2 3 3	5	ND			Brown Silty CLAY, trace black coloring, slightly plastic, wet.
450	4	6-8	1.9	4 4 7 8	11	ND			Brown Silty CLAY, slightly plastic, wet.
	5	8-10	1.5	5 8 9 10	17	ND			
10	6	10-12	1.9	4 4 3 3	7	ND			Brown Silty CLAY, 0.2" Sand seams, trace black coloring, highly plastic, soft.
445	7	12-14	1.8	1 WOH 1 1	NA	0.2			Brown CLAY, highly plastic, soft, wet.
15	8	14-16	1.5	1 WOH 3 4	NA	ND			Brown CLAY, slightly plastic, stiff, wet. Brown very fine SAND, dense, wet. Brown gray fine to coarse SAND, loose, wet.

Well/Boring Construction



BBL®
BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists

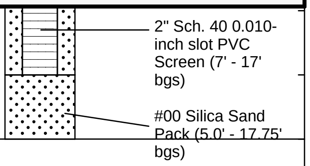
Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect; WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

Client:
New York State Electric and Gas Corporation

Site Location:
Wadsworth St.
Former MGP
Geneva, NY

Well/Boring ID: MW-7

Borehole Depth: 18' bgs

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N - Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
	440	9	16-17.75	1.75	1 1 1 2	2	ND		⁘	Brown gray fine to coarse SAND, loose, wet.	
20											
	435										
25											
	430										
30											
	425										
35											

BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect; WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

Client: New York State Electric and Gas Corporation	**Well/Boring ID:** MW-7
Site Location: Wadsworth St. Former MGP Geneva, NY	**Borehole Depth:** 18' bgs

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N - Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction

BBL®
BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect; WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

Date Start/Finish: 9/21/06
Drilling Company: Lyon Drilling
Driller's Name: Harry Lyon, Cregg Brown
Drilling Method: Hollow Stem Auger
Bit Size: 8-inch
Auger Size: 4.25" ID
Rig Type: CME-55
Sampling Method: 2-inch split spoon

Northing: 1046681.37
Easting: 714242.67
Casing Elevation: 453.15' AMSL

Borehole Depth: 20' bgs
Surface Elevation: 453.61' AMSL

Geologist: Sara Klimek

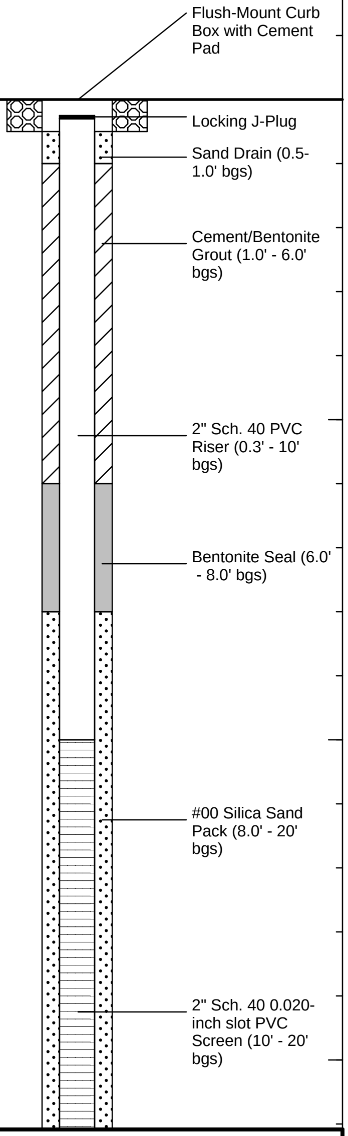
Well/Boring ID: **MW-8**

Client: New York State Electric and Gas Corporation

Location: Wadsworth St.
Former MGP
Geneva, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N - Value	PID Headspace (ppm)	Analytical Sample	Stratigraphic Description
	455								
0		1	0-2	0.9	13 7 5 5	12	ND		Brown fine to coarse SAND and fine to medium angular GRAVEL, loose, dry. Black SILT and ASH, no odor, loose, dry.
	450	2	2-4	1.2	4 4 5 8	9	ND		Brown gray Silty CLAY, trace Brick, trace mottling, slightly plastic, moderately stiff, dry. Dark brown Silty CLAY, little Cinders and fine to medium Gravel, moderately dense, moist.
5		3	4-6	1.2	3 4 5 6	9	ND		Dark brown Silty CLAY, trace brown mottling, slightly plastic, moist to wet.
		4	6-8	1.1	7 6 8 8	14	ND		Trace black coloring below 6' bgs.
	445	5	8-10	1.3	1 3 6 8	9	ND		
10		6	10-12	2.0	2 4 2 4	7	ND		Grading to CLAY, soft, plastic, wet below 11.1' bgs.
	440	7	12-14	2.0	2 1 1 1	2	ND		Brown CLAY, soft becoming very soft at 13.2' bgs, plastic, wet.
15		8	14-16	1.9	WOR WOH 1	NA	ND		Brown CLAY, very soft, highly plastic, wet.

Well/Boring Construction



BBL®
BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect; WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

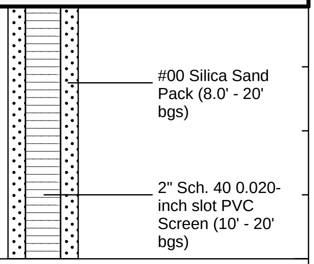
Client:
New York State Electric and Gas Corporation

Site Location:
Wadsworth St.
Former MGP
Geneva, NY

Well/Boring ID: **MW-8**

Borehole Depth: 20' bgs

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N - Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description	Well/Boring Construction
		9	16-18	2.0	1 2 1 2	3	ND		▤	Brown CLAY, very soft, highly plastic, wet. 0.2' thick sand seams at 17.1', 17.5' and 18.4' bgs.	
	435	10	18-20	2.0	1 2 2 3	4	ND		▤		
20											
	430										
25											
	425										
30											
	420										
35											



BBL®
BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists

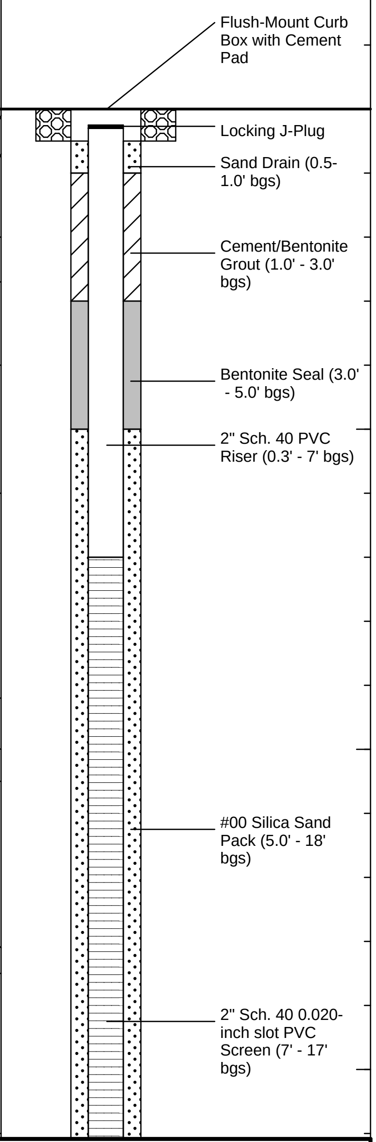
Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect; WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

Project: 13057.003
Data File:MW-8.dat
Template:G:\Div 11\Rockware\LogPlot 2001\LogFiles\13057\Wadsworth 2006.ldf
Date: 9/21/06

Date Start/Finish: 9/18/06	**Northing:** 1046576.36	**Well/Boring ID:** MW-9
Drilling Company: Lyon Drilling	**Easting:** 714329.26	**Client:** New York State Electric and Gas Corporation
Driller's Name: Harry Lyon, Cregg Brown	**Casing Elevation:** 453.15' AMSL	**Location:** Wadsworth St. Former MGP Geneva, NY
Drilling Method: Hollow Stem Auger	**Borehole Depth:** 18' bgs	
Bit Size: 8-inch	**Surface Elevation:** 453.50' AMSL	
Auger Size: 4.25" ID		
Rig Type: CME-55		
Sampling Method: 2-inch split spoon	**Geologist:** Sara Klimek	

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N - Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
	455									
0		1	0-2	1.0	2 2 7 8	9	ND			GRASS. Brown CLAY, trace Silt and Grass, loose, moist. Gray fine to coarse sub-angular GRAVEL and fine to coarse SAND, some red Brick, no odor, moist.
	450	2	2-4	1.0	4 3 3 3	6	ND			Black fine to coarse SAND, trace fine sub-rounded Gravel, non-plastic, wet. Brown CLAY, trace Silt and Organics, loose, moist.
5		3	4-6	1.1	2 3 3 4	6	ND			Brown CLAY, trace Silt, trace black gray mottling, plastic, moist.
		4	6-8	1.5	5 5 5 6	10	ND			Brown gray CLAY, trace Silt, trace black staining below 7' bgs, plastic, moist to wet.
	445	5	8-10	1.9	3 5 3 4	8	ND			Trace black mottling below 8' bgs. Brown gray SILT, little very fine Sand and Clay, no odor, non-plastic, wet.
10		6	10-12	1.3	3 5 7 8	12	ND			Brown gray CLAY, trace Silt, trace black mottling, plastic, moist to wet. Brown gray SILT and CLAY, some fine to coarse Sand, trace fine to coarse sub-rounded Gravel, moderately loose, wet.
	440	7	12-14	1.8	10 5 5 6	10	ND			Saturated below 12' bgs. Brown gray SILT, some Clay, non-plastic, wet. Brown gray CLAY, trace Silt, plastic, wet.
15		8	14-16	1.9	4 5 7 14	12	ND			

Well/Boring Construction



BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect; WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

Client:
New York State Electric and Gas Corporation

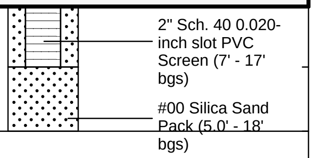
Site Location:
Wadsworth St.
Former MGP
Geneva, NY

Well/Boring ID: MW-9

Borehole Depth: 18' bgs

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blows / 6 Inches	N - Value	PID Headspace (ppm)	Analytical Sample	Geologic Column	Stratigraphic Description
		9	16-18	2.0	9 8 7 12	15	ND			Brown gray CLAY, trace Silt, plastic, wet. Gray CLAY, plastic, moist.
	435									
20										
	430									
25										
	425									
30										
	420									
35										

Well/Boring Construction



BBL®
BLASLAND, BOUCK & LEE, INC.
engineers, scientists, economists

Remarks: a/bgs = above/below ground surface; NA = Not Applicable/Available; ND = Non-Detect; WOR/H = Weight of Rod/Hammer.
Elevations referenced to NGVD 1929.
Northings and Eastings in NY State Plane Central.

Project: 13057.003
Data File:MW-9.dat

Template:G:\Div 11\Rockware\LogPlot 2001\LogFiles\13057\Wadsworth 2006.ldf
Date: 9/18/06

ARCADIS BBL

Appendix B

Vapor Intrusion Evaluation Report

ARCADIS BBL
Infrastructure, environment, facilities

ARCADIS of New York, Inc.
6723 Towpath Road
Syracuse
New York 13214-0066
Tel 315.446.9120
Fax 315.446.8053

Transmittal Letter

To:
Mr. Douglas MacNeal, P.E.
Environmental Engineer I
Bureau of Western Remedial Action
Division of Environmental Remediation
NYSDEC
625 Broadway
Albany, New York 12233-7017

Copies:
Ms. Debbie McNaughton, NYSDOH
Mr. John Ruspantini, NYSEG
Mr. Gordon Eddington, City of Geneva

From:
Scott A. Powlin SAP

Date:
August 23, 2007

Subject:
Geneva (Wadsworth St.) Former MGP Site VI Evaluation Report

ARCADIS BBL Project No.:
BB0013057

We are sending you:
☒ **Attached** ☐ **Under Separate Cover Via _________ the Following Items:**

☐ Shop Drawings
☐ Prints
☐ Other:
☐ Work Plan
☐ Samples
☐ Specifications
☐ Copy of Letter
☐ Change Order
☒ Reports

Copies	Date	Drawing No.	Rev.	Description	Action*
1	Aug. 2007			Hardcopy – Revised Vapor Intrusion Evaluation Report	FA
1	Aug. 2007			CD – Revised Vapor Intrusion Evaluation Report	FA

Action*
☐ A Approved
☐ AN Approved As Noted
☐ AS As Requested
☐ Other:
☐ CR Correct and Resubmit
☐ F File
☒ FA For Approval
☐ Resubmit _____ Copies
☐ Return _____ Copies
☐ Review and Comment

Mailing Method
☐ U.S. Postal Service 1st Class
☐ Certified/Registered Mail
☐ Other:
☐ Courier/Hand Delivery
☐ United Parcel Service (UPS)
☐ FedEx Priority Overnight
☒ FedEx Standard Overnight
☐ FedEx 2-Day Delivery
☐ FedEx Economy

Comments: Doug: On behalf of NYSEG, attached is the referenced document for your approval. Note that in addition to modifying the conclusions of the report, we also changed Table 1 to recalculate the total BTEX concentrations. The Table 1 included with the May 2007 draft report did not calculate the total BTEX concentrations accurately. Please contact John Ruspantini by phone at 607.762.8787 or by e-mail at jjruspantini@nyseg.com if you have any questions.

ARCADIS BBL
Infrastructure, environment, facilities

Imagine the result

New York State Electric & Gas Corporation

Vapor Intrusion Evaluation Report

Geneva (Wadsworth Street) Former MGP Site
Geneva, New York

May 2007
(Revised August 2007)

ARCADIS BBL

Vapor Intrusion Evaluation Report

Geneva (Wadsworth Street)
Former MGP Site
Geneva, New York

Keith A. White

Keith A. White, C.P.G.
Associate

Scott A. Powlin
Sr. Geologist I

Prepared for:
New York State Electric & Gas
Corporation

Prepared by:
ARCADIS of New York, Inc.
6723 Towpath Road
Syracuse
New York 13214-0066
Tel 315.446.9120
Fax 315.446.8053

Our Ref.:
B0013057

Date:
August 2007

Table of Contents

Tables

Figure

Attachments

Introduction

This report is submitted on behalf of New York State Electric & Gas Corporation (NYSEG) and presents laboratory analytical results for a vapor intrusion evaluation performed at the City of Geneva Public Safety Building (PSB) located at 255 Exchange Street in Geneva, New York. The PSB is partially located on property formerly occupied by a manufactured gas plant (MGP). The evaluation was conducted as an element of the remedial investigation of the former MGP, known formally as the Wadsworth Street former MGP site (the “site”).

Sampling Activities

Representatives from the City of Geneva, the New York State Department of Health (NYSDOH), and ARCADIS of New York, Inc. (ARCADIS BBL, formerly known as Blasland, Bouck & Lee, Inc.) performed a building walk-over on December 18, 2006 to select sub-slab vapor and indoor air sampling locations. Based on discussions with the NYSDOH during the building walk-over and review of demolition plans for a former service garage that previously occupied the site, co-located sub-slab and indoor air samples were collected at three locations in the PSB (locations SS-1/IA-1, SS-2/IA-2, and SS-3/IA-3), and an ambient air sample was collected outside the building (location AA-1). Samples SS-1/IA-1 and SS-2/IA-2 were collected in the men’s and women’s cell block areas, respectively, and sample SS-3/IA-3 was collected in the custodial/maintenance closet. These areas were chosen for sampling because historical mapping suggests that several MGP structures may have once existed near or below these areas. The building layout and the sampling locations are shown on Figure 1.

On March 21, 2007, ARCADIS BBL conducted a pre-sampling building walk-through and interviewed the head of the City of Geneva Building, Grounds, and Parks Department (Mr. Mark Perry) to complete the NYSDOH Indoor Air Quality Questionnaire, included as Appendix B to the NYSDOH document titled *Guidance for Evaluating Soil Vapor Intrusion in the State of New York*, dated October 2006 (the ”NYSDOH Soil Vapor Intrusion Guidance”). The completed questionnaire is included in Attachment A. Following the building walk-through, samples were collected in accordance with the procedures detailed in the *Soil Vapor Intrusion Evaluation Work Plan* (ARCADIS BBL, February 2007). Each sample was collected using a 6-liter SUMMA® canister with an attached, pre-set flow regulator. The laboratory-supplied, batch-certified-clean canisters and flow regulators were pre-set to uniformly collect samples over an approximately 2-hour sampling period (i.e., a flow rate of approximately 50 milliliters per minute). Photographs taken by ARCADIS BBL during the sampling activities are included in Attachment B. Copies of the field sampling logs are presented in Attachment C.

After sampling was completed, the slab penetrations (i.e., cored concrete holes) for the sub-slab vapor sampling were restored using hydraulic cement. Samples were submitted to Severn Trent Laboratories, Inc. (STL) of Knoxville, Tennessee and analyzed in accordance with United States Environmental Protection Agency (USEPA) Compendium Method TO-15. STL– Knoxville is certified in the State of New York to perform air analyses. Each sample was analyzed for volatile organic compounds

(VOCs) included in the laboratory’s standard TO-15 Target Analyte List, plus n-alkanes and VOC tentatively-identified compounds (TICs) to provide additional data (if needed) to help differentiate between potential sources. The sub-slab vapor samples were also analyzed for a tracer gas (helium) in accordance with ASTM Method D1946 to provide a mechanism for evaluating the integrity of the seal at each sub-slab sampling point.

The laboratory analytical data report is provided on the attached compact disc. ARCADIS BBL validated the data in accordance with the USEPA National Functional Guidelines dated October 1999. The data validation report is included in Attachment D. Validated sub-slab vapor, indoor air, and ambient air analytical results for VOCs are presented in Table 1. The validated sub-slab vapor analytical results for helium are presented in Table 2.

Sampling Results and Discussion

Several VOCs were identified in vapor samples collected beneath the PSB floor slab, in the air inside the building, and in ambient air. The helium tracer gas was not detected in any of the sub-slab vapor samples, which indicates that the seal was adequate and sub-slab vapor samples were not diluted by surface air during sample collection.

New York State does not currently have standards, criteria, or guidance values (SCGs) for concentrations of compounds in subsurface vapors. The concentrations detected in indoor air are all less than the NYSDOH indoor air guidance values presented in Section 3.2.5 (Table 3.1) of the NYSDOH Soil Vapor Intrusion Guidance. The detected indoor air concentrations are also less than the 90th percentile of background indoor air levels observed by the USEPA in public and commercial office buildings as referenced in Section 3.2.4 of the NYSDOH Soil Vapor Intrusion Guidance. Five VOC constituents (1,2,4-trichlorobenzene, carbon tetrachloride, styrene, toluene, and trichloroethene) were detected in indoor air at concentrations slightly above the 75th percentile of background values observed by the NYSDOH in a study of single-family fuel oil heated homes as referenced in Section 3.2.4 of the NYSDOH Soil Vapor Intrusion Guidance. One VOC constituent (m- and p-xylene) was detected in outdoor air at a concentration slightly above the 75th percentile of background values observed by the NYSDOH in a study of single-family fuel oil heated homes as referenced in Section 3.2.4 of the NYSDOH Soil Vapor Intrusion Guidance.

Despite the fact that trichoroethene did not exceed the NYSDOH Soil Vapor Intrusion guidance value listed in Section 3.2.5 (Table 3.1), this same guidance document includes a decision matrix for trichloroethene (Section 3.4 Decision Matrix 1), which indicates the results for sampling location SS-3/IA-3 should be addressed as follows: "Take reasonable and practical actions to identify source(s) and to reduce exposure". It should be noted that trichloroethene is not associated with former MGP operations. Accordingly, the property owner (the City) should consult directly with the NYSDOH to determine the applicability of this guidance to the PSB, and any action that should be taken in regard to the detection of trichloroethene.

Conclusions and Recommendations

It is not possible to attribute the constituents detected in sub-slab vapor, indoor air, and outdoor air to a particular source. However, the chemical signature of the VOCs detected in indoor air is typically associated with common cleaning products, solvents, pesticides, fire extinguishers, paint removers, refrigerants, and/or gasoline. While MGP-related waste materials do contain some of the same VOCs as gasoline, most notably benzene, toluene, ethylbenzene and xylenes (BTEX), the chlorinated VOCs (such as 1,2,4-trichlorobenzene and carbon tetrachloride) are not related to former MGP operations. The presence of numerous alkanes (e.g., n-butane, n-decane, etc.) suggests that the BTEX detected in the indoor air samples are from a gasoline source. Based on the investigation results, the former MGP does not appear to be contributing VOCs to the indoor air at the PSB.

Upon review of the vapor intrusion data, concern regarding the concentrations of BTEX and naphthalene in the sub-slab vapor samples was raised by NYSDEC/NYSDOH in a June 12, 2007 letter from NYSDEC (See Attachment E). NYSDEC and NYSDOH believe that the concentrations of BTEX and naphthalene compounds detected in sub-slab vapor of the PSB have the potential for future vapor intrusion into the building. In the June 12 letter, NYSDEC recommended that either a sub-slab depressurization system be installed in the PSB to mitigate the potential for future vapor intrusion or to conduct additional vapor sampling at the PSB during the 2007/2008 heating season to further evaluate vapor intrusion potential.

BTEX and naphthalene are components of both petroleum products (e.g., gasoline) and MGP wastes; however, several paraffins (e.g., n-butane, n-decane, etc.) and methyl tert-butyl ether (MTBE), which were also detected in the sub-slab vapor samples, suggest a gasoline source. The PSB was previously used as an automotive repair shop known as Tallmadge Tire.

Although the results of the sub-slab vapor sampling suggest that the BTEX and naphthalene may be related to a gasoline source, the groundwater data from one of the five monitoring wells proximate to the PSB (i.e., MW-3, located just north of the PSB), exhibit characteristics likely related to MGP waste (i.e., polycyclic aromatic hydrocarbons, total cyanide, and BTEX). In light of this, it is possible that some fraction of the BTEX and naphthalene measured in the sub-slab vapor samples may be attributed to MGP wastes and that there could be sub-slab vapor phase commingling of these compounds from both a gasoline and an MGP source. Accordingly, NYSEG is in agreement with the recommendation for the additional measures set forth by NYSDEC and NYSDOH in the June 12 letter from NYSDEC.

In discussions conducted during a meeting between NYSEG, NYSDEC, NYSDOH and the City of Geneva on July 18, 2007 (meeting minutes presented in Attachment F), options to install a sub-slab depressurization system in the PSB or conduct additional vapor sampling at the PSB during the 2007/2008 heating season were presented to the City. The decision as to which course of action will be implemented will be largely influenced by the desires of the City, who currently have the matter under consideration.

TABLES

Table 1. Subslab Vapor, Indoor Air, & Ambient Air VOC Analytical Results (ug/m3)
Vapor Intrusion Evaluation, New York State Electric & Gas Corporation, Wadsworth Former MGP Site, Geneva, New York

	NYSDOH Fuel Oil Heated Homes Outdoor Air (Exceedences in Bold)	NYSDOH Fuel Oil Heated Homes Indoor Air (Exceedences Shaded)	NYSDOH Indoor Air Guidance Value (No Exceedences)	USEPA Indoor Air Background Level (No Exceedences)	VOC Analytical Results (ug/m3)						
					Ambient (Outdoor) Air	Indoor Air			Subslab Vapor		
Sample ID:					**AA-1**	**IA-1**	**IA-2**	**IA-3**	**SS-1**	**SS-2**	**SS-3**
Volatile Organic Compounds (VOCs)											
1,1,1-Trichloroethane	0.3	1.1	- -	20.6	<1.1	<1.1	<1.1	<1.1	<1.1 [<1.1]	11	23
1,1,2,2-Tetrachloroethane	< 0.25	< 0.25	- -	- -	<1.4	<1.4	<1.4	<1.4	<1.4 [<1.4]	<1.4	<1.4
1,1,2-Trichloro-1,2,2-trifluoroethane	- -	- -	- -	- -	0.49 J	0.72 J	0.63 J	0.81 J	0.61 J [0.58 J]	0.67 J	0.70 J
1,1,2-Trichloroethane	< 0.25	< 0.25	- -	< 1.5	<1.1	<1.1	<1.1	<1.1	<1.1 [<1.1]	<1.1	<1.1
1,1-Dichloroethane	< 0.25	< 0.25	- -	< 0.7	<0.81	<0.81	<0.81	<0.81	<0.81 [<0.81]	<0.81	<0.81
1,1-Dichloroethene	< 0.25	< 0.25	- -	< 1.4	<0.79	<0.79	<0.79	<0.79	<0.79 [<0.79]	<0.79	<0.79
1,2,4-Trichlorobenzene	< 0.25	< 0.25	- -	< 6.8	<7.4	2.9 J	0.76 J	0.75 J	0.76 J [2.0 J]	1.6 J	<7.4 J
1,2,4-Trimethylbenzene	0.8	4.3	- -	9.5	0.55 J	0.55 J	0.53 J	0.47 J	7.3 [5.1]	8.1	13
1,2-Dibromoethane	< 0.25	< 0.25	- -	< 1.5	<1.5	<1.5	<1.5	<1.5	<1.5 [<1.5]	<1.5	<1.5
1,2-Dichloro-1,1,2,2-tetrafluoroethane	< 0.25	< 0.25	- -	- -	<1.4	<1.4	<1.4	<1.4	<1.4 [<1.4]	<1.4	<1.4
1,2-Dichlorobenzene	< 0.25	< 0.25	- -	< 1.2	<1.2	<1.2	<1.2	<1.2	<1.2 [0.58 J]	<1.2	<1.2
1,2-Dichloroethane	< 0.25	< 0.25	- -	< 0.9	<0.81	<0.81	<0.81	<0.81	<0.81 [<0.81]	<0.81	<0.81
1,2-Dichloropropane	< 0.25	< 0.25	- -	< 1.6	<0.92	<0.92	<0.92	<0.92	<0.92 [<0.92]	<0.92	<0.92
1,3,5-Trimethylbenzene	0.3	1.7	- -	3.7	<0.98	<0.98	0.33 J	<0.98	2.6 [1.9]	3.5	7.1
1,3-Dichlorobenzene	< 0.25	< 0.25	- -	< 2.4	<1.2	<1.2	<1.2	<1.2	<1.2 [<1.2]	<1.2	<1.2
1,4-Dichlorobenzene	< 0.25	0.5	- -	5.5	<1.2	<1.2	<1.2	<1.2	<1.2 [0.43 J]	1.6	3.9
Benzene	2.2	5.9	- -	9.4	0.50 J	1.0	1.2	0.97	0.71 [0.44 J]	4.0	11
Bromomethane	< 0.25	< 0.25	- -	< 1.7	<0.78	<0.78	<0.78	<0.78	<0.78 [<0.78]	<0.78	<0.78
Carbon Tetrachloride	0.6	0.6	- -	< 1.3	0.42 J	0.67 J	0.79 J	0.61 J	0.62 J [0.40 J]	0.27 J	<1.3
Chlorobenzene	< 0.25	< 0.25	- -	< 0.9	<0.92	<0.92	<0.92	<0.92	<0.92 [<0.92]	<0.92	<0.92
Chloroethane	< 0.25	< 0.25	- -	< 1.1	<0.53	<0.53	<0.53	<0.53	<0.53 [<0.53]	<0.53	<0.53
Chloroform	< 0.25	0.5	- -	1.1	<0.98	<0.98	<0.98	<0.98	<0.98 [<0.98]	<0.98	0.32 J
Chloromethane	1.8	1.8	- -	3.7	1.1	1.5	1.7	1.5	0.39 J [<1.0]	0.95 J	<1.0
cis-1,2-Dichloroethene	< 0.25	< 0.25	- -	< 1.9	<0.79	<0.79	<0.79	<0.79	<0.79 [<0.79]	<0.79	<0.79
cis-1,3-Dichloropropene	< 0.25	< 0.25	- -	< 2.3	<0.91	<0.91	<0.91	<0.91	<0.91 [<0.91]	<0.91	<0.91
Dichlorodifluoromethane	4.2	4.1	- -	16.5	2.1	2.9	2.4	3.4	2.5 [2.2]	2.7	3.4
Ethylbenzene	0.5	2.8	- -	5.7	0.27 J	0.66 J	0.59 J	1.2	16 [10]	7.0	61
Hexachlorobutadiene	- -	- -	- -	< 6.8	<11	<11	<11	<11	<11 [<11]	<11	<11
Isopropylbenzene	< 0.25	0.4	- -	- -	<2.0	<2.0	<2.0	<2.0	2.7 [1.7 J]	0.57 J	9.5
Methyl tert-butyl ether	- -	- -	- -	11.5	<3.6	<3.6	<3.6	<3.6	<3.6 [<3.6]	0.47 J	1.7 J
Methylene Chloride	0.7	6.6	60	10	<1.7	<1.7	<1.7	<1.7	<1.7 [<1.7]	<1.7	<1.7
m-Xylene & p-Xylene	0.5	4.6	- -	- -	**0.93**	2.0	1.9	4.1	89 [53]	33	260
Naphthalene	- -	- -	- -	5.1	0.50 J	<2.6	<2.6	<2.6	3.6 [1.7 J]	23	2.4 J
n-Butane	- -	- -	- -	- -	1.0	2.6	2.3	3.4	2.6 [1.8]	33	61
n-Decane	- -	- -	- -	17.5	<5.8	0.35 J	<5.8	2.2 J	4.5 J [3.0 J]	21	88
n-Dodecane	- -	- -	- -	- -	<7.0	0.87 J	<7.0	1.2 J	20 [16]	19	28

See Notes on Page 3.

Table 1. Subslab Vapor, Indoor Air, & Ambient Air VOC Analytical Results (ug/m3]
Vapor Intrusion Evaluation, New York State Electric & Gas Corporation, Wadsworth Former MGP Site, Geneva, New York

Sample ID:	NYSDOH Fuel Oil Heated Homes Outdoor Air (Exceedences in Bold)	NYSDOH Fuel Oil Heated Homes Indoor Air (Exceedences Shaded)	NYSDOH Indoor Air Guidance Value (No Exceedences)	USEPA Indoor Air Background Level (No Exceedences)	VOC Analytical Results (ug/m3)						
					Ambient (Outdoor) Air	Indoor Air			Subslab Vapor		
					AA-1	IA-1	IA-2	IA-3	SS-1	SS-2	SS-3
VOCs (Cont'd.)											
n-Heptane	1.9	7.6	- -	- -	<2.0	0.40 J	0.43 J	0.61 J	2.0 J [1.3 J]	23	42
n-Hexane	1	5.9	- -	10.2	0.20 J	0.42 J	0.37 J	0.47 J	2.8 [2.1]	19	42
n-Octane	- -	- -	- -	- -	<1.9	<1.9	<1.9	0.38 J	2.2 [1.2 J]	26	88
Nonane	- -	- -	- -	7.8	<2.6	<2.6	<2.6	0.31 J	3.2 [1.9 J]	27	59
n-Undecane	- -	- -	- -	22.6	<6.4	0.38 J	<6.4	0.76 J	13 [9.9]	21	34
o-Xylene	0.6	3.1	- -	7.9	0.30 J	0.69 J	0.72 J	1.3	33 [20]	10	92
Pentane	- -	- -	- -	- -	0.62 J	1.3 J	0.95 J	0.97 J	1.5 J [1.3 J]	19	38
Styrene	< 0.25	0.6	- -	1.9	<0.85	0.63 J	0.18 J	0.26 J	0.25 J [<0.85]	0.46 J	1.1
Tetrachloroethene	0.3	1.1	100	15.9	<1.4	<1.4	0.31 J	0.24 J	0.77 J [1.9]	14	9.1
Toluene	2.4	25	- -	43	0.74	2.4	2.5	26	5.3 J [3.2 J]	17	68
trans-1,3-Dichloropropene	< 0.25	< 0.25	- -	< 1.3	<0.91	<0.91	<0.91	<0.91	<0.91 [<0.91]	<0.91	<0.91
Trichloroethene	< 0.25	< 0.25	5	4.2	<1.1	<1.1	<1.1	0.72 J	<1.1 [<1.1]	<1.1	0.20 J
Trichlorofluoromethane	2.2	5.4	- -	18.1	1.1	1.4	1.2	1.7	1.2 [1.3]	1.2	1.5
Vinyl Chloride	< 0.25	< 0.25	- -	< 1.9	<0.51	<0.51	<0.51	<0.51	<0.51 [<0.51]	<0.51	<0.51
VOC Tentatively Identified Compounds (TICs)											
1,2,3-trimethylbenzene	- -	- -	- -	- -	ND	ND	ND	ND	ND [ND]	ND	ND
1-Methylnaphthalene	- -	- -	- -	- -	ND	ND	ND	ND	ND [ND]	4.8	ND
2,2,4-Trimethyl pentane	- -	- -	- -	- -	ND	ND	ND	ND	ND [ND]	39	ND
2,3-dimethylheptane	- -	- -	- -	- -	ND	ND	ND	ND	ND [ND]	ND	ND
2,3-dimethylpentane	- -	- -	- -	- -	ND	ND	ND	ND	ND [ND]	ND	ND
2-Methylnaphthalene	- -	- -	- -	- -	ND	ND	ND	ND	ND [ND]	2.5	ND
Butylcyclohexane	- -	- -	- -	- -	ND	ND	ND	ND	ND [ND]	ND	ND
Indane	- -	- -	- -	- -	ND	ND	ND	ND	ND [ND]	ND	ND
Indene	- -	- -	- -	- -	ND	ND	ND	ND	ND [ND]	ND	ND
Isopentane	- -	- -	- -	- -	ND	ND	ND	ND	ND [ND]	57	52
Thiopene	- -	- -	- -	- -	ND	ND	ND	ND	ND [ND]	ND	ND
Totals											
Total BTEX	- -	- -	- -	- -	2.7 J	6.8 J	6.9 J	34	140 J [87 J]	71	490
Total VOCs	- -	- -	- -	- -	11 J	26 J	21 J	56 J	220 J [150 J]	450 J	1,100 J

See Notes on Page 3.

Table 1. Subslab Vapor, Indoor Air, & Ambient Air VOC Analytical Results (ug/m3)
Vapor Intrusion Evaluation, New York State Electric & Gas Corporation, Wadsworth Former MGP Site, Geneva, New York

Notes:

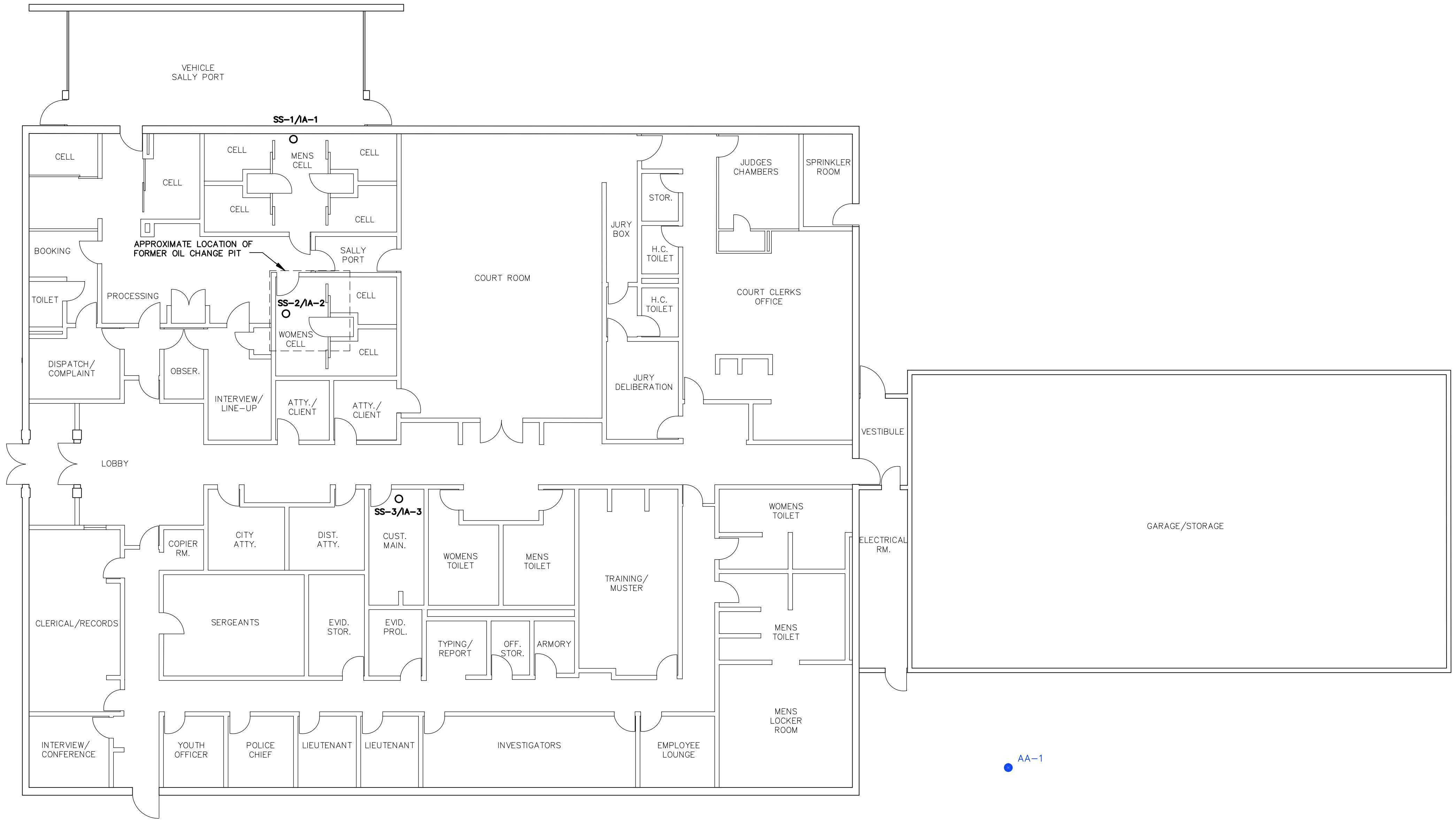
1. Samples were collected by ARCADIS BBL on March 21, 2007.
2. Samples were analyzed for volatile organic compounds (VOCs) by Severn Trent Laboratories, Inc. (STL) of Knoxville, Tennessee using United States Environmental Protection Agency (USEPA) Compendium Method TO-15.
3. Sample designations indicate the following:
   - "SS" = subslab vapor sample
   - "IA" = indoor air sample
   - "AA" = ambient (outdoor) air sample
4. "NYSDOH Fuel Oil Heated Home Outdoor Air" and "NYSDOH Fuel Oil Heated Home Indoor Air" are the 75th percentile of values observed by the NYSDOH in a study of homes that heat with fuel oil, per NYSDOH database information presented in Appendix C of the "Guidance for Evaluating Soil Vapor Intrusion in the State of New York" (NYSDOH, October 2006).
5. "NYSDOH Indoor Air Guidance Value" is from the "Guidance for Evaluating Soil Vapor in the State of New York" (NYSDOH, October 2006). No indoor air sample results exceeded NYSDOH Indoor Air Guidance Values.
6. "USEPA Indoor Air Background Levels" are the 90th percentile of background indoor air values observed by the USEPA in public and commercial office buildings, per USEPA database information referenced in Section 3.2.4 of the "Guidance for Evaluating Soil Vapor Intrusion in the State of New York" (NYSDOH, October 2006). No Indoor air sample results exceeded USEPA Indoor Air Background Levels.
7. Ambient (outdoor) air sample results that exceeded NYSDOH Fuel Oil Heated Home Outdoor Air values are presented in bold font.
8. Indoor air sample results that exceeded NYSDOH Fuel Oil Heated Home Indoor Air 75th percentile values are shaded.
9. Concentrations reported in micrograms per cubic meter (ug/m^3).
10. < = Not detected at or above the associated reporting limit.
11. J - Indicates an estimated value.
12. ND - Not Detected.
13. TIC = Tentatively Identified Compound.
14. -- = Comparison value not available.
15. Field duplicate sample results are presented in brackets.
16. Results have been validated by ARCADIS BBL.

Table 2. **Subslab Vapor Helium Analytical Results (%v/v)**
Vapor Intrusion Evaluation, New York State Electric & Gas Corporation, Wadsworth Former MGP Site, Geneva, New York

Sample ID:	SS-1	SS-2	SS-3
Helium	<0.34 [<0.24]	<0.25	< 0.27

Notes:
1. Samples were collected by ARCADIS BBL on March 21, 2007.
2. Samples were analyzed for helium by Severn Trent Laboratories, Inc. (STL) of Knoxville, Tennessee using ASTM Method D1946.
3. Concentrations reported in percent volume (%v/v).
4. < = Not detected at or above the associated reporting limit.
5. Field duplicate sample results are presented in brackets.
6. Results have been validated by ARCADIS BBL.

FIGURE



FLOOR PLAN

LEGEND:

○	SUB-SLAB/INDOOR AIR SAMPLING LOCATION
●	AMBIENT AIR SAMPLING LOCATION
- - -	APPROXIMATE LOCATION OF FORMER OIL CHANGE PIT.

NOTES:

1. INTERIOR FLOOR PLAN WAS DIGITIZED FROM BELL & SPINA PUBLIC SAFETY BUILDING FIGURE TITLED FLOOR PLAN, SHEET 2 OF 28, DATED FEBRUARY 10, 1997, SCALE 3/16 = 1'-0" .
2. EXTERIOR BUILDING WALLS BASED ON SURVEYS COMPLETED BY NYSEG ON DECEMBER 14, 2005 AND OCTOBER 2006.
3. APPROXIMATE LOCATION OF THE FORMER OIL CHANGE PIT IS BASED ON BELL & SPINA PUBLIC SAFETY BUILDING FIGURE TITLED DEMOLITION PLAN, SHEET 6 OF 28, DATED FEBRUARY 10, 1997, SCALE 1/8 = 1'-0".
4. SAMPLING LOCATIONS ARE BASED ON TIE DISTANCE MEASUREMENTS OBTAINED DURING SAMPLING.

0 20' 40'
GRAPHIC SCALE

NEW YORK STATE ELECTRIC AND GAS
GENEVA (WADSWORTH ST.)
FORMER MGP SITE
SOIL VAPOR INTRUSION EVALUATION REPORT

PUBLIC SAFETY BUILDING SAMPLING LOCATIONS

ARCADIS BBL
Infrastructure, environment, facilities

FIGURE
1

SYR-85-PRO RCB WJJ LAYER: ON=*, OFF=*REF*
G:\CAD\ACTIVE\-DWG\ACT\13057004\13057B04.dwg SAVED:5/4/2007 3:12 PM LAYOUT:1 PAGESETUP:---- PENTABLE:PLTFULL.CTB PRINTED:5/4/2007 3:14 PM BY:WJONES
PROJECTNAME:----
XREFS: IMAGES:

ATTACHMENTS

ARCADIS BBL

Attachment A

NYSDOH Indoor Air Quality Questionnaire and Building Inventory Forms

OSR – 3

NEW YORK STATE DEPARTMENT OF HEALTH
INDOOR AIR QUALITY QUESTIONNAIRE AND BUILDING INVENTORY
CENTER FOR ENVIRONMENTAL HEALTH

This form must be completed for each residence involved in indoor air testing.

Preparer's Name Chris Angier Date/Time Prepared March 21, 2007 11 AM

Preparer's Affiliation ARCADIS Phone No. 446-2570

Purpose of Investigation Evaluate SS + IA

1. OCCUPANT:

Interviewed: [✓ Y] / N

Last Name: Perry First Name: Mark

Address: 47 Castle Street

County: Ontario

Home Phone: ________ Office Phone: (315) 789-7271

Number of Occupants/persons at this location ______ Age of Occupants ________

2. OWNER OR LANDLORD: (Check if same as occupant ___)

Interviewed: Y / N

Last Name: ________ First Name: ________

Address: ________

County: ________

Home Phone: ________ Office Phone: ________

3. BUILDING CHARACTERISTICS

Type of Building: (Circle appropriate response)

Residential School [✓ Commercial/Multi-use]
Industrial Church Other: ________

If the property is residential, type? (Circle appropriate response)

Ranch
Raised Ranch
Cape Cod
Duplex
Modular

2-Family
Split Level
Contemporary
Apartment House
Log Home

3-Family
Colonial
Mobile Home
Townhouses/Condos
Other:______________

If multiple units, how many? ________

If the property is commercial, type?

Business Type(s) Police Department, City Court

Does it include residences (i.e., multi-use)? Y / N If yes, how many? ______

Other characteristics:

Number of floors 1

Building age 50 ±

Is the building insulated? [✓ Y] / N

How air tight? [✓ Tight] / Average / Not Tight

4. AIRFLOW

Use air current tubes or tracer smoke to evaluate airflow patterns and qualitatively describe:

Airflow between floors

N/A

Airflow near source

Outdoor air infiltration

Infiltration into air ducts

5. BASEMENT AND CONSTRUCTION CHARACTERISTICS (Circle all that apply)

a. Above grade construction: wood frame concrete → block wall stone brick

b. Basement type: None full crawlspace slab other ________

c. Basement floor: [✓ concrete] dirt stone other ________

d. Basement floor: uncovered [✓ covered] covered with tile, carpet in some areas

e. Concrete floor: unsealed [✓ sealed] sealed with paint

f. Foundation walls: poured [✓ block] stone other ________

g. Foundation walls: unsealed [✓ sealed] sealed with paint

h. The basement is: wet damp dry moldy

i. The basement is: finished unfinished partially finished

j. Sump present? Y [✓ N]

k. Water in sump? Y / N / not applicable

Basement/Lowest level depth below grade: 0 (feet)

Identify potential soil vapor entry points and approximate size (e.g., cracks, utility ports, drains)

Floor drains

6. HEATING, VENTING and AIR CONDITIONING (Circle all that apply)

Type of heating system(s) used in this building: (circle all that apply – note primary)

[✓ Hot air circulation] Heat pump Hot water baseboard
Space Heaters Stream radiation Radiant floor
Electric baseboard Wood stove Outdoor wood boiler Other ________

The primary type of fuel used is:

[✓ Natural Gas] Fuel Oil Kerosene
Electric Propane Solar
Wood Coal

Domestic hot water tank fueled by: Natural Gas

Boiler/furnace located in: Basement [✓ Outdoors] Main Floor Other ________

Air conditioning: [✓ Central Air] Window units Open Windows None

Are there air distribution ducts present? [✓ Y] / N

Describe the supply and cold air return ductwork, and its condition where visible, including whether there is a cold air return and the tightness of duct joints. Indicate the locations on the floor plan diagram.

Cold air return is present, ductwork is tight, completely rebuilt in 1997 - 1998

7. OCCUPANCY

Is basement/lowest level occupied? Full-time Occasionally Seldom Almost Never

Level	**General Use of Each Floor (e.g., familyroom, bedroom, laundry, workshop, storage)**
Base~~ment~~	None
1st Floor	City Court, Offices, Police Department
2nd Floor	
3rd Floor	
4th Floor	

8. FACTORS THAT MAY INFLUENCE INDOOR AIR QUALITY

a. **Is there an attached garage?** [✓ Y] / N

b. **Does the garage have a separate heating unit?** [✓ Y] / N / NA

c. **Are petroleum-powered machines or vehicles stored in the garage** (e.g., lawnmower, atv, car) [✓ Y] / N / NA
Please specify Trucks

d. **Has the building ever had a fire?** Y / [✓ N] When?

e. **Is a kerosene or unvented gas space heater present?** Y / [✓ N] Where?

f. **Is there a workshop or hobby/craft area?** Y / [✓ N] Where & Type?

g. **Is there smoking in the building?** Y / [✓ N] How frequently?

h. **Have cleaning products been used recently?** [✓ Y] / N When & Type? 5 days a week Clean restrooms, floors, etc.

i. Have cosmetic products been used recently? Y / [✓ N] When & Type? ______________

j. Has painting/staining been done in the last 6 months? Y / [✓ N] Where & When? ______________

k. Is there new carpet, drapes or other textiles? Y / [✓ N] Where & When? ______________

l. Have air fresheners been used recently? Y / [✓ N] When & Type? ______________

m. Is there a kitchen exhaust fan? Y / [✓ N] If yes, where vented? ___________

n. Is there a bathroom exhaust fan? Y / [✓ N] If yes, where vented? ___________

o. Is there a clothes dryer? Y / [✓ N] If yes, is it vented outside? Y / N

p. Has there been a pesticide application? Y / [✓ N] When & Type? ______________

Are there odors in the building? Y / [✓ N]
If yes, please describe: ____

Do any of the building occupants use solvents at work? Y / [✓ N]
(e.g., chemical manufacturing or laboratory, auto mechanic or auto body shop, painting, fuel oil delivery, boiler mechanic, pesticide application, cosmetologist

If yes, what types of solvents are used? ______________________________________

If yes, are their clothes washed at work? Y / N

Do any of the building occupants regularly use or work at a dry-cleaning service? (Circle appropriate response)

Yes, use dry-cleaning regularly (weekly)
Yes, use dry-cleaning infrequently (monthly or less)
Yes, work at a dry-cleaning service
No
[✓ Unknown]

Is there a radon mitigation system for the building/structure? Y / [✓ N] Date of Installation: __________
Is the system active or passive? Active/Passive

9. WATER AND SEWAGE

Water Supply: [✓ Public Water] Drilled Well Driven Well Dug Well Other: ______

Sewage Disposal: [✓ Public Sewer] Septic Tank Leach Field Dry Well Other: ______

10. RELOCATION INFORMATION (for oil spill residential emergency)

a. Provide reasons why relocation is recommended: ______________________________

b. Residents choose to: remain in home relocate to friends/family relocate to hotel/motel

c. Responsibility for costs associated with reimbursement explained? Y / N

d. Relocation package provided and explained to residents? Y / N

11. FLOOR PLANS

Draw a plan view sketch of the basement and first floor of the building. Indicate air sampling locations, possible indoor air pollution sources and PID meter readings. If the building does not have a basement, please note.

Basement: None

First Floor: Refer to Figure 1

12. OUTDOOR PLOT Refer to SVI Work Plan

Draw a sketch of the area surrounding the building being sampled. If applicable, provide information on spill locations, potential air contamination sources (industries, gas stations, repair shops, landfills, etc.), outdoor air sampling location(s) and PID meter readings.

Also indicate compass direction, wind direction and speed during sampling, the locations of the well and septic system, if applicable, and a qualifying statement to help locate the site on a topographic map.

Product Inventory Form: City of Geneva Public Safety Building, 255 Exchange Street, Geneva, New York

Make & Model of Field Instrument Used: RAE Systems – ppbRAE, Background PID reading = 40 ppb
List specific products found in the residence that have the potential to affect indoor air quality

Location	Product Description	Size (units)	Condition*	Manufacturer	Field Instrument Reading (ppb)	Product Ingredients	CAS #	Photo** (Y/N)
Maintenance Closet	Minwax Wood Finish	0.5 gallon	U	Minwax Company 10 Mountainview Road Upper Saddle River, NJ 07458 Phone: 800-523-9299	40	Aliphatic Hydrocarbons		N
Maintenance Closet	Woodpride Polyuerethane Varnish	0.5 gallon	U		40		136-52-7 112926-00-8 8052-41-3 68333-62-0 66070-62-0 68188-21-6 64741-65-7 71-43-2 64742-47-8	N
Maintenance Closet	Benjamin Moore Paint	1 gallon	U	Benjamin Moore & Co. 101 Paragon Drive Montvale, NJ 07645 Phone: 800-344-0400	40		8052-41-3 66070-60-8 14807-96-6 1314-13-2 7779-90-0 13463-67-7 1332-37-2 7784-30-7 7732-18-5 471-34-1 13463-67-7 25067-61-0 14808-60-7	N
Maintenance Closet	Simoniz Pink Handsoap	2 gallon	U	Simoniz USA, Inc 201 Boston Tnpk Bolton, CT 06043 Phone: 800-227-5536	60		7732-18-5 68439-57-6 68603-42-9 120-40-1	N

Notes:

1. * - Describe the condition of the product containers as **Unopened (UO), Used (U),** or **Deteriorated (D).**
2. ** - Photographs of the **front and back** of product containers can replace the handwritten list of chemical ingredients. However, the photographs must be of good quality and ingredient labels must be legible.

Product Inventory Form: City of Geneva Public Safety Building, 255 Exchange Street, Geneva, New York

Make & Model of Field Instrument Used: RAE Systems – ppbRAE, Background PID reading = 40 ppb
List specific products found in the residence that have the potential to affect indoor air quality

Location	Product Description	Size (units)	Condition*	Manufacturer	Field Instrument Reading (ppb)	Product Ingredients	CAS #	Photo** (Y/N)
Maintenance Closet	Qwik Shine Polish	3 cans	U		50	Brazil palm wax Coal oil Silicone oil		N
Maintenance Closet	Johnson Dust Cleaner	1 can	U		55		64741-44-2 64742-48-9 75-28-5 74-98-6 7732-18-5	N
Maintenance Closet	Johnson Stainless Steel Cleaner	1 can	U		75		64741-44-2 64742-48-9 75-28-5 74-98-6 7732-18-5	N
Maintenance Closet	Husky Disinfectant	1 qt	U		45	n-Alkyl dimethyl benzyl ammonium chlorides n-Alkyl dimethyle ethyl benzyl ammonium chlorides		N
Maintenance Closet	DG Toilet Cleaner	13 bottles	UO		40	Hydrogen Chloride		N
Maintenance Closet	Spartan Heavy Duty Cleaner	3 bottles	UO	Spartan Chemical Company, Inc. 1110 Spartan Drive Maumee, OH 43537-0110 Phone: 800-537-8990	65		7732-18-5 111-76-2 68991-48-0	N
Maintenance Closet	Windex	2 bottles	O	SC Johnson 1525 Howe Street Racine, Wisconsin 53403 Phone: 800-494-4855	55			N

Notes:
1. * - Describe the condition of the product containers as **Unopened (UO), Used (U),** or **Deteriorated (D).**
2. ** - Photographs of the **front and back** of product containers can replace the handwritten list of chemical ingredients. However, the photographs must be of good quality and ingredient labels must be legible.

Product Inventory Form: City of Geneva Public Safety Building, 255 Exchange Street, Geneva, New York

Make & Model of Field Instrument Used: RAE Systems – ppbRAE, Background PID reading = 40 ppb
List specific products found in the residence that have the potential to affect indoor air quality

Location	Product Description	Size (units)	Condition*	Manufacturer	Field Instrument Reading (ppb)	Product Ingredients	CAS #	Photo** (Y/N)
Maintenance Closet	Pine All-purpose Cleaner (concentrate)	3 bottles	UO	Dolgencorp. Inc. 100 Mission Ridge Goodlettsville , TN 37072 Phone: 615-855-4000	60		111-76-2 1643-20-5 6834-92-0 61725-89-1 64-02-8 8002-09-3 6359-98-4	N
Maintenance Closet	Dulux Latex Paint	20 gal	U		40		107-21-1 25067-01-0 1332-58-7 7732-18-5 13463-67-7 27136-15-8	N
Maintenance Closet	Dust Mops	NA	U	NA	300	NA	NA	N

Notes:

1. * - Describe the condition of the product containers as **Unopened (UO), Used (U),** or **Deteriorated (D).**
2. ** - Photographs of the **front and back** of product containers can replace the handwritten list of chemical ingredients. However, the photographs must be of good quality and ingredient labels must be legible.

ARCADIS BBL

Attachment B

Photographs of Sampling In Progress

ATTACHMENT B
MARCH 21, 2007 – PUBIC SAFETY BUILDING SAMPLING
NEW YORK STATE ELECTRIC & GAS CORPORATION
FORMER MANUFACTURED GAS PLANT – WADSWORTH STREET
GENEVA, NEW YORK

Photo 1
Sampling Location SS-1 (and DUP-1)
Men’s Cell Area

ATTACHMENT B
MARCH 21, 2007 – PUBIC SAFETY BUILDING SAMPLING
NEW YORK STATE ELECTRIC & GAS CORPORATION
FORMER MANUFACTURED GAS PLANT – WADSWORTH STREET
GENEVA, NEW YORK

Photo 2
Sampling Location IA-1
Men's Cell Area

ATTACHMENT B
MARCH 21, 2007 – PUBIC SAFETY BUILDING SAMPLING
NEW YORK STATE ELECTRIC & GAS CORPORATION
FORMER MANUFACTURED GAS PLANT – WADSWORTH STREET
GENEVA, NEW YORK

Photo 3
Sampling Location SS-2
Women's Cell Area

ATTACHMENT B
MARCH 21, 2007 – PUBIC SAFETY BUILDING SAMPLING
NEW YORK STATE ELECTRIC & GAS CORPORATION
FORMER MANUFACTURED GAS PLANT – WADSWORTH STREET
GENEVA, NEW YORK

Photo 4
Sampling Location IA-2
Women's Cell Area

ATTACHMENT B
MARCH 21, 2007 – PUBIC SAFETY BUILDING SAMPLING
NEW YORK STATE ELECTRIC & GAS CORPORATION
FORMER MANUFACTURED GAS PLANT – WADSWORTH STREET
GENEVA, NEW YORK

Photo 5
Sampling Location SS-3
Custodial/Maintenance Closet

ATTACHMENT B
MARCH 21, 2007 – PUBIC SAFETY BUILDING SAMPLING
NEW YORK STATE ELECTRIC & GAS CORPORATION
FORMER MANUFACTURED GAS PLANT – WADSWORTH STREET
GENEVA, NEW YORK

Photo 6
Sampling Location IA-3
Custodial/Maintenance Closet

ATTACHMENT B
MARCH 21, 2007 – PUBIC SAFETY BUILDING SAMPLING
NEW YORK STATE ELECTRIC & GAS CORPORATION
FORMER MANUFACTURED GAS PLANT – WADSWORTH STREET
GENEVA, NEW YORK

Photo 7
Sampling Location AA-1
Ambient Air Location – South of the Public Safety Building

Attachment C

Field Sampling Logs

ARCADIS BBL
Infrastructure, environment, facilities

Sub Slab Sample Collection Log

Sample ID: SS-1

Client:	NYSEG	**Date/Day:**	03/21/07 WEDNESDAY
Project:	WADSWORTH	**Boring Equipment:**	HAMMER DRILL
Location:	255 EXCHANGE ST GENEVA	**Sealant:**	BEES WAX
Project #:	13057	**Tubing Information:**	1/4" ID TEFLON LINED
Time of Collection:	Start: 1037 Finish: 1237	**Miscellaneous Equipment:**	
Samplers:	SPS /CSA		
Sample Point Location:	NORTH WALL OF MENS CELL	**Moisture Content of Sampling Zone (circle one):**	[✓ Dry] / Moist
Sampling Depth:	6"	**Approximate Purge Volume & Method:**	SYRINGE - 120 cc
Probe (circle one):	Permanent / [✓ Temporary]	**Subcontractor:**	

Canister Pressure (inches Hg):

Reported By Laboratory	Measured Prior to Sample Collection	Measured Following Sample Collection
-30.0	-29.0	-6.0

Tracer Gas Concentration (if applicable):

Measured in Purge Effluent	Measured in 'Concentrated' Area Prior to Sample Collection	Measured in 'Concentrated' Area Following Sample Collection
0 ppm	3.6%	4.3%

SUMMA Canister Information

1124 -18.0

Size (circle one): 1 L [✓ 6 L]

Canister ID: 963

Flow Controller ID: 111

General Observations/Notes:

Approximating One-Well Volume (for purging):
When using a 5/8-inch drill bit, each vertical inch of open space will have a volume of approximately 5 mL (e.g., a 2-inch sampling interval has a volume of approximately 10 mL). Each foot of ¼-inch tubing will have a volume of approximately 10 mL.

ARCADIS BBL
Infrastructure, environment, facilities

Indoor/Ambient Air Sample Collection Log

Sample ID: IA-1

Client:	NYSEG	**Date/Day:**	03/21/07 WEDNESDAY
Project:	WADSWORTH	**Sample Intake Height:**	3.45'
Location:	255 EXCHANGE ST, GENEVA	**Subcontractor:**	
Project #:	13057	**Miscellaneous Equipment:**	
Samplers:	SPS/CSA		
Coordinates:		**Time Start:**	1037
Outdoor/Indoor:	INDOOR	**Time Stop:**	

Instrument Readings:

Time	Canister Pressure (inches Hg)	Temperature (F or C)	Relative Humidity (%)	Air Speed (ft/min)	Barometric Pressure	PID (ppm or ppb)
1037	-28.0	70.2 °F	22%		30.59	
1124	-18.0					
1237	-6.0					

SUMMA Canister Information

Size (circle one): 1 L [✓ 6 L]

Canister ID: 04325

Flow Controller ID: 006

General Observations/Notes:

ARCADIS BBL
Infrastructure, environment, facilities

Sub Slab Sample Collection Log

Sample ID: SS-2

Client:	NYSEG	**Date/Day:**	03/21/07 WEDNESDAY
Project:	WADSWORTH	**Boring Equipment:**	HAMMER DRILL
Location:	255 EXCHANGE ST GENEVA, NY	**Sealant:**	BEES WAX
Project #:	13057	**Tubing Information:**	1/4" ID TEFLON LINED
Time of Collection:	Start: 1039 Finish:	**Miscellaneous Equipment:**	
Samplers:	SPS / CSA		
Sample Point Location:	WEST WALL OF WOMANS CELL	**Moisture Content of Sampling Zone (circle one):**	[✓ Dry] / Moist
Sampling Depth:	7"	**Approximate Purge Volume & Method:**	SYRINGE- 120 cc
Probe (circle one):	Permanent / [✓ Temporary]	**Subcontractor:**	

Canister Pressure (inches Hg):

Reported By Laboratory	Measured Prior to Sample Collection	Measured Following Sample Collection
-30.0	> -30.0	-7.0

Tracer Gas Concentration (if applicable):

Measured in Purge Effluent	Measured in 'Concentrated' Area Prior to Sample Collection	Measured in 'Concentrated' Area Following Sample Collection
0 ppm	4.8%	

1127 -19.5

SUMMA Canister Information

Size (circle one): 1 L [✓ 6 L]

Canister ID: GL0009

Flow Controller ID: 016

General Observations/Notes:

Approximating One-Well Volume (for purging):
When using a 5/8-inch drill bit, each vertical inch of open space will have a volume of approximately 5 mL (e.g., a 2-inch sampling interval has a volume of approximately 10 mL). Each foot of ¼-inch tubing will have a volume of approximately 10 mL.

ARCADIS BBL
Infrastructure, environment, facilities

Indoor/Ambient Air Sample Collection Log

Sample ID: IA-2

Client:	NYSEG	**Date/Day:**	03/21/07 WEDNESDAY
Project:	WADSWORTH	**Sample Intake Height:**	4.53'
Location:	255 EXCHANGE ST GENEVA, NY	**Subcontractor:**	
Project #:	13057	**Miscellaneous Equipment:**	
Samplers:	SPS/GSA		
Coordinates:		**Time Start:**	1039
Outdoor/Indoor:	INDOOR	**Time Stop:**	

Instrument Readings:

Time	Canister Pressure (inches Hg)	Temperature (F or C)	Relative Humidity (%)	Air Speed (ft/min)	Barometric Pressure	PID (ppm or ppb)
1039	-26.0					
1128	-9.0					
1150	-6.0					
1239	-2.0					

SUMMA Canister Information

Size (circle one): 1 L [✓ 6 L]

Canister ID: 04417

Flow Controller ID: 033

General Observations/Notes:

G:\Div10\CMB\2007\02871202_Sampling Logs.doc
3/15/2007

ARCADIS BBL
Infrastructure, environment, facilities

Sub Slab Sample Collection Log

Sample ID: SS-3

Client:	NYSEG	**Date/Day:**	03/21/07 WEDNESDAY
Project:	WADSWORTH	**Boring Equipment:**	HAMMER DRILL
Location:	255 EXCHANGE ST. GENEVA, NY	**Sealant:**	BEES WAX
Project #:	13057	**Tubing Information:**	¼" ID TEFLON LINED
Time of Collection:	Start: ~~1040~~ 12:58 Finish: 2:58	**Miscellaneous Equipment:**	
Samplers:	SPS / CSA		
Sample Point Location:	NORTHEAST CORNER OF JANITOR'S CLOSET	**Moisture Content of Sampling Zone (circle one):**	[✓ Dry] / Moist
Sampling Depth:	6"	**Approximate Purge Volume & Method:**	SYRINGE - 120 cc
Probe (circle one):	Permanent / [✓ Temporary]	**Subcontractor:**	

Canister Pressure (inches Hg):

Reported By Laboratory	Measured Prior to Sample Collection	Measured Following Sample Collection
-30.0	> ~~-30.0~~ -28.0	- 6.0

Tracer Gas Concentration (if applicable):

Measured in Purge Effluent	Measured in 'Concentrated' Area Prior to Sample Collection	Measured in 'Concentrated' Area Following Sample Collection
0	~~8%~~ 8.0 %	~~8%~~ 2.2 %

SUMMA Canister Information

1130 > -30.0

Size (circle one): 1 L [✓ 6 L]

Canister ID: A-239 | 0060

Flow Controller ID: 106 | 026

CANISTER #2
START: 1135 -29.0
START: 1258 -28.0
FINISH 258 -6.0

CONC. HELIUM
PRIOR 8.0%
POST 2.2%

General Observations/Notes:

Approximating One-Well Volume (for purging):
When using a 5/8-inch drill bit, each vertical inch of open space will have a volume of approximately 5 mL (e.g., a 2-inch sampling interval has a volume of approximately 10 mL). Each foot of ¼-inch tubing will have a volume of approximately 10 mL.

ARCADIS BBL
Infrastructure, environment, facilities

Indoor/Ambient Air Sample Collection Log

Sample ID: IA-3

Client:	NYSEG	**Date/Day:**	03/21/07 WEDNESDAY
Project:	WADSWORTH	**Sample Intake Height:**	3.22'
Location:	255 EXCHANGE ST. GENEVA, NY	**Subcontractor:**	
Project #:	13057	**Miscellaneous Equipment:**	
Samplers:	SPS/CSA		
Coordinates:		**Time Start:**	1040
Outdoor/Indoor:	INDOOR	**Time Stop:**	

Instrument Readings:

Time	Canister Pressure (inches Hg)	Temperature (F or C)	Relative Humidity (%)	Air Speed (ft/min)	Barometric Pressure	PID (ppm or ppb)
1040	730.0					
1131	-20.5					
1240	-9.0					

SUMMA Canister Information

Size (circle one): 1 L [✓ 6 L]

Canister ID: A-278

Flow Controller ID: 027

General Observations/Notes:

ARCADIS BBL
Infrastructure, environment, facilities

Indoor/Ambient Air Sample Collection Log

Sample ID: AA - 1

Client:	NYSEG	**Date/Day:**	03/21/07 WEDNESDAY
Project:	WADSWORTH	**Sample Intake Height:**	5.3'
Location:	255 EXCHANGE ST. GENEVA	**Subcontractor:**	
Project #:	13057	**Miscellaneous Equipment:**	
Samplers:	SPS/CSA		
Coordinates:		**Time Start:**	1043
Outdoor/Indoor:	OUTDOOR - SE CORNER OF BLDG	**Time Stop:**	

Instrument Readings:

Time	Canister Pressure (inches Hg)	Temperature (F or C)	Relative Humidity (%)	Air Speed (ft/min)	Barometric Pressure	PID (ppm or ppb)
~~103~~ 1043	-28.0					
1138	-14.5					
1243	-5.0					

SUMMA Canister Information

Size (circle one): 1 L [✓ 6 L]

Canister ID: 063231

Flow Controller ID: 015

General Observations/Notes:

ARCADIS BBL
Infrastructure, environment, facilities

Sub Slab Sample Collection Log

Sample ID: DUP-1

Client:	NYSEG	**Date/Day:**	03/21/07 WEDNESDAY
Project:	WADSWORTH	**Boring Equipment:**	HAMMER DRILL
Location:	255 EXCHANGE ST GENEVA, NY	**Sealant:**	BEES WAX
Project #:	13057	**Tubing Information:**	1/4" ID TEFLON LINED
Time of Collection:	Start: 1037 Finish: 1237	**Miscellaneous Equipment:**	
Samplers:	SPS / CSA		
Sample Point Location:	NORTH WALL OF MENS CELL	**Moisture Content of Sampling Zone (circle one):**	[✓ Dry] / Moist
Sampling Depth:	6"	**Approximate Purge Volume & Method:**	SYRINGE - 120 cc
Probe (circle one):	Permanent / [✓ Temporary]	**Subcontractor:**	

Canister Pressure (inches Hg):		
Reported By Laboratory	**Measured Prior to Sample Collection**	**Measured Following Sample Collection**
-30.0	-28.0	-7.5

Tracer Gas Concentration (if applicable):		
Measured in Purge Effluent	**Measured in 'Concentrated' Area Prior to Sample Collection**	**Measured in 'Concentrated' Area Following Sample Collection**
0 ppm	3.6%	4.3%

SUMMA Canister Information 1124 -18.5

Size (circle one): 1 L [✓ 6 L]

Canister ID: 93234

Flow Controller ID: 082

General Observations/Notes:

PARENT LOCATION -> SS-1

Approximating One-Well Volume (for purging):
When using a 5/8-inch drill bit, each vertical inch of open space will have a volume of approximately 5 mL (e.g., a 2-inch sampling interval has a volume of approximately 10 mL). Each foot of ¼-inch tubing will have a volume of approximately 10 mL.

ARCADIS BBL

Attachment D

Analytical Data Validation Report

DATA USABILITY SUMMARY REPORT

NYSEG

WADSWORTH ST. GENEVA

SDG #H7C230285

AIR VOLATILE AND HELIUM ANALYSIS

Analyses performed by:

Severn Trent Laboratories
Knoxville, Tennessee

Review performed by:

ARCADIS BBL
Infrastructure, environment, facilities

Syracuse, New York
Report #6827

Summary

The following is an assessment of the data package for sample delivery group (SDG) #H7C230285 for sampling from the NYSEG Wadsworth Street Geneva Site. Included with this assessment are the data review check sheets used in the review of the package and corrected sample results. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Date	Analysis				
				VOC	**SVOC**	**PCB**	**MET**	**MISC**
SS-1	H7C230285-001	AIR	3/21/2007	X				X
IA-1	H7C230285-002	AIR	3/21/2007	X				X
SS-2	H7C230285-003	AIR	3/21/2007	X				X
IA-2	H7C230285-004	AIR	3/21/2007	X				X
SS-3	H7C230285-005	AIR	3/21/2007	X				X
IA-3	H7C230285-006	AIR	3/21/2007	X				X
AA-1	H7C230285-007	AIR	3/21/2007	X				X
DUP-1	H7C230285-008	AIR	3/21/2007	X				X

Notes:

1. Sample location DUP-1 is the field duplicate for parent sample location SS-1.
2. Miscellaneous parameters include helium.

AIR VOLATILE ORGANIC COMPOUND (VOC) ANALYSES

Introduction

Analyses were performed according to (United Stated Environmental Protection Agency) USEPA Method TO-15. Data were reviewed in accordance with USEPA National Functional Guidelines of October 1999, USEPA Region II SOP HW-18- Validating Canisters of Volatile Organics in Ambient Air of August 1994, and New York State ASP 2005- R9 TO-15 QC.

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

U	The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
J	The compound was positively identified; however, the associated numerical value is an estimated concentration only.
B	The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.
N	The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.
JN	The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.
E	The compound was quantitated above the calibration range.
D	Concentration is based on a diluted sample analysis.
UJ	The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.
R	The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

Data Assessment

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
Method TO-15	Air	14 days from collection to analysis	Ambient temperature

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance blanks (i.e., method, trip, and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Trip blanks measure contamination of samples during shipment. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

All compounds associated with the QA blanks exhibited a concentration less than the MDL, with the exception of the compounds listed in the following table. Sample results associated with the following sample locations were qualified.

Sample Locations	Compounds	Sample Result	Qualification
IA-1 IA-2 IA-3	Naphthalene	Detected sample results <RL and <BAL	U at the RL
SS-3		Detected sample results <RL and >BAL	Remove B
SS-1 SS-2		Detected sample results >RL and >BAL	
SS-3	n-Butane		
SS-1 IA-1 SS-2 IA-2 SS-3 IA-3 AA-1 DUP-1	Methylene Chloride	Detected sample results <RL and <BAL	U at the RL

RL = reporting limit

3. Mass Spectrometer Tuning

Mass spectrometer performance was acceptable. System performance and column resolution were acceptable. The mass spectrometer tune was performed within method specifications.

4. Calibration

Satisfactory instrument calibration is established to insure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

4.1 Initial Calibration

The method specifies percent relative standard deviation (%RSD) and relative response factor (RRF) limits for select compounds only. A technical review of the data applies limits to all compounds with no exceptions.

All target compounds associated with the initial calibration standards must exhibit a %RSD less than the control limit (30%) or a correlation coefficient greater than 0.99 and an RRF value greater than control limit (0.05).

4.2 Continuing Calibration

All target compounds associated with the continuing calibration standard must exhibit a percent difference (%D) less then the control limit (30%) and RRF value greater than control limit (0.05).

All compounds associated with the calibrations were within the specified control limits, with the exception of the compounds presented in the following table.

Sample Locations	Initial/Continuing	Compound	Criteria
SS-3	CCV %D	1,2,4-Trichlorobenzene	-36.5%

The criteria used to evaluate the initial and continuing calibration are presented in the following table. In the case of a calibration deviation, the sample results are qualified.

Initial/Continuing	Criteria	Sample Result	Qualification
Initial and Continuing Calibration	RRF <0.05	Non-detect	R
		Detect	J
	RRF <0.01[1]	Non-detect	R
		Detect	J
	RRF >0.05 or RRF >0.01[1]	Non-detect	No Action
		Detect	

Initial/Continuing	Criteria	Sample Result	Qualification
Initial Calibration	%RSD > 30%	Non-detect	UJ
		Detect	J
Continuing Calibration	%D >30% (increase in sensitivity)	Non-detect	No Action
		Detect	J
	%D >30% (decrease in sensitivity)	Non-detect	UJ
		Detect	J

1. RRF of 0.01 only applies to compounds which are typically poor responding compounds (i.e. ketones, 1,4-Dioxane, etc.)

5. Surrogates/System Monitoring Compounds

All samples to be analyzed for organic compounds are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. VOC analysis requires that all surrogates associated with the analysis exhibit recoveries within the laboratory-established acceptance limits.

All surrogate recoveries were within control limits.

6. Internal Standard Performance

Internal standard performance criteria insure that the GC/MS sensitivity and response are stable during every sample analysis. The criteria requires the internal standard compounds associated with the VOC exhibit area counts that are not greater than two times (+40%) or less than one-half (-40%) of the area counts of the associated continuing calibration standard.

All internal standard areas and retention times were within established limits.

7. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

SMS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within the laboratory-established acceptance limits.

> Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations were the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

A MS/MSD was not performed on a sample location associated with this SDG.

8. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

Sample locations associated with LCS analysis exhibiting recoveries outside of the control limits presented in the following table.

Sample Locations	Compound	Recovery
SS-3	1,2,4-Trichlorobenzene	<LL but >10%

The criteria used to evaluate the LCS recoveries are presented in the following table. In the case of an LCS deviation, the sample results are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
> the upper control limit (UL)	Non-detect	No Action
	Detect	J
< the lower control limit (LL) but > 10%	Non-detect	UJ
	Detect	J
< 10%	Non-detect	R
	Detect	J

9. Field Duplicate Analysis

Field duplicate analysis is used to assess the precision and accuracy of the field sampling procedures and analytical method. A control limit of 100% for air matrices is applied to the RPD between the parent sample and the field duplicate.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
SS-1/DUP-1	1,1,2-Trichloro-1,2,2-trifluoroethane	0.61 J	0.58 J	AC
	1,2,4-Trichlorobenzene	0.76 J	2.0 J	AC
	1,2,4-Trimethylbenzene	7.3	5.1	35.4 %
	1,2-Dichlorobenzene	ND(1.2)	0.58 J	AC
	1,3,5-Trimethylbenzene	2.6	1.9	AC
	1,4-Dichlorobenzene	ND(1.2)	0.43 J	AC
	Benzene	0.71	0.44 J	AC

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
SS-1/DUP-1	Carbon tetrachloride	0.62 J	0.4 J	AC
	Chloromethane	0.39 J	ND(1.0)	AC
	Cumene	2.7	1.7 J	AC
	Dichlorodifluoromethane	2.5	2.2	AC
	Ethylbenzene	16	10	46.1 %
	Methylene chloride	0.4 J	0.52 J	AC
	m-Xylene & p-Xylene	89	53	50.7 %
	Naphthalene	3.6	1.7 J	AC
	n-Butane	2.6	1.8	AC
	n-Decane	4.5 J	3.0 J	AC
	n-Dodecane	20	16	AC
	n-Heptane	2.0 J	1.3 J	AC
	n-Hexane	2.8	2.1	AC
	n-Octane	2.2	1.2 J	AC
	Nonane	3.2	1.9 J	AC
	n-Undecane	13	9.9	AC
	o-Xylene	33	20	49.0 %
	Pentane	1.5 J	1.3 J	AC
	Styrene	0.25 J	ND(0.85)	AC
	Tetrachloroethene	0.77 J	1.9	AC
	Toluene	5.3	3.2	NC
	Trichlorofluoromethane	1.2	1.3	AC

ND = Not detected.
AC = The field duplicate is acceptable when the difference between parent sample and field duplicate sample is less than two times the RL and where the parent sample and/or duplicate concentration is less than five times the RL.
NC = Non-complaint

The compound toluene associated with samples SS-1 and DUP-1 exhibited a field duplicate difference greater than the control limit. The associated sample results from sample locations for the listed analyte were qualified as estimated.

10. Compound Identification

Compounds are identified on the GC/MS by using the analytes relative retention time and ion spectra.

All identified compounds met the specified criteria.

11. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

Data Validation Checklist

Volatile Organics Data Validation Checklist

	YES	NO	NA
Data Completeness and Deliverables			
Have any missing deliverables been received and added to the data package?		X	
Is there a narrative or cover letter present?	X		
Are the sample numbers included in the narrative?	X		
Are the sample chain-of-custodies present?	X		
Do the chain-of-custodies indicate any problems with sample receipt or sample condition?		X	
Holding Times			
Have any holding times been exceeded?		X	
Surrogate Recovery			
Are surrogate recovery forms present?	X		
Are all samples listed on the surrogate recovery form?	X		
Was one or more surrogate recovery outside control limits for any sample or blank?		X	
If yes, were the samples reanalyzed?			X
Are there any transcription/calculation errors between the raw data and the summary form?		X	
Matrix Spikes			
Is there a MS recovery form present?		X	
Were matrix spikes analyzed at the required frequency?		X	

How many spike recoveries were outside of QC limits?

_NA_ out of _NA_

How many RPDs for MS/MSD were outside of QC limits?

_NA_ out of _NA_

	YES	NO	NA
Blanks			
Is a method blank summary form present?	X		
Has a method blank been analyzed for each day or for each 20 samples, whichever is more frequent?	X		
Has a blank been analyzed at least once every 12 hours for each system used?		X	
Do any method/instrument blanks have positive results?	X		
Are trip/field/rinse blanks associated with every sample?			X

	YES	NO	NA
Do any trip/field/rinse blanks have positive results?			X
Tuning and Mass Calibration			
Are the GC/MS tuning forms present for BFB?	X		
Are the bar graph spectrum and mass/charge listing provided for each BFB?	X		
Has a BFB been analyzed for each 12 hours of analysis per instrument?		X	
Have the ion abundance criteria been met for each instrument used?	X		
Target Analytes			
Is an organics analysis data sheet present for each of the following:			
Samples	X		
Matrix spikes			X
Blanks	X		
Are the reconstructed ion chromatograms present for each of the following:			
Samples	X		
Matrix spikes			X
Blanks	X		
Is the chromatographic performance acceptable?	X		
Are the mass spectra of the identified compounds present?	X		
Are all ions present in the standard mass spectrum at a relative intensity of 10% or greater also present in the sample spectrum?	X		
Do the samples and standard relative ion intensities agree within 20%?	X		
Tentatively Identified Compounds			
Are all the TIC summary forms present?	X		
Are the mass spectra for the tentatively identified compounds and their associated "best match" spectra present?	X		
Are any target compounds listed as TICs?		X	
Are all ions present in the reference mass spectrum with a relative intensity greater than 10% also present in the sample mass spectrum?	X		
Do the TIC and "best match" spectrum agree within 20%?	X		
Quantitation and Detection Limits			
Are there any transcription/calculation errors in the Form 1 results?		X	
Are the reporting limits adjusted to reflect sample dilutions and, for soils, sample moisture?	X		

Standard Data

	YES	NO	NA
Are the quantitation reports and reconstructed ion chromatograms present for the initial and continuing calibration standards?	X		
Initial Calibration			
Are the initial calibration forms present for each instrument used?	X		
Are the response factor RSDs within acceptable limits?	X		
Are the average RRFs minimum requirements met?	X		
Are there any transcription/calculation errors in reporting the RRFs or RSDs?		X	
Continuing Calibration			
Are the continuing calibration forms present for each day and each instrument?	X		
Has a continuing calibration standard been analyzed for each 12 hours of analysis per instrument?	X		
All %D within acceptable limits?		X	
Are all RF minimum requirements met?	X		
Are there any transcription/calculation errors in reporting of RF or %D?		X	
Internal Standards			
Are internal standard areas of every sample within the upper and lower limits for each continuing calibration?	X		
Are the retention times of the internal standards within 30 seconds of the associated calibration standard?	X		
Field Duplicates			
Were field duplicates submitted with the samples?	X		

HELIUM ANALYSES

Introduction

Analyses were performed according to the following methods:

Helium	ASTM D1946

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and that it was already subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with the USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

U	The analyte was analyzed for but not detected. The associated value is the analyte instrument detection limit.
B	The reported value was obtained from a reading less than the contract-required detection limit (CRDL), but greater than or equal to the instrument detection limit (IDL).

- Quantitation (Q) Qualifiers

E	The reported value is estimated due to the presence of interference.
N	Spiked sample recovery is not within control limits.
*	Duplicate analysis is not within control limits.

- Validation Qualifiers

J	The analyte was positively identified; however, the associated numerical value is an estimated concentration only.
UJ	The analyte was not detected above the reported sample detection limit. However, the reported limit is approximate and may or may not represent the actual limit of detection.
R	The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant QC problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

Data Assessment

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
Helium by ASTM D1946	Air	14 days from collection to analysis	Ambient Temperature

All samples were analyzed within the specified holding times.

2. Blank Contamination

Quality assurance blanks (i.e., method, trip, and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Trip blanks measure contamination of samples during shipment. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

All compounds associated with the QA blanks exhibited a concentration less than the MDL.

3. System Performance

System performance and column resolution were acceptable.

4. Calibration

Satisfactory instrument calibration is established to insure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

4.1 Initial Calibration

All target compounds associated with the initial calibration standards must exhibit a %RSD less than the control limit (30%).

4.2 Continuing Calibration

All target compounds associated with the continuing calibration standard must exhibit a percent difference (%D) less then the control limit (30%).

All calibration criteria were within the control limits.

5. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations were the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

A MS/MSD was not performed on a sample location associated with this SDG.

6. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS analysis must exhibit a percent recovery within the established acceptance limits.

The LCS analysis exhibited recoveries within the control limits.

7. Field Duplicate Analysis

Field duplicate analysis is used to assess the precision and accuracy of the field sampling procedures and analytical method. A control limit of 20% for air matrices is applied to the RPD between the parent sample and the field duplicate.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
SS-1/DUP-1	Helium	ND(0.34)	ND(0.24)	AC

ND = Not detected.
AC = The field duplicate is acceptable when the difference between parent sample and field duplicate sample is less than two times the RL and where the parent sample and/or duplicate concentration is less than five times the RL.

8. Compound Identification

Compounds are identified on the GC by using the analytes relative retention time.

No target compounds were identified in the samples.

9. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

Data Validation Checklist

Data Validation Checklist

	YES	NO	NA
Data Completeness and Deliverables			
Have any missing deliverables been received and added to the data package?		X	
Is there a narrative or cover letter present?	X		
Are the sample numbers included in the narrative?	X		
Are the sample chain-of-custodies present?	X		
Do the chain-of-custodies indicate any problems with sample receipt or sample condition?		X	
Holding Times			
Have any holding times been exceeded?		X	
Surrogate Recovery			
Are the surrogate recovery forms present?			X
Are all the samples listed on the appropriate surrogate recovery form?			X
Were recoveries of any surrogate outside of specified limits for any sample or blank?			X
If yes, were the samples reanalyzed?			X
Are there any transcription/calculation errors between the raw data and the summary form?			X
Matrix Spikes			
Is there a matrix spike recovery form present?			X
Were matrix spikes analyzed at the required frequency?			X
How many spike recoveries were outside of QC limits?			
_NA_ out of _NA____			
How many RPDs for matrix spike and matrix spike duplicate were outside of QC limits?			
_NA_ out of _NA_			
Blanks			
Is a method blank summary form present?	X		
Has a method blank been analyzed for each set of samples or for each 20 samples, whichever is more frequent?	X		
Do any method/reagent/instrument blanks have positive results?		X	
Do any field/rinse/equipment blanks have positive results?			X

	YES	NO	NA
Are there field/rinse/equipment blanks associated with every sample?			X
Calibration and GC Performance			
Are the following chromatograms and integration reports present?			
Is a calibration summary form present and complete for each analytical sequence?	X		
Are there any transcription/calculation errors between the raw data and the forms?		X	
Are the %RSD for the initial calibration within specified limits for all analytes?	X		
Have all samples been injected within a 12 hour period beginning with the injection of a calibration standard?	X		
Is a continuing calibration summary form present and complete for each continuing standard analyzed?	X		
Are there any transcription/calculation errors between the raw data and the form?		X	
Are all the percent difference (%D) values for all continuing calibration standards within specified limits?	X		
Analytical Sequence			
Is Form VIII present and complete for each column and each period of analyses?	X		
Was the proper analytical sequence followed?	X		
Cleanup Efficiency Verification			
Are percent recoveries of the compounds used to check the efficiency of the cleanup procedure within QC limits?			X
Identification			
Are RT of sample compounds within the established RT windows?	X		
Were all positively identified compounds confirmed on a second column?			X
Was GC/MS confirmation provided when required?			X
Were there any false negatives?		X	
Compound Quantitation and Reported Detection Limits			
Are there any transcription/calculation errors in the Form 1 results?		X	
Are the reporting limits adjusted to reflect sample dilutions and, for soils, sample moisture?	X		

	YES	NO	NA
Chromatogram Quality			
Were the baselines stable?	X		
Were any electronegative displacement (negative peaks) or unusual peaks detected?		X	
Field Duplicates			
Were field duplicates submitted with the samples?	X		

CORRECTED SAMPLE ANALYSIS DATA SHEETS

STL Buffalo

Client Sample ID: SS-1

GC/MS Volatiles

Lot-Sample # H7C230285 - 001 **Work Order #** JRM371AA **Matrix.........:** AIR

Date Sampled...: 3/21/07 **Date Received..:** 3/22/07
Prep Date.........: 3/26/07 **Analysis Date..** 3/27/07
Prep Batch #.....: 7087207
Dilution Factor.: 1 **Method.............** TO-15

PARAMETER	RESULTS (ppb(v/v))	REPORTING LIMIT (ppb(v/v))	RESULTS (ug/m3)		REPORTING LIMIT (ug/m3)
Methyl tert-butyl ether	ND	1.0	ND		3.6
Dichlorodifluoromethane	**0.51**	**0.20**	**2.5**		**0.99**
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	0.20	ND		1.4
Chloromethane	**0.19**	**0.50**	**0.39**	**J**	**1.0**
Vinyl chloride	ND	0.20	ND		0.51
n-Butane	**1.1**	**0.40**	**2.6**		**0.95**
Bromomethane	ND	0.20	ND		0.78
Chloroethane	ND	0.20	ND		0.53
Trichlorofluoromethane	**0.22**	**0.20**	**1.2**		**1.1**
Pentane	**0.49**	**1.0**	**1.5**	**J**	**3.0**
1,1-Dichloroethene	ND	0.20	ND		0.79
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.080**	**0.20**	**0.61**	**J**	**1.5**
Methylene chloride	0.5 ~~**0.11**~~ U	**0.50**	1.7 ~~**0.40**~~ U	~~**J B**~~	**1.7**
n-Hexane	**0.80**	**0.50**	**2.8**		**1.8**
1,1-Dichloroethane	ND	0.20	ND		0.81
cis-1,2-Dichloroethene	ND	0.20	ND		0.79
Chloroform	ND	0.20	ND		0.98
1,1,1-Trichloroethane	ND	0.20	ND		1.1
Carbon tetrachloride	**0.098**	**0.20**	**0.62**	**J**	**1.3**
Benzene	**0.22**	**0.20**	**0.71**		**0.64**
1,2-Dichloroethane	ND	0.20	ND		0.81
n-Heptane	**0.48**	**0.50**	**2.0**	**J**	**2.0**
Trichloroethene	ND	0.20	ND		1.1
1,2-Dichloropropane	ND	0.20	ND		0.92
cis-1,3-Dichloropropene	ND	0.20	ND		0.91
Toluene	**1.4** J	**0.20**	**5.3** J		**0.75**
n-Octane	**0.48**	**0.40**	**2.2**		**1.9**
trans-1,3-Dichloropropene	ND	0.20	ND		0.91
1,1,2-Trichloroethane	ND	0.20	ND		1.1
Tetrachloroethene	**0.11**	**0.20**	**0.77**	**J**	**1.4**
1,2-Dibromoethane (EDB)	ND	0.20	ND		1.5
Chlorobenzene	ND	0.20	ND		0.92
Ethylbenzene	**3.8**	**0.20**	**16**		**0.87**
m-Xylene & p-Xylene	**20**	**0.20**	**89**		**0.87**
Nonane	**0.61**	**0.50**	**3.2**		**2.6**
o-Xylene	**7.6**	**0.20**	**33**		**0.87**
Styrene	**0.060**	**0.20**	**0.25**	**J**	**0.85**
Cumene	**0.54**	**0.40**	**2.7**		**2.0**
1,1,2,2-Tetrachloroethane	ND	0.20	ND		1.4

STL Buffalo

Client Sample ID: SS-1

GC/MS Volatiles

Lot-Sample # H7C230285 - 001 **Work Order #** JRM371AA **Matrix........:** AIR

PARAMETER	RESULTS (ppb(v/v))	REPORTING LIMIT (ppb(v/v))	RESULTS (ug/m3)		REPORTING LIMIT (ug/m3)
1,3,5-Trimethylbenzene	**0.54**	**0.20**	**2.6**		**0.98**
n-Decane	**0.78**	**1.0**	**4.5**	**J**	**5.8**
1,2,4-Trimethylbenzene	**1.5**	**0.20**	**7.3**		**0.98**
1,3-Dichlorobenzene	ND	0.20	ND		1.2
1,4-Dichlorobenzene	ND	0.20	ND		1.2
1,2-Dichlorobenzene	ND	0.20	ND		1.2
n-Undecane	**2.1**	**1.0**	**13**		**6.4**
n-Dodecane	**2.8**	**1.0**	**20**		**7.0**
1,2,4-Trichlorobenzene	**0.10**	**1.0**	**0.76**	**J**	**7.4**
Hexachlorobutadiene	ND	1.0	ND		11
Naphthalene	**0.69**	**0.50**	**3.6**	~~**B**~~	**2.6**

TENTATIVELY INDENTIFIED COMPOUND	RESULT	UNITS
butylcyclohexane	ND	ppb(v/v)
indane	ND	ppb(v/v)
indene	ND	ppb(v/v)
isopentane	ND	ppb(v/v)
thiophene	ND	ppb(v/v)
1-methylnaphthalene	ND	ppb(v/v)
1,2,3-trimethylbenzene	ND	ppb(v/v)
2-methylnaphthalene	ND	ppb(v/v)
2,2,4-trimethylpentane	ND	ppb(v/v)
2,3-dimethylheptane	ND	ppb(v/v)
2,3-dimethylpentane	ND	ppb(v/v)

SURROGATE	PERCENT RECOVERY	LABORATORY CONTROL LIMITS (%)
1,2-Dichloroethane-d4	120	70 - 130
Toluene-d8	94	70 - 130
4-Bromofluorobenzene	95	70 - 130

Qualifiers

B	Method blank contamination. The associated method blank contains the target analyte at a reportable level.
J	Estimated result. Result is less than RL.

The 'Result' in ug/m3 is calculated using the following equation: Amount Found(before rounding)*(Molecular Weight/24.45)

The 'Reporting Limit' in ug/m3 is calculated using the following equation: (Reporting Limit(before rounding) * Dilution Factor) * (Molecular Weight/24.45)

STL Buffalo

Client Sample ID: IA-1

GC/MS Volatiles

Lot-Sample # H7C230285 - 002 **Work Order #** JRM4E1AA **Matrix.........:** AIR

Date Sampled...: 3/21/07 **Date Received..:** 3/22/07
Prep Date.........: 3/26/07 **Analysis Date..** 3/27/07
Prep Batch #.....: 7087207
Dilution Factor.: 1 **Method.............** TO-15

PARAMETER	RESULTS (ppb(v/v))	REPORTING LIMIT (ppb(v/v))	RESULTS (ug/m3)		REPORTING LIMIT (ug/m3)
Methyl tert-butyl ether	ND	1.0	ND		3.6
Dichlorodifluoromethane	**0.59**	**0.20**	**2.9**		**0.99**
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	0.20	ND		1.4
Chloromethane	**0.74**	**0.50**	**1.5**		**1.0**
Vinyl chloride	ND	0.20	ND		0.51
n-Butane	**1.1**	**0.40**	**2.6**		**0.95**
Bromomethane	ND	0.20	ND		0.78
Chloroethane	ND	0.20	ND		0.53
Trichlorofluoromethane	**0.26**	**0.20**	**1.4**		**1.1**
Pentane	**0.44**	**1.0**	**1.3**	**J**	**3.0**
1,1-Dichloroethene	ND	0.20	ND		0.79
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.094**	**0.20**	**0.72**	**J**	**1.5**
Methylene chloride	0.5 ~~**0.19**~~ U	**0.50**	1.7 ~~**0.66**~~ U	~~**J B**~~	**1.7**
n-Hexane	**0.12**	**0.50**	**0.42**	**J**	**1.8**
1,1-Dichloroethane	ND	0.20	ND		0.81
cis-1,2-Dichloroethene	ND	0.20	ND		0.79
Chloroform	ND	0.20	ND		0.98
1,1,1-Trichloroethane	ND	0.20	ND		1.1
Carbon tetrachloride	**0.11**	**0.20**	**0.67**	**J**	**1.3**
Benzene	**0.33**	**0.20**	**1.0**		**0.64**
1,2-Dichloroethane	ND	0.20	ND		0.81
n-Heptane	**0.098**	**0.50**	**0.40**	**J**	**2.0**
Trichloroethene	ND	0.20	ND		1.1
1,2-Dichloropropane	ND	0.20	ND		0.92
cis-1,3-Dichloropropene	ND	0.20	ND		0.91
Toluene	**0.63**	**0.20**	**2.4**		**0.75**
n-Octane	ND	0.40	ND		1.9
trans-1,3-Dichloropropene	ND	0.20	ND		0.91
1,1,2-Trichloroethane	ND	0.20	ND		1.1
Tetrachloroethene	ND	0.20	ND		1.4
1,2-Dibromoethane (EDB)	ND	0.20	ND		1.5
Chlorobenzene	ND	0.20	ND		0.92
Ethylbenzene	**0.15**	**0.20**	**0.66**	**J**	**0.87**
m-Xylene & p-Xylene	**0.47**	**0.20**	**2.0**		**0.87**
Nonane	ND	0.50	ND		2.6
o-Xylene	**0.16**	**0.20**	**0.69**	**J**	**0.87**
Styrene	**0.15**	**0.20**	**0.63**	**J**	**0.85**
Cumene	ND	0.40	ND		2.0
1,1,2,2-Tetrachloroethane	ND	0.20	ND		1.4

STL Buffalo

Client Sample ID: IA-1

GC/MS Volatiles

Lot-Sample # H7C230285 - 002 Work Order # JRM4E1AA Matrix.........: AIR

PARAMETER	RESULTS (ppb(v/v))	REPORTING LIMIT (ppb(v/v))	RESULTS (ug/m3)		REPORTING LIMIT (ug/m3)
1,3,5-Trimethylbenzene	ND	0.20	ND		0.98
n-Decane	**0.060**	**1.0**	**0.35**	**J**	**5.8**
1,2,4-Trimethylbenzene	**0.11**	**0.20**	**0.55**	**J**	**0.98**
1,3-Dichlorobenzene	ND	0.20	ND		1.2
1,4-Dichlorobenzene	ND	0.20	ND		1.2
1,2-Dichlorobenzene	ND	0.20	ND		1.2
n-Undecane	**0.060**	**1.0**	**0.38**	**J**	**6.4**
n-Dodecane	**0.12**	**1.0**	**0.87**	**J**	**7.0**
1,2,4-Trichlorobenzene	**0.39**	**1.0**	**2.9**	**J**	**7.4**
Hexachlorobutadiene	ND	1.0	ND		11
Naphthalene	0.5 ~~**0.15**~~ U	**0.50**	2.6 ~~**0.79**~~ U	~~**J B**~~	**2.6**

TENTATIVELY INDENTIFIED COMPOUND	RESULT	UNITS
butylcyclohexane	ND	ppb(v/v)
indane	ND	ppb(v/v)
indene	ND	ppb(v/v)
isopentane	ND	ppb(v/v)
thiophene	ND	ppb(v/v)
1-methylnaphthalene	ND	ppb(v/v)
1,2,3-trimethylbenzene	ND	ppb(v/v)
2-methylnaphthalene	ND	ppb(v/v)
2,2,4-trimethylpentane	ND	ppb(v/v)
2,3-dimethylheptane	ND	ppb(v/v)
2,3-dimethylpentane	ND	ppb(v/v)

SURROGATE	PERCENT RECOVERY	LABORATORY CONTROL LIMITS (%)
1,2-Dichloroethane-d4	112	70 - 130
Toluene-d8	104	70 - 130
4-Bromofluorobenzene	99	70 - 130

Qualifiers

B	Method blank contamination. The associated method blank contains the target analyte at a reportable level.
J	Estimated result. Result is less than RL.

The 'Result' in ug/m3 is calculated using the following equation: Amount Found(before rounding)*(Molecular Weight/24.45)

The 'Reporting Limit' in ug/m3 is calculated using the following equation: (Reporting Limit(before rounding) * Dilution Factor) * (Molecular Weight/24.45)

STL Buffalo

Client Sample ID: SS-2

GC/MS Volatiles

Lot-Sample # H7C230285 - 003 **Work Order #** JRM4K1AA **Matrix.........:** AIR

Date Sampled...: 3/21/07 **Date Received..:** 3/22/07
Prep Date.........: 3/26/07 **Analysis Date..** 3/27/07
Prep Batch #.....: 7087207
Dilution Factor.: 1 **Method.............** TO-15

PARAMETER	RESULTS (ppb(v/v))	REPORTING LIMIT (ppb(v/v))	RESULTS (ug/m3)		REPORTING LIMIT (ug/m3)
Methyl tert-butyl ether	0.13	1.0	0.47	J	3.6
Dichlorodifluoromethane	0.54	0.20	2.7		0.99
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	0.20	ND		1.4
Chloromethane	0.46	0.50	0.95	J	1.0
Vinyl chloride	ND	0.20	ND		0.51
n-Butane	14	0.40	33		0.95
Bromomethane	ND	0.20	ND		0.78
Chloroethane	ND	0.20	ND		0.53
Trichlorofluoromethane	0.22	0.20	1.2		1.1
Pentane	6.4	1.0	19		3.0
1,1-Dichloroethene	ND	0.20	ND		0.79
1,1,2-Trichloro-1,2,2-trifluoroethane	0.087	0.20	0.67	J	1.5
Methylene chloride	0.5 ~~0.084~~ U	0.50	1.7 ~~0.29~~ U	~~J B~~	1.7
n-Hexane	5.5	0.50	19		1.8
1,1-Dichloroethane	ND	0.20	ND		0.81
cis-1,2-Dichloroethene	ND	0.20	ND		0.79
Chloroform	ND	0.20	ND		0.98
1,1,1-Trichloroethane	2.0	0.20	11		1.1
Carbon tetrachloride	0.043	0.20	0.27	J	1.3
Benzene	1.2	0.20	4.0		0.64
1,2-Dichloroethane	ND	0.20	ND		0.81
n-Heptane	5.6	0.50	23		2.0
Trichloroethene	ND	0.20	ND		1.1
1,2-Dichloropropane	ND	0.20	ND		0.92
cis-1,3-Dichloropropene	ND	0.20	ND		0.91
Toluene	4.6	0.20	17		0.75
n-Octane	5.5	0.40	26		1.9
trans-1,3-Dichloropropene	ND	0.20	ND		0.91
1,1,2-Trichloroethane	ND	0.20	ND		1.1
Tetrachloroethene	2.0	0.20	14		1.4
1,2-Dibromoethane (EDB)	ND	0.20	ND		1.5
Chlorobenzene	ND	0.20	ND		0.92
Ethylbenzene	1.6	0.20	7.0		0.87
m-Xylene & p-Xylene	7.7	0.20	33		0.87
Nonane	5.1	0.50	27		2.6
o-Xylene	2.4	0.20	10		0.87
Styrene	0.11	0.20	0.46	J	0.85
Cumene	0.12	0.40	0.57	J	2.0
1,1,2,2-Tetrachloroethane	ND	0.20	ND		1.4

STL Buffalo

Client Sample ID: SS-2

GC/MS Volatiles

Lot-Sample # H7C230285 - 003 **Work Order #** JRM4K1AA **Matrix.........:** AIR

PARAMETER	RESULTS (ppb(v/v))	REPORTING LIMIT (ppb(v/v))	RESULTS (ug/m3)		REPORTING LIMIT (ug/m3)
1,3,5-Trimethylbenzene	**0.71**	**0.20**	**3.5**		**0.98**
n-Decane	**3.6**	**1.0**	**21**		**5.8**
1,2,4-Trimethylbenzene	**1.6**	**0.20**	**8.1**		**0.98**
1,3-Dichlorobenzene	ND	0.20	ND		1.2
1,4-Dichlorobenzene	**0.27**	**0.20**	**1.6**		**1.2**
1,2-Dichlorobenzene	ND	0.20	ND		1.2
n-Undecane	**3.3**	**1.0**	**21**		**6.4**
n-Dodecane	**2.7**	**1.0**	**19**		**7.0**
1,2,4-Trichlorobenzene	**0.22**	**1.0**	**1.6**	J	**7.4**
Hexachlorobutadiene	ND	1.0	ND		11
Naphthalene	**4.3**	**0.50**	**23**	~~B~~	**2.6**

TENTATIVELY INDENTIFIED COMPOUND	RESULT	UNITS
butylcyclohexane	ND	ppb(v/v)
indane	ND	ppb(v/v)
indene	ND	ppb(v/v)
isopentane	19	ppb(v/v)
thiophene	ND	ppb(v/v)
1-methylnaphthalene	4.8	ppb(v/v)
1,2,3-trimethylbenzene	ND	ppb(v/v)
2-methylnaphthalene	2.5	ppb(v/v)
2,2,4-trimethylpentane	8.4	ppb(v/v)
2,3-dimethylheptane	ND	ppb(v/v)
2,3-dimethylpentane	ND	ppb(v/v)

SURROGATE	PERCENT RECOVERY	LABORATORY CONTROL LIMITS (%)
1,2-Dichloroethane-d4	115	70 - 130
Toluene-d8	99	70 - 130
4-Bromofluorobenzene	93	70 - 130

Qualifiers

B	Method blank contamination. The associated method blank contains the target analyte at a reportable level.
J	Estimated result. Result is less than RL.

The 'Result' in ug/m3 is calculated using the following equation: Amount Found(before rounding)*(Molecular Weight/24.45)

The 'Reporting Limit' in ug/m3 is calculated using the following equation: (Reporting Limit(before rounding) * Dilution Factor) * (Molecular Weight/24.45)

STL Buffalo

Client Sample ID: IA-2

GC/MS Volatiles

Lot-Sample # H7C230285 - 004 **Work Order #** JRM4M1AA **Matrix.........:** AIR

Date Sampled...: 3/21/07 **Date Received..:** 3/22/07
Prep Date.........: 3/26/07 **Analysis Date..** 3/27/07
Prep Batch #.....: 7087207
Dilution Factor.: 1 **Method.............** TO-15

PARAMETER	RESULTS (ppb(v/v))	REPORTING LIMIT (ppb(v/v))	RESULTS (ug/m3)		REPORTING LIMIT (ug/m3)
Methyl tert-butyl ether	ND	1.0	ND		3.6
Dichlorodifluoromethane	**0.49**	**0.20**	**2.4**		**0.99**
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	0.20	ND		1.4
Chloromethane	**0.82**	**0.50**	**1.7**		**1.0**
Vinyl chloride	ND	0.20	ND		0.51
n-Butane	**0.99**	**0.40**	**2.3**		**0.95**
Bromomethane	ND	0.20	ND		0.78
Chloroethane	ND	0.20	ND		0.53
Trichlorofluoromethane	**0.22**	**0.20**	**1.2**		**1.1**
Pentane	**0.32**	**1.0**	**0.95**	**J**	**3.0**
1,1-Dichloroethene	ND	0.20	ND		0.79
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.082**	**0.20**	**0.63**	**J**	**1.5**
Methylene chloride	0.5 ~~**0.14**~~ U	**0.50**	1.7 ~~**0.50**~~ U	~~**J B**~~	**1.7**
n-Hexane	**0.11**	**0.50**	**0.37**	**J**	**1.8**
1,1-Dichloroethane	ND	0.20	ND		0.81
cis-1,2-Dichloroethene	ND	0.20	ND		0.79
Chloroform	ND	0.20	ND		0.98
1,1,1-Trichloroethane	ND	0.20	ND		1.1
Carbon tetrachloride	**0.13**	**0.20**	**0.79**	**J**	**1.3**
Benzene	**0.39**	**0.20**	**1.2**		**0.64**
1,2-Dichloroethane	ND	0.20	ND		0.81
n-Heptane	**0.10**	**0.50**	**0.43**	**J**	**2.0**
Trichloroethene	ND	0.20	ND		1.1
1,2-Dichloropropane	ND	0.20	ND		0.92
cis-1,3-Dichloropropene	ND	0.20	ND		0.91
Toluene	**0.65**	**0.20**	**2.5**		**0.75**
n-Octane	ND	0.40	ND		1.9
trans-1,3-Dichloropropene	ND	0.20	ND		0.91
1,1,2-Trichloroethane	ND	0.20	ND		1.1
Tetrachloroethene	**0.046**	**0.20**	**0.31**	**J**	**1.4**
1,2-Dibromoethane (EDB)	ND	0.20	ND		1.5
Chlorobenzene	ND	0.20	ND		0.92
Ethylbenzene	**0.14**	**0.20**	**0.59**	**J**	**0.87**
m-Xylene & p-Xylene	**0.45**	**0.20**	**1.9**		**0.87**
Nonane	ND	0.50	ND		2.6
o-Xylene	**0.17**	**0.20**	**0.72**	**J**	**0.87**
Styrene	**0.043**	**0.20**	**0.18**	**J**	**0.85**
Cumene	ND	0.40	ND		2.0
1,1,2,2-Tetrachloroethane	ND	0.20	ND		1.4

STL Buffalo

Client Sample ID: IA-2

GC/MS Volatiles

Lot-Sample # H7C230285 - 004 **Work Order #** JRM4M1AA **Matrix.........:** AIR

PARAMETER	RESULTS (ppb(v/v))	REPORTING LIMIT (ppb(v/v))	RESULTS (ug/m3)		REPORTING LIMIT (ug/m3)
1,3,5-Trimethylbenzene	**0.067**	**0.20**	**0.33**	**J**	**0.98**
n-Decane	ND	1.0	ND		5.8
1,2,4-Trimethylbenzene	**0.11**	**0.20**	**0.53**	**J**	**0.98**
1,3-Dichlorobenzene	ND	0.20	ND		1.2
1,4-Dichlorobenzene	ND	0.20	ND		1.2
1,2-Dichlorobenzene	ND	0.20	ND		1.2
n-Undecane	ND	1.0	ND		6.4
n-Dodecane	ND	1.0	ND		7.0
1,2,4-Trichlorobenzene	**0.10**	**1.0**	**0.76**	**J**	**7.4**
Hexachlorobutadiene	ND	1.0	ND		11
Naphthalene	0.5 ~~**0.067**~~ U	**0.50**	2.6 ~~**0.35**~~ U	~~**J B**~~	**2.6**

TENTATIVELY INDENTIFIED COMPOUND	RESULT	UNITS
butylcyclohexane	ND	ppb(v/v)
indane	ND	ppb(v/v)
indene	ND	ppb(v/v)
isopentane	ND	ppb(v/v)
thiophene	ND	ppb(v/v)
1-methylnaphthalene	ND	ppb(v/v)
1,2,3-trimethylbenzene	ND	ppb(v/v)
2-methylnaphthalene	ND	ppb(v/v)
2,2,4-trimethylpentane	ND	ppb(v/v)
2,3-dimethylheptane	ND	ppb(v/v)
2,3-dimethylpentane	ND	ppb(v/v)

SURROGATE	PERCENT RECOVERY	LABORATORY CONTROL LIMITS (%)
1,2-Dichloroethane-d4	117	70 - 130
Toluene-d8	100	70 - 130
4-Bromofluorobenzene	96	70 - 130

Qualifiers

B	Method blank contamination. The associated method blank contains the target analyte at a reportable level.
J	Estimated result. Result is less than RL.

The 'Result' in ug/m3 is calculated using the following equation: Amount Found(before rounding)*(Molecular Weight/24.45)

The 'Reporting Limit' in ug/m3 is calculated using the following equation: (Reporting Limit(before rounding) * Dilution Factor) * (Molecular Weight/24.45)

STL Buffalo

Client Sample ID: SS-3

GC/MS Volatiles

Lot-Sample # H7C230285 - 005 **Work Order #** JRM4Q3AA **Matrix.........:** AIR

Date Sampled...: 3/21/07 **Date Received..:** 3/22/07
Prep Date.........: 4/3/07 **Analysis Date..** 4/3/07
Prep Batch #.....: 7094100
Dilution Factor.: 1 **Method.............** TO-15

PARAMETER	RESULTS (ppb(v/v))	REPORTING LIMIT (ppb(v/v))	RESULTS (ug/m3)		REPORTING LIMIT (ug/m3)
Methyl tert-butyl ether	0.34	1.0	1.2	J	3.6
Dichlorodifluoromethane	0.70	0.20	3.4		0.99
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	0.20	ND		1.4
Chloromethane	ND	0.50	ND		1.0
Vinyl chloride	ND	0.20	ND		0.51
n-Butane	26	0.40	61	~~B~~	0.95
Bromomethane	ND	0.20	ND		0.78
Chloroethane	ND	0.20	ND		0.53
Trichlorofluoromethane	0.26	0.20	1.5		1.1
Pentane	13	1.0	38		3.0
1,1-Dichloroethene	ND	0.20	ND		0.79
1,1,2-Trichloro-1,2,2-trifluoroethane	0.092	0.20	0.70	J	1.5
Methylene chloride	0.5 ~~0.21~~ U	0.50	1.7 ~~0.72~~ U	~~J B~~	1.7
n-Hexane	12	0.50	42		1.8
1,1-Dichloroethane	ND	0.20	ND		0.81
cis-1,2-Dichloroethene	ND	0.20	ND		0.79
Chloroform	0.065	0.20	0.32	J	0.98
1,1,1-Trichloroethane	4.3	0.20	23		1.1
Carbon tetrachloride	ND	0.20	ND		1.3
Benzene	3.4	0.20	11		0.64
1,2-Dichloroethane	ND	0.20	ND		0.81
n-Heptane	10	0.50	42		2.0
Trichloroethene	0.037	0.20	0.20	J	1.1
1,2-Dichloropropane	ND	0.20	ND		0.92
cis-1,3-Dichloropropene	ND	0.20	ND		0.91
Toluene	18	0.20	68		0.75
n-Octane	19	0.40	88		1.9
trans-1,3-Dichloropropene	ND	0.20	ND		0.91
1,1,2-Trichloroethane	ND	0.20	ND		1.1
Tetrachloroethene	1.3	0.20	9.1		1.4
1,2-Dibromoethane (EDB)	ND	0.20	ND		1.5
Chlorobenzene	ND	0.20	ND		0.92
Ethylbenzene	14	0.20	61		0.87
m-Xylene & p-Xylene	59	0.20	260		0.87
Nonane	11	0.50	59		2.6
o-Xylene	21	0.20	92		0.87
Styrene	0.27	0.20	1.1		0.85
Cumene	1.9	0.40	9.5		2.0
1,1,2,2-Tetrachloroethane	ND	0.20	ND		1.4

STL Buffalo

Client Sample ID: SS-3

GC/MS Volatiles

Lot-Sample # H7C230285 - 005 **Work Order #** JRM4Q3AA **Matrix.........:** AIR

PARAMETER	RESULTS (ppb(v/v))	REPORTING LIMIT (ppb(v/v))	RESULTS (ug/m3)	REPORTING LIMIT (ug/m3)
1,3,5-Trimethylbenzene	**1.4**	**0.20**	**7.1**	**0.98**
n-Decane	**15**	**1.0**	**88**	**5.8**
1,2,4-Trimethylbenzene	**2.7**	**0.20**	**13**	**0.98**
1,3-Dichlorobenzene	ND	0.20	ND	1.2
1,4-Dichlorobenzene	**0.66**	**0.20**	**3.9**	**1.2**
1,2-Dichlorobenzene	ND	0.20	ND	1.2
n-Undecane	**5.3**	**1.0**	**34**	**6.4**
n-Dodecane	**4.1**	**1.0**	**28**	**7.0**
1,2,4-Trichlorobenzene	ND J	1.0	ND J	7.4
Hexachlorobutadiene	ND	1.0	ND	11
Naphthalene	**0.45**	**0.50**	**2.4** J ~~B~~	**2.6**

TENTATIVELY INDENTIFIED COMPOUND	RESULT	UNITS
Butylcyclohexane	ND	ppb(v/v)
Indane	ND	ppb(v/v)
Indene	ND	ppb(v/v)
Isopentane	18	ppb(v/v)
Thiopene	ND	ppb(v/v)
1-methylnaphthalene	ND	ppb(v/v)
1,2,3-Trimethylbenzene	ND	ppb(v/v)
2-Methylnaphthalene	ND	ppb(v/v)
2,2,4-Trimethylpentane	ND	ppb(v/v)
2,3-Dimethylheptane	ND	ppb(v/v)
2,3-Dimethylpentane	ND	ppb(v/v)

SURROGATE	PERCENT RECOVERY	LABORATORY CONTROL LIMITS (%)
1,2-Dichloroethane-d4	99	70 - 130
Toluene-d8	104	70 - 130
4-Bromofluorobenzene	97	70 - 130

Qualifiers

B	Method blank contamination. The associated method blank contains the target analyte at a reportable level.
J	Estimated result. Result is less than RL.

The 'Result' in ug/m3 is calculated using the following equation: Amount Found(before rounding)*(Molecular Weight/24.45)

The 'Reporting Limit' in ug/m3 is calculated using the following equation: (Reporting Limit(before rounding) * Dilution Factor) * (Molecular Weight/24.45)

STL Buffalo

Client Sample ID: IA-3

GC/MS Volatiles

Lot-Sample # H7C230285 - 006 **Work Order #** JRM4T1AA **Matrix.........:** AIR

Date Sampled...: 3/21/07 **Date Received..:** 3/22/07
Prep Date.........: 3/26/07 **Analysis Date..** 3/27/07
Prep Batch #.....: 7087207
Dilution Factor.: 1 **Method.............** TO-15

PARAMETER	RESULTS (ppb(v/v))	REPORTING LIMIT (ppb(v/v))	RESULTS (ug/m3)		REPORTING LIMIT (ug/m3)
Methyl tert-butyl ether	ND	1.0	ND		3.6
Dichlorodifluoromethane	0.70	0.20	3.4		0.99
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	0.20	ND		1.4
Chloromethane	0.74	0.50	1.5		1.0
Vinyl chloride	ND	0.20	ND		0.51
n-Butane	1.4	0.40	3.4		0.95
Bromomethane	ND	0.20	ND		0.78
Chloroethane	ND	0.20	ND		0.53
Trichlorofluoromethane	0.30	0.20	1.7		1.1
Pentane	0.33	1.0	0.97	J	3.0
1,1-Dichloroethene	ND	0.20	ND		0.79
1,1,2-Trichloro-1,2,2-trifluoroethane	0.11	0.20	0.81	J	1.5
Methylene chloride	0.5 ~~0.25~~ U	0.50	1.7 ~~0.88~~ U	~~J B~~	1.7
n-Hexane	0.13	0.50	0.47	J	1.8
1,1-Dichloroethane	ND	0.20	ND		0.81
cis-1,2-Dichloroethene	ND	0.20	ND		0.79
Chloroform	ND	0.20	ND		0.98
1,1,1-Trichloroethane	ND	0.20	ND		1.1
Carbon tetrachloride	0.097	0.20	0.61	J	1.3
Benzene	0.30	0.20	0.97		0.64
1,2-Dichloroethane	ND	0.20	ND		0.81
n-Heptane	0.15	0.50	0.61	J	2.0
Trichloroethene	0.13	0.20	0.72	J	1.1
1,2-Dichloropropane	ND	0.20	ND		0.92
cis-1,3-Dichloropropene	ND	0.20	ND		0.91
Toluene	7.0	0.20	26		0.75
n-Octane	0.081	0.40	0.38	J	1.9
trans-1,3-Dichloropropene	ND	0.20	ND		0.91
1,1,2-Trichloroethane	ND	0.20	ND		1.1
Tetrachloroethene	0.036	0.20	0.24	J	1.4
1,2-Dibromoethane (EDB)	ND	0.20	ND		1.5
Chlorobenzene	ND	0.20	ND		0.92
Ethylbenzene	0.28	0.20	1.2		0.87
m-Xylene & p-Xylene	0.93	0.20	4.1		0.87
Nonane	0.059	0.50	0.31	J	2.6
o-Xylene	0.29	0.20	1.3		0.87
Styrene	0.061	0.20	0.26	J	0.85
Cumene	ND	0.40	ND		2.0
1,1,2,2-Tetrachloroethane	ND	0.20	ND		1.4

STL Buffalo

Client Sample ID: IA-3

GC/MS Volatiles

Lot-Sample # H7C230285 - 006 **Work Order #** JRM4T1AA **Matrix.........:** AIR

PARAMETER	RESULTS (ppb(v/v))	REPORTING LIMIT (ppb(v/v))	RESULTS (ug/m3)		REPORTING LIMIT (ug/m3)
1,3,5-Trimethylbenzene	ND	0.20	ND		0.98
n-Decane	**0.39**	**1.0**	**2.2**	**J**	**5.8**
1,2,4-Trimethylbenzene	**0.095**	**0.20**	**0.47**	**J**	**0.98**
1,3-Dichlorobenzene	ND	0.20	ND		1.2
1,4-Dichlorobenzene	ND	0.20	ND		1.2
1,2-Dichlorobenzene	ND	0.20	ND		1.2
n-Undecane	**0.12**	**1.0**	**0.76**	**J**	**6.4**
n-Dodecane	**0.18**	**1.0**	**1.2**	**J**	**7.0**
1,2,4-Trichlorobenzene	**0.10**	**1.0**	**0.75**	**J**	**7.4**
Hexachlorobutadiene	ND	1.0	ND		11
Naphthalene	0.5 ~~**0.21**~~ U	**0.50**	2.6 ~~**1.1**~~ U	~~**J B**~~	**2.6**

TENTATIVELY INDENTIFIED COMPOUND	RESULT	UNITS
butylcyclohexane	ND	ppb(v/v)
indane	ND	ppb(v/v)
indene	ND	ppb(v/v)
isopentane	ND	ppb(v/v)
thiophene	ND	ppb(v/v)
1-methylnaphthalene	ND	ppb(v/v)
1,2,3-trimethylbenzene	ND	ppb(v/v)
2-methylnaphthalene	ND	ppb(v/v)
2,2,4-trimethylpentane	ND	ppb(v/v)
2,3-dimethylheptane	ND	ppb(v/v)
2,3-dimethylpentane	ND	ppb(v/v)

SURROGATE	PERCENT RECOVERY	LABORATORY CONTROL LIMITS (%)
1,2-Dichloroethane-d4	108	70 - 130
Toluene-d8	103	70 - 130
4-Bromofluorobenzene	101	70 - 130

Qualifiers

B	Method blank contamination. The associated method blank contains the target analyte at a reportable level.
J	Estimated result. Result is less than RL.

The 'Result' in ug/m3 is calculated using the following equation: Amount Found(before rounding)*(Molecular Weight/24.45)

The 'Reporting Limit' in ug/m3 is calculated using the following equation: (Reporting Limit(before rounding) * Dilution Factor) * (Molecular Weight/24.45)

STL Buffalo

Client Sample ID: AA-1

GC/MS Volatiles

Lot-Sample #	H7C230285 - 007	**Work Order #**	JRM4W1AA	**Matrix.........:**	AIR

Date Sampled...:	3/21/07	**Date Received..:**	3/22/07
Prep Date.........:	3/26/07	**Analysis Date..**	3/27/07
Prep Batch #.....:	7087140		
Dilution Factor.:	1	**Method.............**	TO-15

PARAMETER	RESULTS (ppb(v/v))	REPORTING LIMIT (ppb(v/v))	RESULTS (ug/m3)		REPORTING LIMIT (ug/m3)
Methyl tert-butyl ether	ND	1.0	ND		3.6
Dichlorodifluoromethane	**0.42**	**0.20**	**2.1**		**0.99**
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	0.20	ND		1.4
Chloromethane	**0.52**	**0.50**	**1.1**		**1.0**
Vinyl chloride	ND	0.20	ND		0.51
n-Butane	**0.44**	**0.40**	**1.0**		**0.95**
Bromomethane	ND	0.20	ND		0.78
Chloroethane	ND	0.20	ND		0.53
Trichlorofluoromethane	**0.20**	**0.20**	**1.1**		**1.1**
Pentane	**0.21**	**1.0**	**0.62**	**J**	**3.0**
1,1-Dichloroethene	ND	0.20	ND		0.79
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.064**	**0.20**	**0.49**	**J**	**1.5**
Methylene chloride	0,5 ~~**0.12**~~ U	**0.50**	1.7 ~~**0.40**~~ U	~~**J B**~~	**1.7**
n-Hexane	**0.057**	**0.50**	**0.20**	**J**	**1.8**
1,1-Dichloroethane	ND	0.20	ND		0.81
cis-1,2-Dichloroethene	ND	0.20	ND		0.79
Chloroform	ND	0.20	ND		0.98
1,1,1-Trichloroethane	ND	0.20	ND		1.1
Carbon tetrachloride	**0.068**	**0.20**	**0.42**	**J**	**1.3**
Benzene	**0.16**	**0.20**	**0.50**	**J**	**0.64**
1,2-Dichloroethane	ND	0.20	ND		0.81
n-Heptane	ND	0.50	ND		2.0
Trichloroethene	ND	0.20	ND		1.1
1,2-Dichloropropane	ND	0.20	ND		0.92
cis-1,3-Dichloropropene	ND	0.20	ND		0.91
Toluene	**0.20**	**0.20**	**0.74**		**0.75**
n-Octane	ND	0.40	ND		1.9
trans-1,3-Dichloropropene	ND	0.20	ND		0.91
1,1,2-Trichloroethane	ND	0.20	ND		1.1
Tetrachloroethene	ND	0.20	ND		1.4
1,2-Dibromoethane (EDB)	ND	0.20	ND		1.5
Chlorobenzene	ND	0.20	ND		0.92
Ethylbenzene	**0.062**	**0.20**	**0.27**	**J**	**0.87**
m-Xylene & p-Xylene	**0.21**	**0.20**	**0.93**		**0.87**
Nonane	ND	0.50	ND		2.6
o-Xylene	**0.069**	**0.20**	**0.30**	**J**	**0.87**
Styrene	ND	0.20	ND		0.85
Cumene	ND	0.40	ND		2.0
1,1,2,2-Tetrachloroethane	ND	0.20	ND		1.4

STL Buffalo

Client Sample ID: AA-1

GC/MS Volatiles

Lot-Sample # H7C230285 - 007 **Work Order #** JRM4W1AA **Matrix.........:** AIR

PARAMETER	RESULTS (ppb(v/v))	REPORTING LIMIT (ppb(v/v))	RESULTS (ug/m3)		REPORTING LIMIT (ug/m3)
1,3,5-Trimethylbenzene	ND	0.20	ND		0.98
n-Decane	ND	1.0	ND		5.8
1,2,4-Trimethylbenzene	**0.11**	**0.20**	**0.55**	**J**	**0.98**
1,3-Dichlorobenzene	ND	0.20	ND		1.2
1,4-Dichlorobenzene	ND	0.20	ND		1.2
1,2-Dichlorobenzene	ND	0.20	ND		1.2
n-Undecane	ND	1.0	ND		6.4
n-Dodecane	ND	1.0	ND		7.0
1,2,4-Trichlorobenzene	ND	1.0	ND		7.4
Hexachlorobutadiene	ND	1.0	ND		11
Naphthalene	**0.095**	**0.50**	**0.50**	**J**	**2.6**

TENTATIVELY INDENTIFIED COMPOUND	RESULT	UNITS
Butylcyclohexane	ND	ppb(v/v)
Indane	ND	ppb(v/v)
Indene	ND	ppb(v/v)
Isopentane	ND	ppb(v/v)
Thiopene	ND	ppb(v/v)
1-methylnaphthalene	ND	ppb(v/v)
1,2,3-Trimethylbenzene	ND	ppb(v/v)
2-Methylnaphthalene	ND	ppb(v/v)
2,2,4-Trimethylpentane	ND	ppb(v/v)
2,3-Dimethylheptane	ND	ppb(v/v)
2,3-Dimethylpentane	ND	ppb(v/v)

SURROGATE	PERCENT RECOVERY	LABORATORY CONTROL LIMITS (%)
1,2-Dichloroethane-d4	100	70 - 130
Toluene-d8	104	70 - 130
4-Bromofluorobenzene	97	70 - 130

Qualifiers

B	Method blank contamination. The associated method blank contains the target analyte at a reportable level.
J	Estimated result. Result is less than RL.

The 'Result' in ug/m3 is calculated using the following equation: Amount Found(before rounding)*(Molecular Weight/24.45)

The 'Reporting Limit' in ug/m3 is calculated using the following equation: (Reporting Limit(before rounding) * Dilution Factor) * (Molecular Weight/24.45)

STL Buffalo

Client Sample ID: DUP-1

GC/MS Volatiles

Lot-Sample #	H7C230285 - 008	**Work Order #**	JRM411AA	**Matrix.........:**	AIR
Date Sampled...:	3/21/07	**Date Received..:**	3/22/07		
Prep Date.........:	3/26/07	**Analysis Date..**	3/27/07		
Prep Batch #.....:	7087140				
Dilution Factor.:	1	**Method.............**	TO-15		

PARAMETER	RESULTS (ppb(v/v))	REPORTING LIMIT (ppb(v/v))	RESULTS (ug/m3)		REPORTING LIMIT (ug/m3)
Methyl tert-butyl ether	ND	1.0	ND		3.6
Dichlorodifluoromethane	**0.44**	**0.20**	**2.2**		**0.99**
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	0.20	ND		1.4
Chloromethane	ND	0.50	ND		1.0
Vinyl chloride	ND	0.20	ND		0.51
n-Butane	**0.77**	**0.40**	**1.8**		**0.95**
Bromomethane	ND	0.20	ND		0.78
Chloroethane	ND	0.20	ND		0.53
Trichlorofluoromethane	**0.22**	**0.20**	**1.3**		**1.1**
Pentane	**0.45**	**1.0**	**1.3**	J	**3.0**
1,1-Dichloroethene	ND	0.20	ND		0.79
1,1,2-Trichloro-1,2,2-trifluoroethane	**0.075**	**0.20**	**0.58**	J	**1.5**
Methylene chloride	0.5 ~~**0.15**~~ U	**0.50**	1.7 ~~**0.52**~~ U	~~J B~~	**1.7**
n-Hexane	**0.60**	**0.50**	**2.1**		**1.8**
1,1-Dichloroethane	ND	0.20	ND		0.81
cis-1,2-Dichloroethene	ND	0.20	ND		0.79
Chloroform	ND	0.20	ND		0.98
1,1,1-Trichloroethane	ND	0.20	ND		1.1
Carbon tetrachloride	**0.064**	**0.20**	**0.40**	J	**1.3**
Benzene	**0.14**	**0.20**	**0.44**	J	**0.64**
1,2-Dichloroethane	ND	0.20	ND		0.81
n-Heptane	**0.31**	**0.50**	**1.3**	J	**2.0**
Trichloroethene	ND	0.20	ND		1.1
1,2-Dichloropropane	ND	0.20	ND		0.92
cis-1,3-Dichloropropene	ND	0.20	ND		0.91
Toluene	**0.86** J	**0.20**	**3.2** J		**0.75**
n-Octane	**0.25**	**0.40**	**1.2**	J	**1.9**
trans-1,3-Dichloropropene	ND	0.20	ND		0.91
1,1,2-Trichloroethane	ND	0.20	ND		1.1
Tetrachloroethene	**0.28**	**0.20**	**1.9**		**1.4**
1,2-Dibromoethane (EDB)	ND	0.20	ND		1.5
Chlorobenzene	ND	0.20	ND		0.92
Ethylbenzene	**2.3**	**0.20**	**10**		**0.87**
m-Xylene & p-Xylene	**12**	**0.20**	**53**		**0.87**
Nonane	**0.36**	**0.50**	**1.9**	J	**2.6**
o-Xylene	**4.7**	**0.20**	**20**		**0.87**
Styrene	ND	0.20	ND		0.85
Cumene	**0.35**	**0.40**	**1.7**	J	**2.0**
1,1,2,2-Tetrachloroethane	ND	0.20	ND		1.4

STL Buffalo

Client Sample ID: DUP-1

GC/MS Volatiles

Lot-Sample # H7C230285 - 008 **Work Order #** JRM411AA **Matrix........:** AIR

PARAMETER	RESULTS (ppb(v/v))	REPORTING LIMIT (ppb(v/v))	RESULTS (ug/m3)		REPORTING LIMIT (ug/m3)
1,3,5-Trimethylbenzene	**0.38**	**0.20**	**1.9**		**0.98**
n-Decane	**0.52**	**1.0**	**3.0**	**J**	**5.8**
1,2,4-Trimethylbenzene	**1.0**	**0.20**	**5.1**		**0.98**
1,3-Dichlorobenzene	ND	0.20	ND		1.2
1,4-Dichlorobenzene	**0.071**	**0.20**	**0.43**	**J**	**1.2**
1,2-Dichlorobenzene	**0.096**	**0.20**	**0.58**	**J**	**1.2**
n-Undecane	**1.5**	**1.0**	**9.9**		**6.4**
n-Dodecane	**2.3**	**1.0**	**16**		**7.0**
1,2,4-Trichlorobenzene	**0.28**	**1.0**	**2.0**	**J**	**7.4**
Hexachlorobutadiene	ND	1.0	ND		11
Naphthalene	**0.32**	**0.50**	**1.7**	**J**	**2.6**

TENTATIVELY INDENTIFIED COMPOUND	RESULT	UNITS
Butylcyclohexane	ND	ppb(v/v)
Indane	ND	ppb(v/v)
Indene	ND	ppb(v/v)
Isopentane	ND	ppb(v/v)
Thiopene	ND	ppb(v/v)
1-methylnaphthalene	ND	ppb(v/v)
1,2,3-Trimethylbenzene	ND	ppb(v/v)
2-Methylnaphthalene	ND	ppb(v/v)
2,2,4-Trimethylpentane	ND	ppb(v/v)
2,3-Dimethylheptane	ND	ppb(v/v)
2,3-Dimethylpentane	ND	ppb(v/v)

SURROGATE	PERCENT RECOVERY	LABORATORY CONTROL LIMITS (%)
1,2-Dichloroethane-d4	100	70 - 130
Toluene-d8	105	70 - 130
4-Bromofluorobenzene	101	70 - 130

Qualifiers

B	Method blank contamination. The associated method blank contains the target analyte at a reportable level.
J	Estimated result. Result is less than RL.

The 'Result' in ug/m3 is calculated using the following equation: Amount Found(before rounding)*(Molecular Weight/24.45)

The 'Reporting Limit' in ug/m3 is calculated using the following equation: (Reporting Limit(before rounding) * Dilution Factor) * (Molecular Weight/24.45)

STL Buffalo

Client Sample ID: SS-1

GC Volatiles

Lot-Sample #...: H7C230285-001 **Work Order #...:** JRM371AF **Matrix.........:** AG
Date Sampled...: 03/21/07 **Date Received..:** 03/22/07
Prep Date......: 04/02/07 **Analysis Date..:** 04/02/07
Prep Batch #...: 7093302
Dilution Factor: 3.37 **Method.........:** ASTM D1946 MOD

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Helium	ND	0.34	%

STL Buffalo

Client Sample ID: SS-2

GC Volatiles

Lot-Sample #...:	H7C230285-003	**Work Order #...:**	JRM4K1AF	**Matrix.........:**	AG
Date Sampled...:	03/21/07	**Date Received..:**	03/22/07		
Prep Date......:	04/02/07	**Analysis Date..:**	04/02/07		
Prep Batch #...:	7093302				
Dilution Factor:	2.47	**Method.........:**	ASTM D1946 MOD		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Helium	ND	0.25	%

STL Buffalo

Client Sample ID: SS-3

GC Volatiles

Lot-Sample #...:	H7C230285-005	**Work Order #...:**	JRM4Q1AF	**Matrix.........:**	AG
Date Sampled...:	03/21/07	**Date Received..:**	03/22/07		
Prep Date......:	04/02/07	**Analysis Date..:**	04/02/07		
Prep Batch #...:	7093302				
Dilution Factor:	2.71	**Method.........:**	ASTM D1946 MOD		

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Helium	ND	0.27	%

STL Buffalo

Client Sample ID: DUP-1

GC Volatiles

Lot-Sample #...: H7C230285-008 **Work Order #...:** JRM411AF **Matrix.........:** AG
Date Sampled...: 03/21/07 **Date Received..:** 03/22/07
Prep Date......: 04/02/07 **Analysis Date..:** 04/02/07
Prep Batch #...: 7093302
Dilution Factor: 2.44 **Method.........:** ASTM D1946 MOD

PARAMETER	RESULT	REPORTING LIMIT	UNITS
Helium	ND	0.24	%

SAMPLE COMPLIANCE REPORT

SAMPLE COMPLIANCE REPORT

Sample Delivery Group	Sampling Date	Protocol	Sample ID	Matrix	Compliancy[1]					Noncompliance
					VOC	SVOC	PCB	MET	MISC	
H7C230285	3/21/2007	ASP 2005	SS-1	Air	No	--	--	--	Yes	Associated Blank; Field Duplicate RPD
H7C230285	3/21/2007	ASP 2005	IA-1	Air	No	--	--	--	Yes	Associated Blank
H7C230285	3/21/2007	ASP 2005	SS-2	Air	No	--	--	--	Yes	Associated Blank
H7C230285	3/21/2007	ASP 2005	IA-2	Air	No	--	--	--	Yes	Associated Blank
H7C230285	3/21/2007	ASP 2005	SS-3	Air	No	--	--	--	Yes	Associated Blank; CCV %D; LCS %Recovery
H7C230285	3/21/2007	ASP 2005	IA-3	Air	No	--	--	--	Yes	Associated Blank
H7C230285	3/21/2007	ASP 2005	AA-1	Air	No	--	--	--	Yes	Associated Blank
H7C230285	3/21/2007	ASP 2005	DUP-1	Air	No	--	--	--	Yes	Associated Blank; Field Duplicate RPD

1 Samples which are compliant with no added validation qualifiers are listed as "yes". Samples which are non-compliant or which have added qualifiers are listed as "no". A "no" designation does not necessarily indicate that the data have been rejected or are otherwise unusable.

New York State Department of Environmental Conservation
Division of Environmental Remediation
Remedial Bureau C, 11th Floor
625 Broadway, Albany, New York 12233-7014
Phone: (518) 402-9662 • **FAX:** (518) 402-9679
Website: www.dec.state.ny.us

Alexander B. Grannis
Commissioner

RECEIVED
JUN 18 2007
Environmental
Compliance Dept

June 12, 2007

Mr. John Ruspantini
New York State Electric and Gas
Corporate Drive - Kirkwood Industrial Park
PO Box 5224
Binghamton, NY 13902-5224

Dear Mr. Ruspantini:

Re: Geneva Wadsworth Former MGP Site
Geneva (C), Ontario County, Site No: 8-35-015
Vapor Intrusion Evaluation Report

The New York State Department of Environmental Conservation (Department) and New York State Department of Health (NYSDOH) have reviewed the referenced report, dated May, 2007. Both the Department and NYSDOH believe that, due to elevated levels of BTEX and naphthalene in the sub-slab samples, there is a potential for future soil vapor intrusion into the Geneva Safety Building. Therefore, the Department and NYSDOH recommends that either a sub-slab depressurization system be installed or additional indoor air and soil vapor samples should be collected during the 2007/2008 heating season to further evaluate the potential for soil vapor intrusion. The report should be revised to reflect this. If you have any questions, feel free to contact me at (518) 402-9564.

Sincerely,

Douglas MacNeal

Douglas MacNeal, P.E.
Environmental Engineer 2
Remedial Action Bureau C
Division of Environmental Remediation

ec: G. Cross
D. McNaughton, DOH
M. VanValkenburg, DOH

NYSEG

July 23, 2007

Gordon P. Eddington
Director of Public Works
City of Geneva Engineering Department
47 Castle Street
3rd Floor, City Hall
Geneva, NY 14456

Subject: Geneva Wadsworth Street Former Manufactured Gas Plant (MGP) Site
Remedial Investigation (RI)
Discussion Summary of Meeting Held on July 18, 2007

Dear Mr. Eddington:

Enclosed for your information is a discussion summary for our meeting held at Geneva City Hall on July 18, 2007. Please contact me at your convenience to set up a follow up meeting or teleconference. I can be reached by phone at (607) 762-8787 or by email at jjruspantini@nyseg.com.

Sincerely,

NYSEG

John J. Ruspantini, CHMM
Environmental Analyst
Site Investigation & Remediation

Enclosure

cc: J. M. Simone – NYSEG
R. Pass – NYSEG Ithaca
D. MacNeal– NYSDEC Albany
D. McNaughton – NYSDOH Rochester
S. Powlin – Arcadis BBL

F:\lenv\doc\city of geneva5.doc

An equal opportunity employer

James A. Carrigg Center | 18 Link Drive | P.O. Box 5224 | Binghamton, NY 13902-5224

www.nyseg.com

An Energy East Company

Minutes from Meeting with City of Geneva
Recorded by John Ruspantini - NYSEG
Wednesday, July 18, 2007, 10:30 AM
City Hall, 47 Castle Street, Geneva, NY

Subject: Wadsworth Street Manufactured Gas Plant (MGP) Remedial Investigation Discussion of Soil Vapor Intrusion (SVI) Evaluation and Options for Additional Work

In Attendance:
Gordon Eddington – City of Geneva
Douglas MacNeal – NYSDEC
Deborah McNaughton – NYSDOH
Robert Pass – NYSEG
John Ruspantini – NYSEG

- NYSEG began the discussion by explaining the general context of the SVI evaluation for the Geneva Public Safety Building as part of the framework for the MGP remedial investigation. VOCs were measured from indoor air samples collected inside the building and from vapor samples collected beneath the slab (sub-slab) of the building. A number of VOCs were detected in both indoor air and sub-slab samples. Relatively low concentrations of VOCs were detected inside the building. MGP-related VOCs do not appear to be affecting indoor air quality at this time.

- NYSDOH pointed out that a number of products stored inside the building may be contributing to indoor air concentrations of VOCs. The bigger concern is with a number of compounds measured in the building's sub-slab vapor and the potential for these compounds to affect indoor air quality in the future. Some of these compounds are MGP-related and others are not. One groundwater monitoring well located to the north of the building has shown evidence of MGP-related groundwater impacts. NYSDOH suggested the possibility of conducting additional sampling of indoor air and sub-slab vapor sampling or setting up a long term monitoring program to ensure that indoor air quality is not adversely impacted.

- NYSEG pointed out that, per NYSDEC and NYSDOH directive (Ed. Note: NYSDEC letter of June 12, 2007), another option would be to install a sub-slab depressurization system in the building to release VOCs beneath the slab. Sub-slab concentrations of BTEX (benzene, toluene, ethylbenzene and xylenes) and naphthalene that have the potential for future entry into the building were cited as concerns by NYSDEC and NYSDOH. These compounds may be related to MGP coal tar, but are also found in many other products such as gasoline. There is evidence to suggest that these compounds may be related to a gasoline spill that may have occurred during Talmadge Tire's (auto repair shop) occupancy of the building (MTBE and alkanes found in gasoline were present in the sub-slab samples).

- Given the uncertainty as to the source of the BTEX and naphthalene in the sub-slab vapor, NYSEG suggested a cost sharing arrangement with the City, if the City desires a sub-slab depressurization system. NYSEG will agree to pay for design and installation of the system, if the City would agree to pay for ongoing operation and maintenance costs including the electricity to operate the system.

- The City was receptive to this idea indicating that a more proactive approach in dealing with the potential problem would be favored. The City indicated that internal discussions and discussions with its consultants would need to take place before making a decision.

- All agreed to hold a follow up meeting or teleconference to discuss the City's decision and/or entertain additional discussions or clarifications that may be required. The City will contact NYSEG at appropriate time.

NYSEG

August 3, 2007

Douglas MacNeal, P.E.
Environmental Engineer 2
Remedial Action Bureau C
Division of Environmental Remediation
New York State Department of Environmental Conservation
625 Broadway
Albany, NY 12233-7017

Re: Geneva Wadsworth St. Former Manufactured Gas Plant (MGP) Site
Vapor Intrusion (VI) Evaluation Report
Response to NYSDEC Letter of June 12, 2007

Dear Mr. MacNeal:

Thank you for your letter of June 12, 2007 where you provided comment on the above-referenced report. NYSEG would also like to thank you and Ms. Deborah McNaughton of the New York State Department of Health (NYSDOH) for attending the July 18, 2007 meeting with Mr. Gordon Eddington of the City of Geneva.

As noted in your June 12 letter and discussed in the July 18 meeting, the NYSDEC and NYSDOH believe that the concentrations of benzene, toluene, ethylbenzene, xylene (BTEX), and naphthalene compounds detected in sub-slab vapor of the Geneva Public Safety Building (PSB) have the potential for future vapor intrusion into the building. As you know, these compounds are components of both petroleum products (e.g., gasoline) and MGP wastes; however, several paraffins (e.g., n-butane, n-decane, etc.) and methyl tert-butyl ether (MTBE), which were also detected in the sub-slab vapor samples, suggest a gasoline source. The PSB was previously used as an automotive repair shop known as Tallmadge Tire.

Although the results of the sub-slab vapor sampling suggest that the BTEX and naphthalene may be related to a gasoline source, we acknowledge that groundwater data from one of the five monitoring wells proximate to the PSB (i.e., MW-3, located just north of the PSB), exhibit characteristics likely related to MGP waste (i.e., polycyclic aromatic hydrocarbons, total cyanide, and BTEX). In light of this, NYSEG recognizes that some fraction of the BTEX and naphthalene measured in the sub-slab vapor samples may be attributed to MGP wastes and that there could be sub-slab vapor phase commingling of these compounds from both a gasoline and an MGP source. As such, NYSEG agrees with the NYSDEC/NYSDOH recommendation to either install a sub-slab depressurization system in the PSB to mitigate the potential for future vapor intrusion, or to conduct additional vapor sampling at the PSB during the 2007/2008 heating season to further evaluate vapor intrusion potential. NYSEG will revise and re-submit the VI Report to reflect this recommendation.

An equal opportunity employer

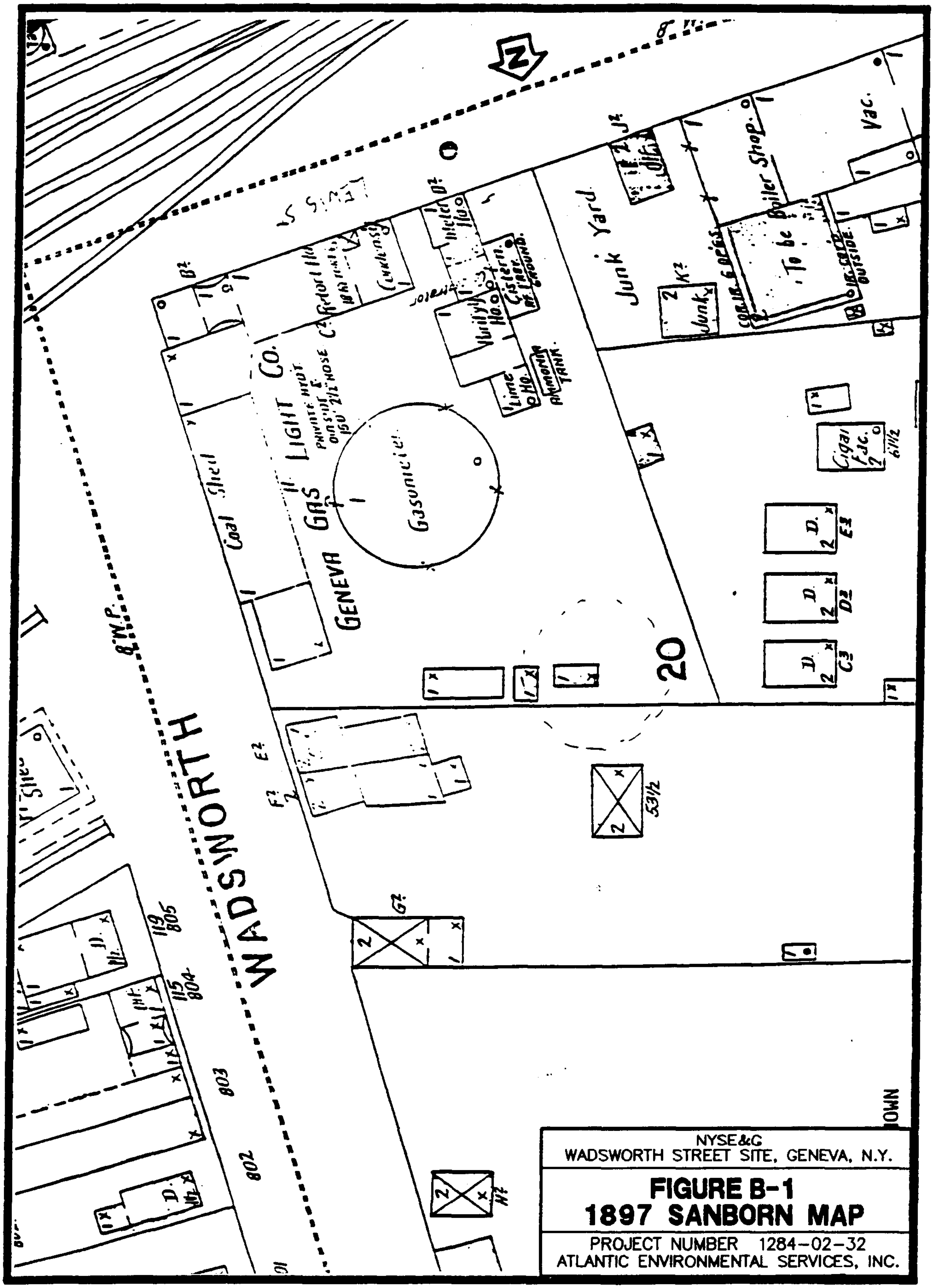
James A. Carrigg Center | 18 Link Drive | P.O. Box 5224 | Binghamton, NY 13902-5224

www.nyseg.com

An Energy East Company

ARCADIS BBL

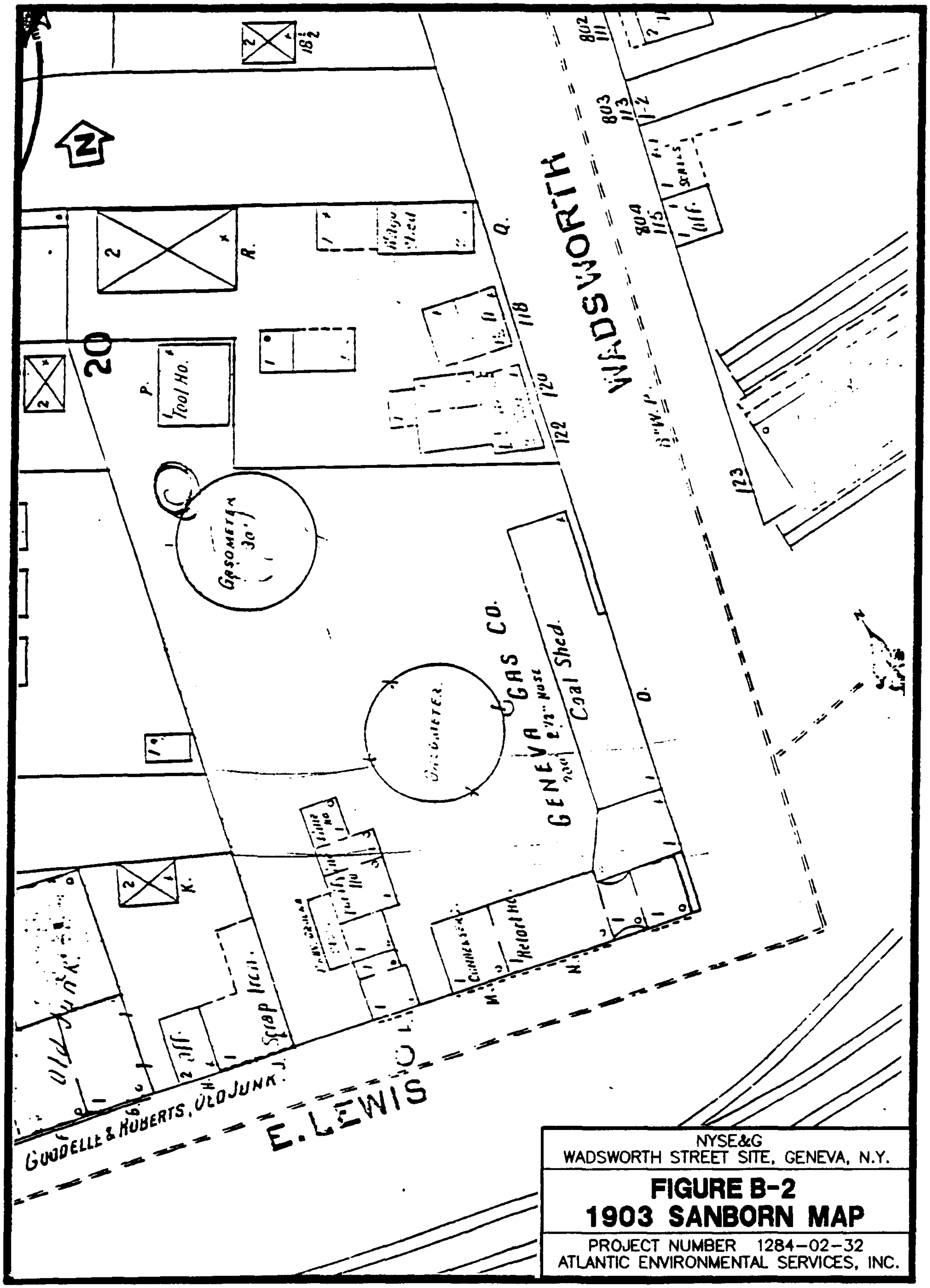
ELECTRONIC ATTACHMENTS
(DATA CD)



NYSE&G
WADSWORTH STREET SITE, GENEVA, N.Y.

FIGURE B-1
1897 SANBORN MAP

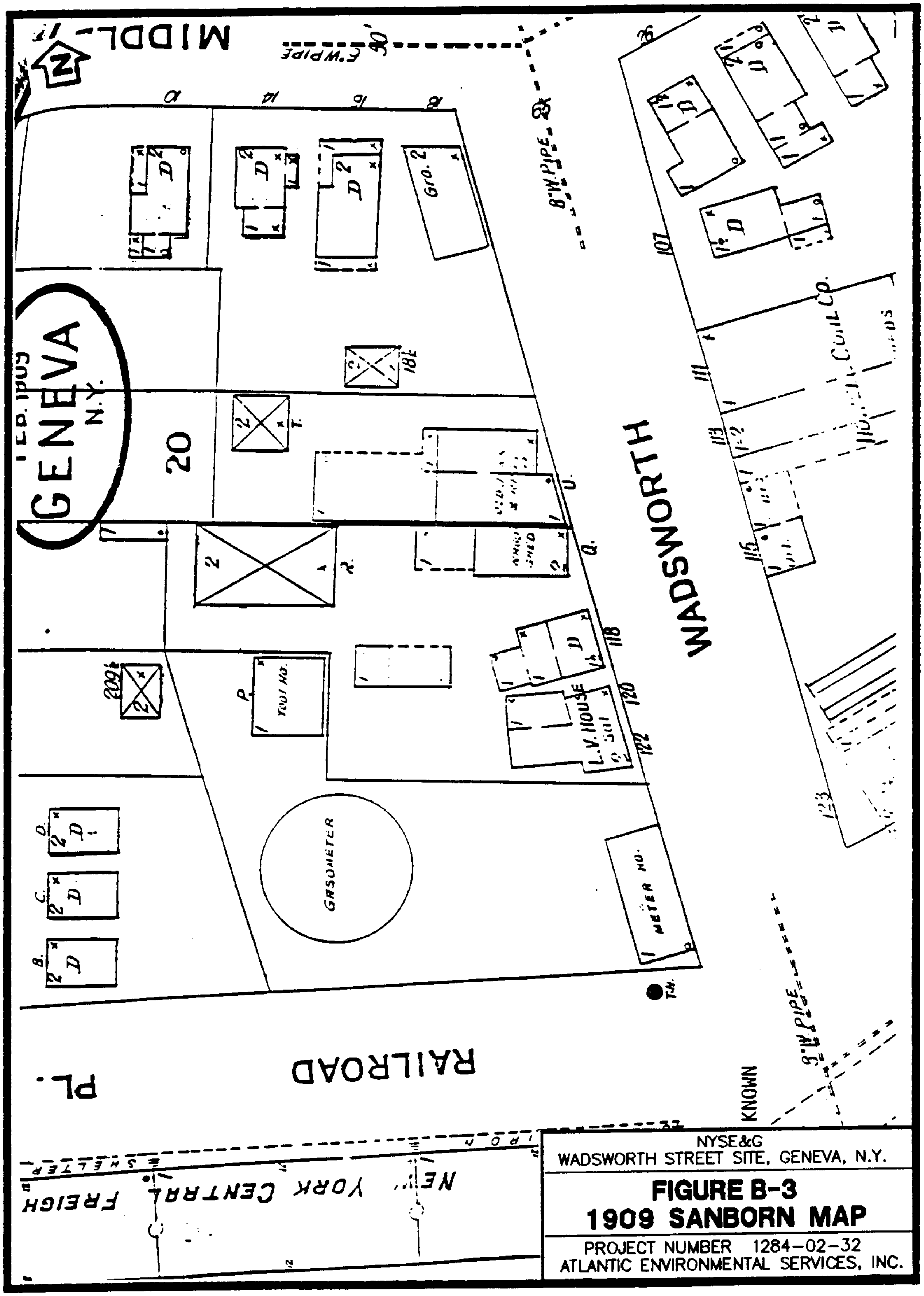
PROJECT NUMBER 1284-02-32
ATLANTIC ENVIRONMENTAL SERVICES, INC.



NYSE&G
WADSWORTH STREET SITE, GENEVA, N.Y.

FIGURE B-2
1903 SANBORN MAP

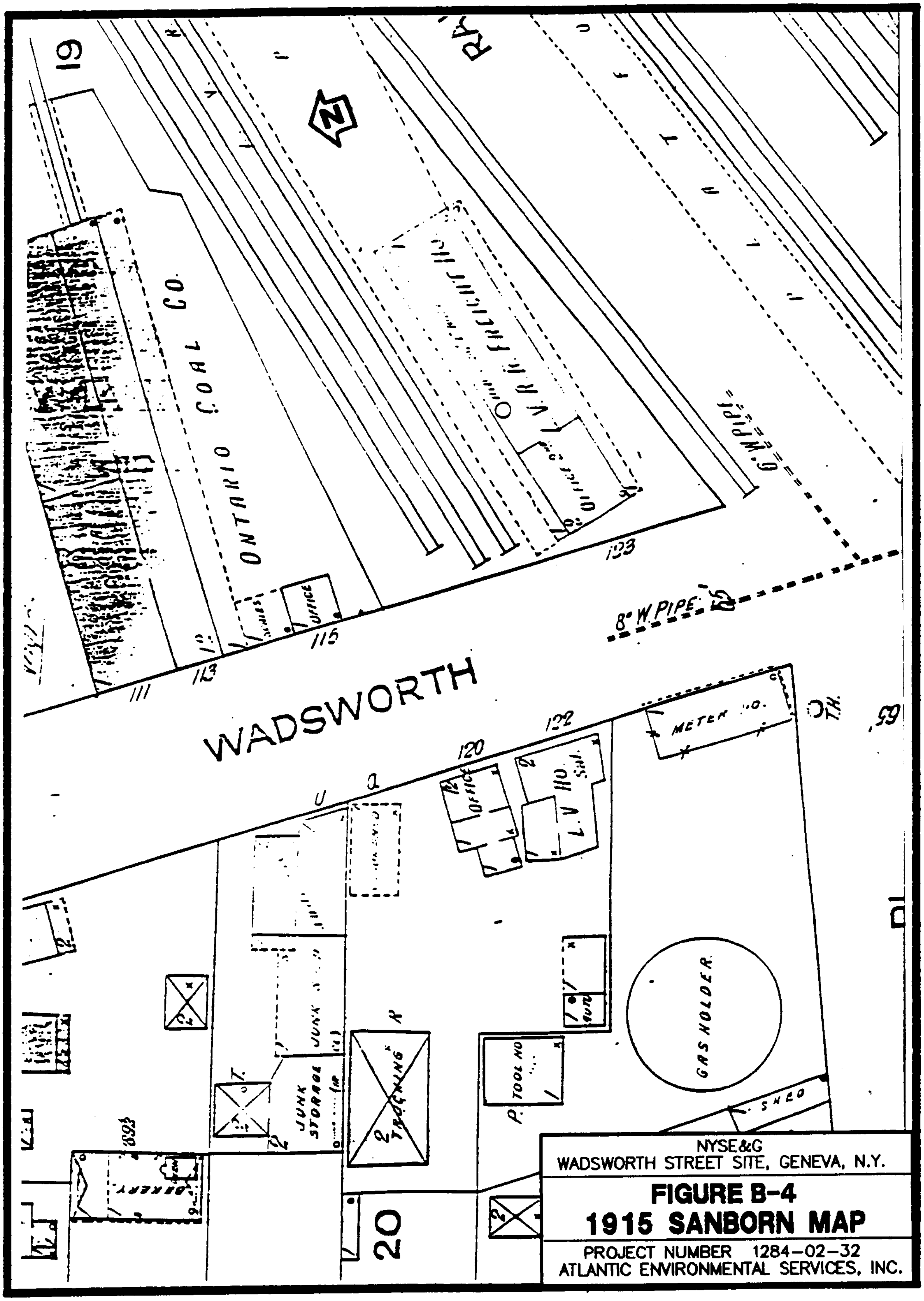
PROJECT NUMBER 1284-02-32
ATLANTIC ENVIRONMENTAL SERVICES, INC.



NYSE&G
WADSWORTH STREET SITE, GENEVA, N.Y.

FIGURE B-3
1909 SANBORN MAP

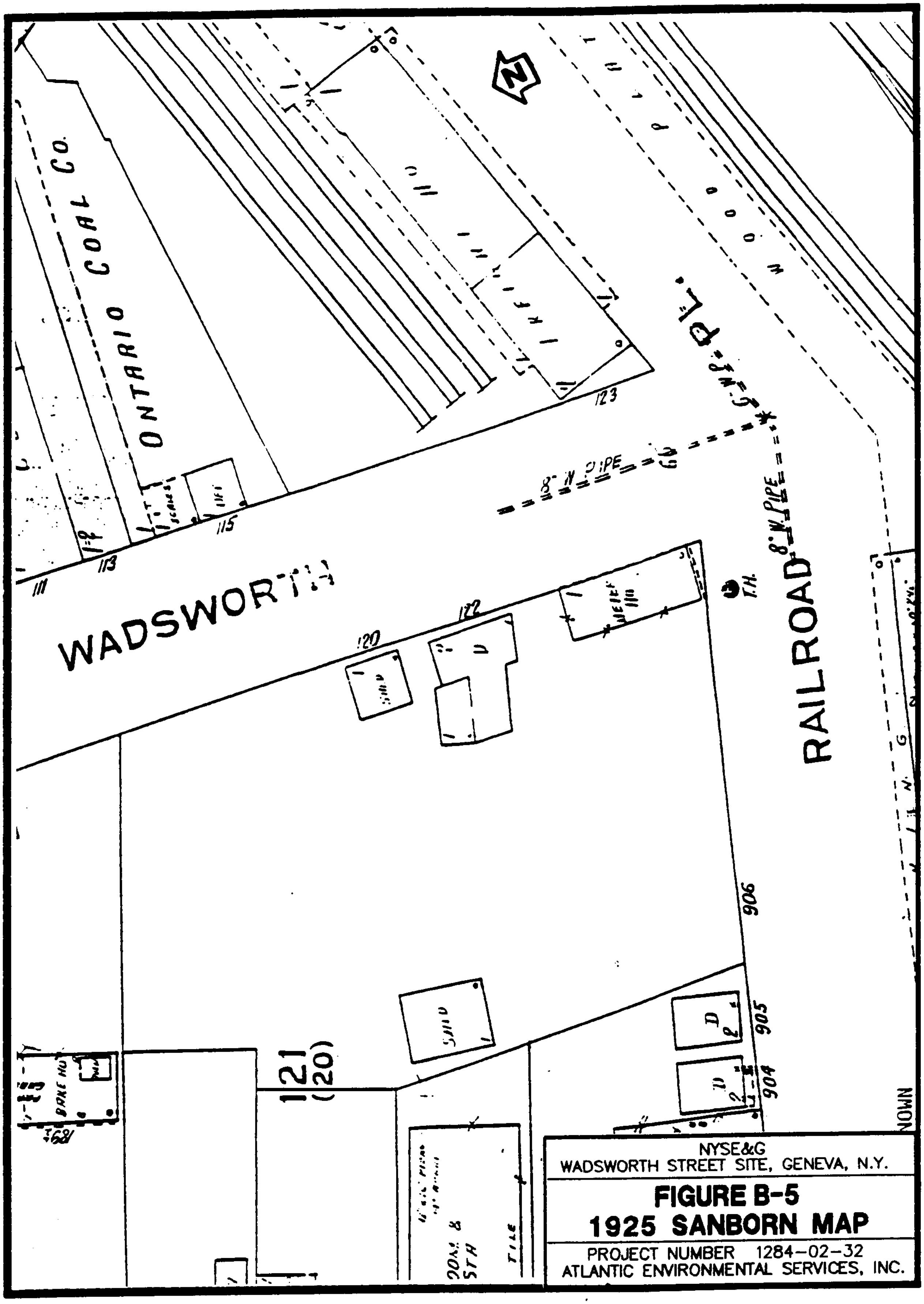
PROJECT NUMBER 1284-02-32
ATLANTIC ENVIRONMENTAL SERVICES, INC.



NYSE&G
WADSWORTH STREET SITE, GENEVA, N.Y.

FIGURE B-4
1915 SANBORN MAP

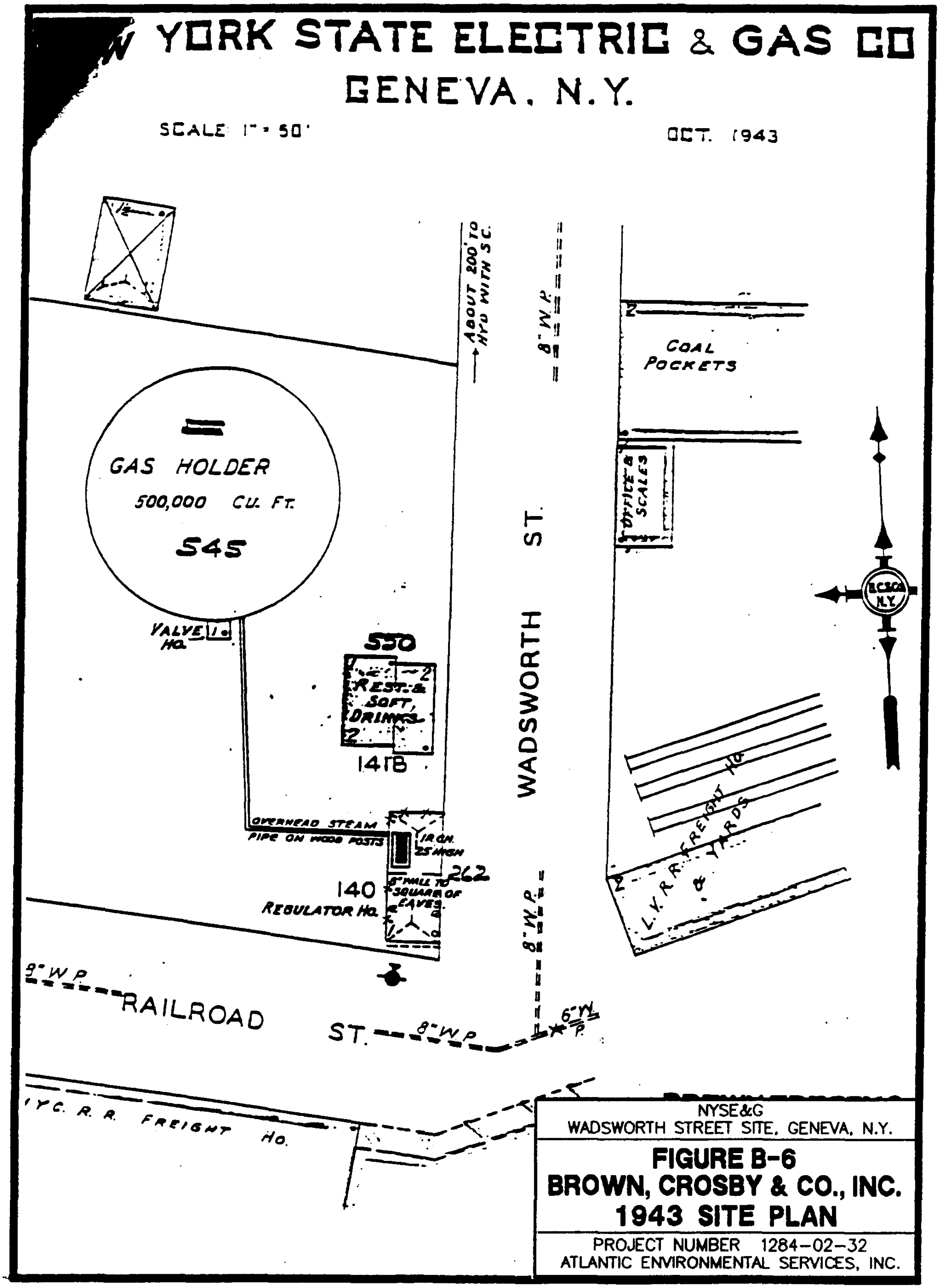
PROJECT NUMBER 1284-02-32
ATLANTIC ENVIRONMENTAL SERVICES, INC.



NYSE&G
WADSWORTH STREET SITE, GENEVA, N.Y.

FIGURE B-5
1925 SANBORN MAP

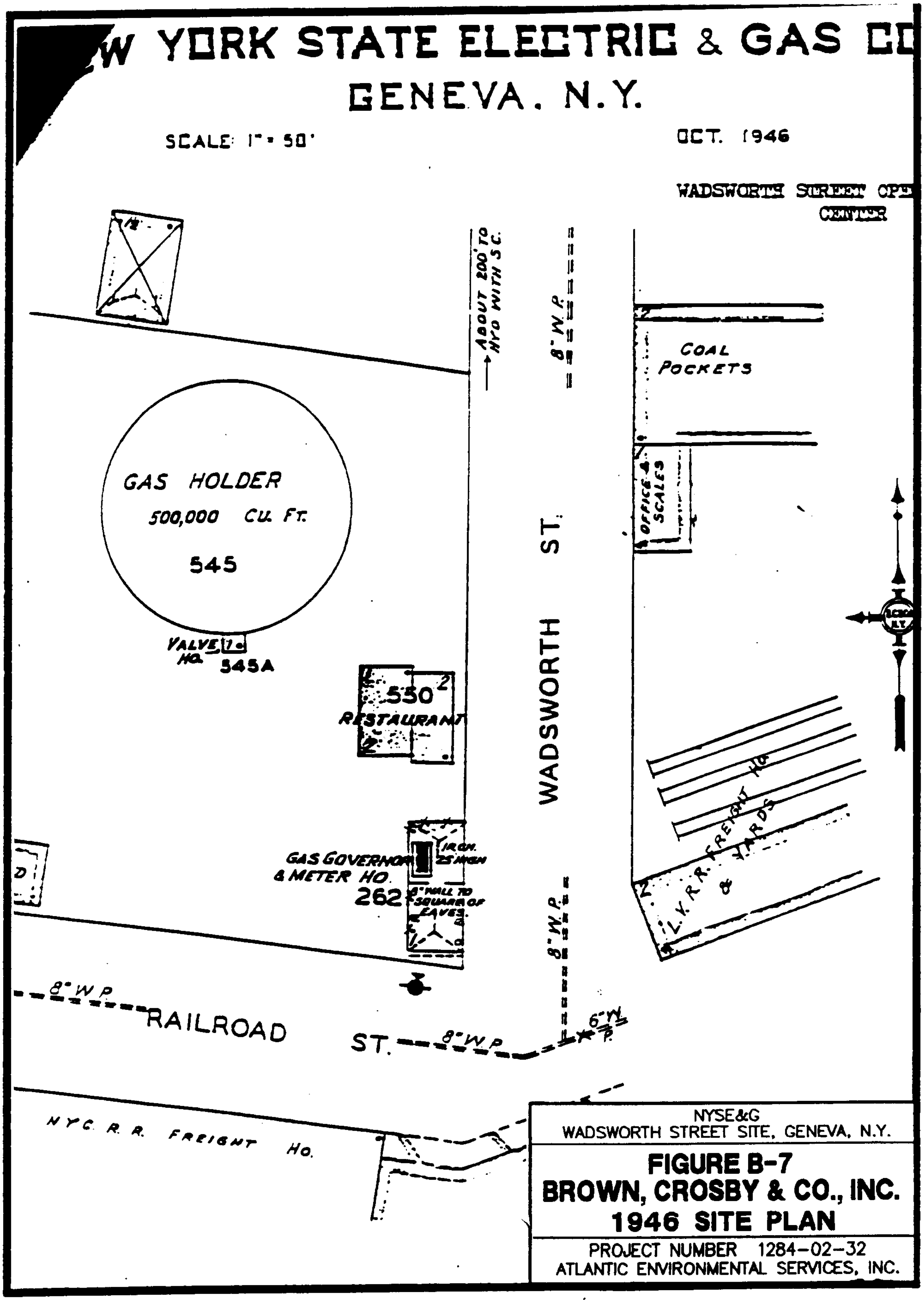
PROJECT NUMBER 1284-02-32
ATLANTIC ENVIRONMENTAL SERVICES, INC.



NYSE&G
WADSWORTH STREET SITE, GENEVA, N.Y.

FIGURE B-6
BROWN, CROSBY & CO., INC.
1943 SITE PLAN

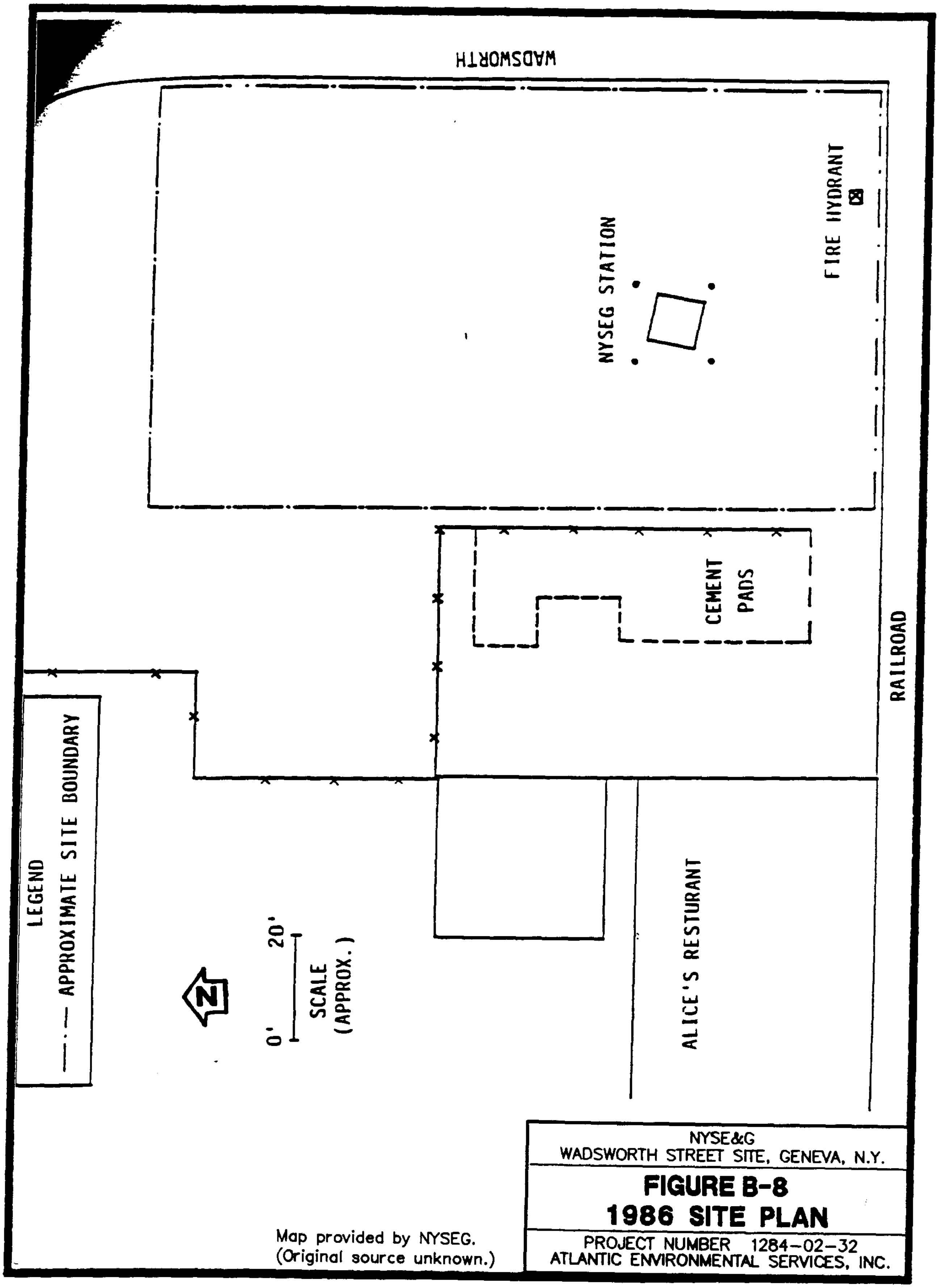
PROJECT NUMBER 1284-02-32
ATLANTIC ENVIRONMENTAL SERVICES, INC.



NYSE&G
WADSWORTH STREET SITE, GENEVA, N.Y.

FIGURE B-7
BROWN, CROSBY & CO., INC.
1946 SITE PLAN

PROJECT NUMBER 1284-02-32
ATLANTIC ENVIRONMENTAL SERVICES, INC.



Map provided by NYSEG.
(Original source unknown.)

NYSE&G
WADSWORTH STREET SITE, GENEVA, N.Y.

FIGURE B-8
1986 SITE PLAN

PROJECT NUMBER 1284-02-32
ATLANTIC ENVIRONMENTAL SERVICES, INC.

MANUFACTURED GAS PLANT
SITE SCREENING REPORT
WADSWORTH STREET SITE
GENEVA, NEW YORK

PREPARED FOR:

NEW YORK STATE ELECTRIC AND GAS

NYSEG

PREPARED BY:

ATLANTIC ENVIRONMENTAL SERVICES, INC.
188 Norwich Avenue
Colchester, Connecticut 06415

ATLANTIC PROJECT NO.: 1284-02-32

SEPTEMBER 1991

MANUFACTURED GAS PLANT SITE SCREENING REPORT
WADSWORTH STREET SITE
GENEVA, NEW YORK

PREPARED FOR:

NEW YORK STATE ELECTRIC AND GAS
4500 Vestal Parkway, East
Binghamton, New York 13903

PREPARED BY:

ATLANTIC ENVIRONMENTAL SERVICES, INC.
188 Norwich Avenue
Colchester, Connecticut 06415

ATLANTIC PROJECT NO.: 1284-02-32

SEPTEMBER 1991

PROJECT MANAGER

Dennis Unites

Dennis Unites, P.G.

PREPARED BY:

Anna Sullivan

Anna Sullivan, Hydrogeologist

REVIEWED BY:

Paul Burgess

Paul Burgess, Project Engineer

STATE OF NEW YORK
PAUL LEWIS BURGESS
067038
LICENSED PROFESSIONAL ENGINEER

Anna Sullivan for

Peter Georgetti - Civil Engineer

NEW YORK STATE ELECTRIC & GAS CORPORATION
MANUFACTURED GAS PLANT SITE INVESTIGATION
WADSWORTH STREET SITE

NYSEG Local Office:
Geneva Division
480 Border City, Box 313
Geneva, NY 14456

Project Coordinators:
J.C. Hylind - Corporate
John Schiefen - Area Contact

Site Location Section

Site Address: Tax Map #104.35, Block #1, Parcel 6; Wadsworth Street; Geneva; Ontario County, NY

Site Description: The site is bordered by Wadsworth Street to the east, Railroad Place to the south, Josephine's Restaurant to the west, and residential properties to the north. The site is vacant except for a gas regulator building.

Property Owners/Land Use: Property owned by NYSEG, conveyed by Empire Gas & Electric Co, circa 1936.

Site History-Operations Section

Years of Operation: 1853-1903 (approx.); gas holder present in 1946, removed before 1986. NYSEG gas regulator station onsite.

Predecessor Companies:
1852-1897, Geneva Gas Light Co.
1897-1903, Geneva Gas Co.
1903-1911, Inter-Urban Gas Co.
1911-1936, Empire Gas & Electric Co.
1936-Present, New York State Electric & Gas Corp.

Operations Summary: Produced coal gas by coal carbonization until 1903, works demolished between 1903 and 1906, holder received gas from Border City MGP, holder removed after 1946.

Site History-Environmental Investigations Section

Contractors Retained: 1990-Present-
Atlantic Environmental Services, Inc.
Colchester, Connecticut (203) 537-0751
Contact: Dennis Unites

Work Activities to Date:
Historical research
Site reconnaissance
Surface soil sampling and analysis

Findings Section

Materials Present:
Volatile organic compounds (VOCs)
Polycyclic aromatic hydrocarbons (PAHs) (some are considered carcinogenic)
Heavy metals including arsenic, beryllium, zinc and mercury

Location of Materials:
Non-carcinogenic and carcinogenic PAHs, dibenzofuran, 2-methylnaphthalene, toluene and metals, found in surface soils.

General Conclusions

Residues from past MGP-related practices may be present at the Wadsworth Street Site. The surface soils analysis revealed some levels of polycyclic aromatic hydrocarbons and metals. No risk assessment can be developed without further study, including subsurface investigations and ground water quality analysis.

TABLE OF CONTENTS

APPENDICES:

LIST OF FIGURES

LIST OF TABLES

"Legal Notice"

"This report was prepared by Atlantic Environmental Services, Inc. as an account of work sponsored by New York State Electric & Gas Corporation (NYSEG). Neither NYSEG, nor any person acting on its behalf: (a) make any warranty, express or implied, with respect to the use of any information, apparatus, equipment, method, design, system, program or process disclosed in this report or that such use may not infringe privately owned rights; or (b) assumes any liability with respect to the use of, or for any damages, losses, costs, expenses or claims, resulting from or arising out of the use of any information, apparatus, equipment, method, design, system, program or process disclosed in this report."

EXECUTIVE SUMMARY

The purpose of this program is to prioritize a number of former manufactured gas plant (MGP) sites for New York State Electric and Gas Corporation (NYSEG). The site evaluated in this report is the Wadsworth Street former MGP site in Geneva, New York. The intent of the program is to determine if there is any imminent threat to human health or the environment at this site and to establish a relative ranking of sites. The Site Screening and Priority Setting System (SSPS) developed by the Electric Power Research Institute (EPRI) specifically for use with MGP sites was used to prioritize the NYSEG sites.

MGPs were the primary source of producing combustible gas for heating, cooking and illumination at 1,500 to 2,500 sites in the United States between 1816 and the 1950s. Gas was manufactured at plants similar to the Wadsworth Street MGP from coke, coal and oil, and had certain by-products and residues associated with the processes. The Wadsworth Street MGP was established in 1853 and produced gas by coal carbonization until 1903.

The general approach used to investigate contamination at the Wadsworth Street Site was to identify routes of exposure which may result in direct contact with MGP residues and to chemically characterize the media associated with the exposure routes to evaluate potential risks. The SSPS calculates indicators of actual and perceived risks for each site evaluated. The actual risk is determined from surface water, ground water, air, and direct contact exposure routes. It predicts an estimate of the imminent threat at the site. The perceived risk reflects economic risks, public image impacts, and similar effects on the previously identified exposure routes. The perceived risk score focuses on the single pathway of greatest risk.

The SSPS scores reflect several site characteristics which describe site size and current use, waste containment efforts, nearby ground water and surface water use, soil and hydrological conditions, precipitation, chemical characteristics, and potential receptors. Site surveys, historical data, state and federal publications, as well as a field sampling and analysis program provided the information needed to complete the SSPS analysis. The media sampled at the Wadsworth Street Site in Geneva, New York included surficial soils. Surface water and streambed sediments were not collected at the site because there are no surface water bodies adjacent to the site.

All of the four surface soil samples (SS-1, SS-2, SS-3 and SS-4) contained carcinogenic polycyclic aromatic hydrocarbons (C-PAHs) at total concentrations of 11.6 parts per million (ppm), 3.19 ppm, 24.93 ppm, and 17.72 ppm, respectively (total concentrations include estimated (J) levels). Other non-carcinogenic polycyclic aromatic hydrocarbons (PAHs) were detected at levels of 14.73 ppm, 3.55 ppm, 24.92 ppm, and 17.19 ppm in surface soil samples SS-1, SS-2, SS-3 and SS-5, respectively (total concentrations include estimated (J) levels). Toluene was detected at low levels in surface soil sample SS-2. Dibenzofuran, bis(2-ethylhexyl)phthalate, 2-methylnaphthalene, and butylbenzyl phthalate were also detected in some surface soil samples. All of the surface soil samples contained elevated levels of several metals (arsenic, beryllium, and mercury) when compared to background concentrations of metals as described by Shacklette and Boerngen (1984). Cyanide was detected in samples SS-1, SS-2, and SS-4 at 37.00 ppm, 2.00 ppm, and 6.80 ppm, respectively.

The PAHs, C-PAHs, 2-methylnaphthalene, dibenzofuran, toluene, and cyanide may be associated with MGP residues. Bis(2-ethylhexyl)phthalate and butylbenzyl phthalate are common laboratory contaminants and are ubiquitous in the environment. The elevated concentrations of arsenic and mercury may be, but are not necessarily associated with MGP residues. Cyanides at

MGP sites are associated with purifier residue and are complex cyanides which are stable under normal environmental conditions.

The Wadsworth Street Site received an actual risk score of 20.3 and a perceived risk score of 24.3. The SSPS scores reflect the assumption that subsurface MGP residues exist at the Wadsworth Street Site, although no subsurface investigations were conducted. The answers to and assumptions used to answer specific SSPS questions in order to ensure consistency between sites are detailed in Appendix A. The breakdown of exposure route and individual scores are also listed in Appendix A.

The major route of exposure to MGP residues at the Wadsworth Street Site, based on available data, was identified as direct contact with surficial soils. Surficial soils at the site contained PAHs, C-PAHs, toluene, and dibenzofuran which may be harmful to humans if ingested or through direct contact. Residential properties border the site to the north and a restaurant is located to the west of the site. Concrete slabs from a former car wash business are located east of the restaurant along the western border of the site. The site is not restricted from public access. Cars, presumed to belong to people living in the adjacent homes, were parked in the northern part of the site.

Several wells used for domestic, commercial, agricultural, and industrial purposes are located in the site vicinity. The well construction details, specific locations and updated water use information on these wells are unknown. Ground water may also be a potential pathway of exposure to MGP residues at the Wadsworth Street Site.

Due to the detection of potential MGP residues in the surficial soils at the Wadsworth Street Site and the sensitive adjacent land use, it is recommended that the site be fenced to lower the possible risks associated with the site at a relatively low cost. An investigation of ground water use in the site vicinity is also recommended to evaluate the potential for subsurface MGP residues to adversely affect the water quality of nearby wells. Based on the SSPS score of this site relative to other sites, no other field investigations at the Wadsworth Street Site currently are recommended. In the future, if changes in land use at the Wadsworth Street Site are proposed, including any excavation or construction, a focused site investigation should be conducted prior to any development action. This investigation might include ground water and subsurface soil studies focusing in areas where former MGP structures existed, areas of vegetative stress, and where volatile and semi-volatile organic compounds were detected during the screening process.

1.0 INTRODUCTION

Combustible gas for heating, cooking, and illumination was manufactured from coke, coal, and oil at 1,500 to 2,500 sites in the United States between 1816 and the 1950s. Manufactured gas was the major gas fuel available during this period for the majority of the country. During the 1940s and 1950s, the manufactured gas industry encountered severe competition from natural gas. Natural gas became more readily available through interstate pipelines, was less expensive and had a higher Btu content than manufactured gas. Natural gas became the major base fuel. Eventually manufactured gas processes were phased out and the plants were decommissioned.

The three major processes used to manufacture gas were coal carbonization, carburetted water gas and oil gas. In the coal carbonization process, bituminous coal was heated in a sealed chamber causing the distillation of gas from coal and the formation of coke. Carburetted water gas, containing hydrogen and carbon monoxide, was produced by passing steam through a bed of incandescent coke (or coal). The resultant "blue gas" was then passed through two chambers containing hot firebrick in which oil was sprayed and the oil cracked into gaseous hydrocarbons and tar. The oil gas process cracked oil alone into gaseous hydrocarbons, tar, and carbon. The carburetted water gas and the oil gas processes used a variety of oil-based feedstocks such as naphtha, gas oil, fuel oil, and residual oils.

The three processes produced similar by-products however, important differences exist which affect the current character and toxicity of the wastes. Tars produced during coal carbonization were high in phenols and base neutral organics. Tars produced by carburetted water gas and oil gas processes contain lower amounts of these compounds. Substantial amounts of cyanide and ammonia were produced by coal carbonization but only trace amounts of cyanide were produced during carburetted water gas and oil gas processes.

A number of former MGP sites, operated by NYSEG or its predecessor companies, have been investigated for potential risk to human health and/or the environment. If residues of the MGP remain at the sites, they may pose health risks to the surrounding populations and the environment. The sites were screened for size, current use, waste containment, nearby ground water and surface water use, soil and hydrological conditions, rainfall, chemical characteristics, and potential receptors. The information gathered through the screening effort was input into SSPS in order to assign risk-based priorities among sites. The goal of the screening is to identify and prioritize former MGP sites that may then require further investigation.

During the priority setting, no attempt was made to determine the ultimate level of site remediation which might be required. Site prioritization was conducted in order to enable NYSEG to develop plans of action and resource allocation so that any potential risks posed by these sites can be adequately addressed.

2.0 METHODOLOGY

The SSPS (Site Screening and Priority Setting System) is a menu-driven program designed for IBM-compatible PCs. The Electric Power Research Institute (EPRI) developed SSPS to help utilities manage former MGP sites, but it is a general tool that can be applied efficiently to many types of sites. The SSPS assigns scores to individual site characteristics. The individual scores are used to calculate risks associated with four potential routes of exposure, namely surface water, ground water, direct contact and air. The scores are combined to produce final scores which are indicators of actual risk and perceived risk at each site.

The SSPS is simple to use and requires information that is relatively straightforward to obtain. It can screen and rank a large number of MGP sites for further investigation and analysis. It has been tested with a number of MGP sites where complete risk analyses have been conducted and has produced reliable rankings with a strong correlation between the SSPS risk scores and the results of the remedial investigation risk analyses. The system does not attempt to determine the ultimate level of site remediation.

The SSPS requires information regarding the site and the surrounding areas including site size and current use, waste containment efforts, nearby ground water and surface water use, soil and hydrological conditions, rainfall, chemical characteristics, and potential receptors. Initial site surveys were conducted at the NYSEG Western Area and North Central Area sites on October 23 and 24, 1990. During these surveys, information regarding site size, current use, surface water use, general soil conditions, waste containment, and potential receptors was recorded. Historical data, U.S. Geological Survey (USGS), New York State Department of Environmental Conservation (NYSDEC), Department of Health (DOH), National Oceanic Atmospheric Administration (NOAA), and Soil Conservation Service (SCS) files and publications provided insights to nearby ground water and surface water use, soil and hydrological conditions, rainfall, and waste containment. The sampling program consisted of surface soil samples collected on November 21, 1990. Surface water and streambed sediment samples were not collected at the site due to the distance of the site from the nearest surface water body.

No wells for sampling ground water exist at the site. Subsurface investigations were not conducted as part of the site evaluation. The potential effects of MGP residues on ground water and subsurface soils at the site were estimated for purposes of completing the SSPS forms. The quantities of potential MGP residues in the subsurface at the Wadsworth Street Site were estimated by applying the geometric mean concentration of residues associated with MGPs to a percentage of the tar produced onsite based on the annual average gas production. The geometric mean concentrations of residues associated with MGPs were derived from the GRI-EPRI data base compiled by Atlantic Environmental Services, Inc. The percentage of tar produced was estimated from the Radian Report. The quantities of potential MGP residues in the subsurface at the Wadsworth Street Site and the methods used to derive them are listed in Appendix A, questions 18 and 23.

3.0 SCOPE OF WORK

The following sections describe the information gathered concerning site history, current use, physiography, hydrogeology, ground water and surface water use, sensitive habitats, and field activities relating to the Wadsworth Street Site evaluation.

3.1 Site History

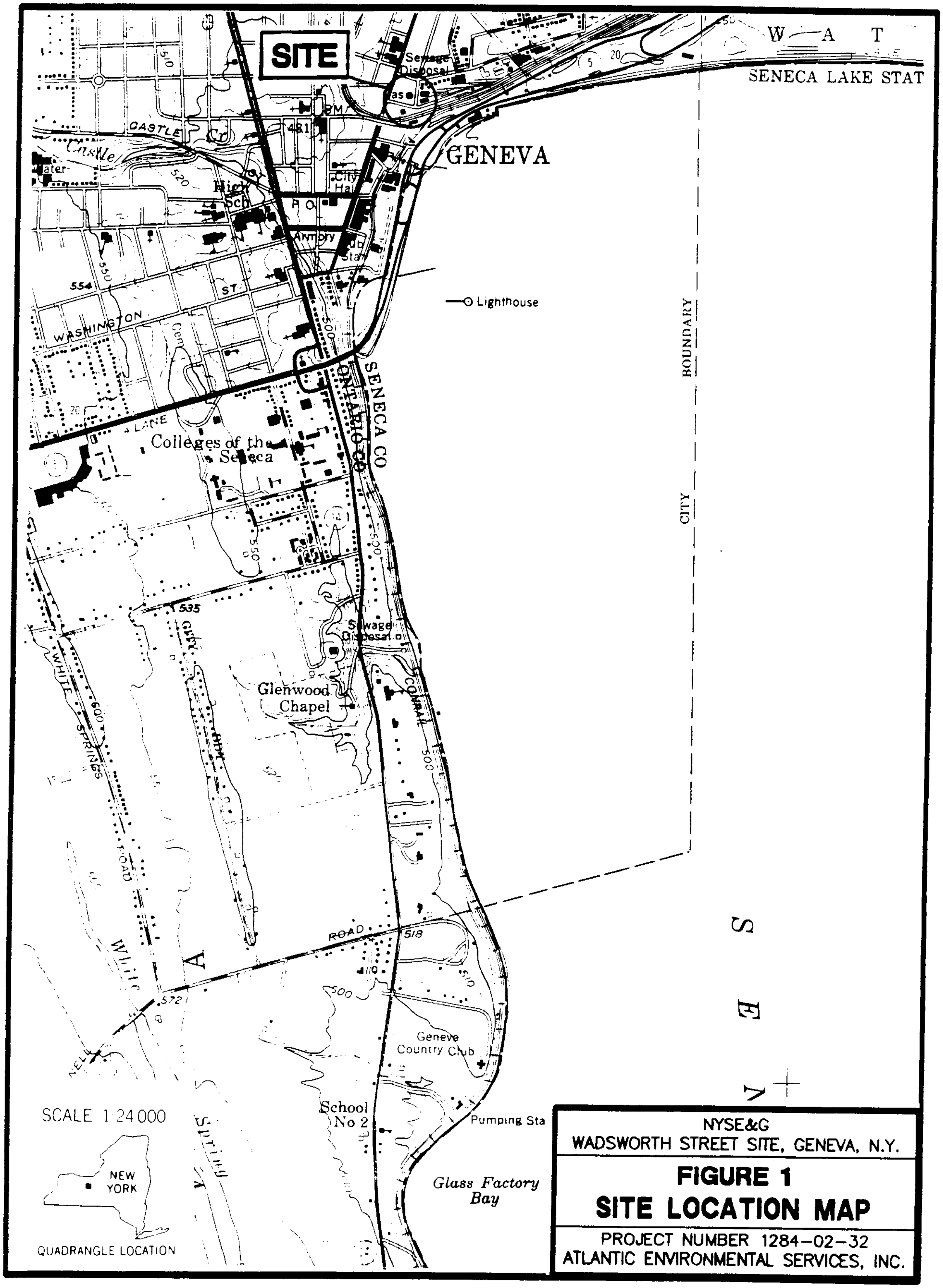
The Wadsworth Street Site is the location of a former MGP in Geneva, Ontario County, New York. The following site history is summarized on a Fact Sheet following the Title Page of this report. The Wadsworth Street Site acquisition, organization, history, and available historical maps (Figures B-1 through B-9), which were researched and compiled by NYSEG, are provided in Appendix B.

The site location is indicated on the Geneva South, New York USGS Quadrangle map (Figure 1). The Wadsworth Street MGP was established in 1853 and produced coal gas by coal carbonization until 1903. The MGP was initially operated by the Geneva Gas Light Company. Figure 2 illustrates the existence and configuration of structures at the Wadsworth Street Site from 1897 through 1986. The 1897 Sanborn Map (Figure B-1) showed the Wadsworth Street Site occupied by a retort and condenser house, a purification building (including a lime room, ammonia tank and cistern) a coal shed, and a single gas holder. A junkyard, cigar factory and residences were located west of the site. A second gas holder was constructed circa 1900 in the northwest corner of the site and appears on the 1903 Sanborn Map (Figure B-2). Between 1903 and 1909, the gas plant was demolished; the only remaining structures were the second gas holder, a tool house, and a meter house (Figure B-3). Railroad Place was constructed through the center of the former MGP site and covered the southernmost gas holder location. The New York Central Freight Terminal was constructed where the former gas works buildings had existed. In 1897, the Geneva Gas Company acquired the property and sold it between 1900 and 1909 to Inter-Urban Gas Company. Empire Gas and Electric Company acquired the property in 1911. The site configuration remained unchanged from 1909 through 1915 (Figure B-3 and Figure B-4). The 1915 Sanborn Map (Figure B-4) documents the existence of the Ontario Coal Company and the L.V.R.R. Freight House east of the site on the opposite side of Wadsworth Street. The remaining holder was demolished between 1915 and 1925 and does not appear on the 1925 Sanborn Map (Figure B-5). In 1936, NYSEG acquired the site. Prior to 1943, a 500,000 cubic foot gas holder and a regulator house were constructed at the site to serve as a storage/distribution facility (Figure B-6). The gas holder remained until at least 1946 (Figure B-7), but was demolished prior to 1986 (Figure B-8).

3.2 Site Reconnaissance

3.2.1 Current Use

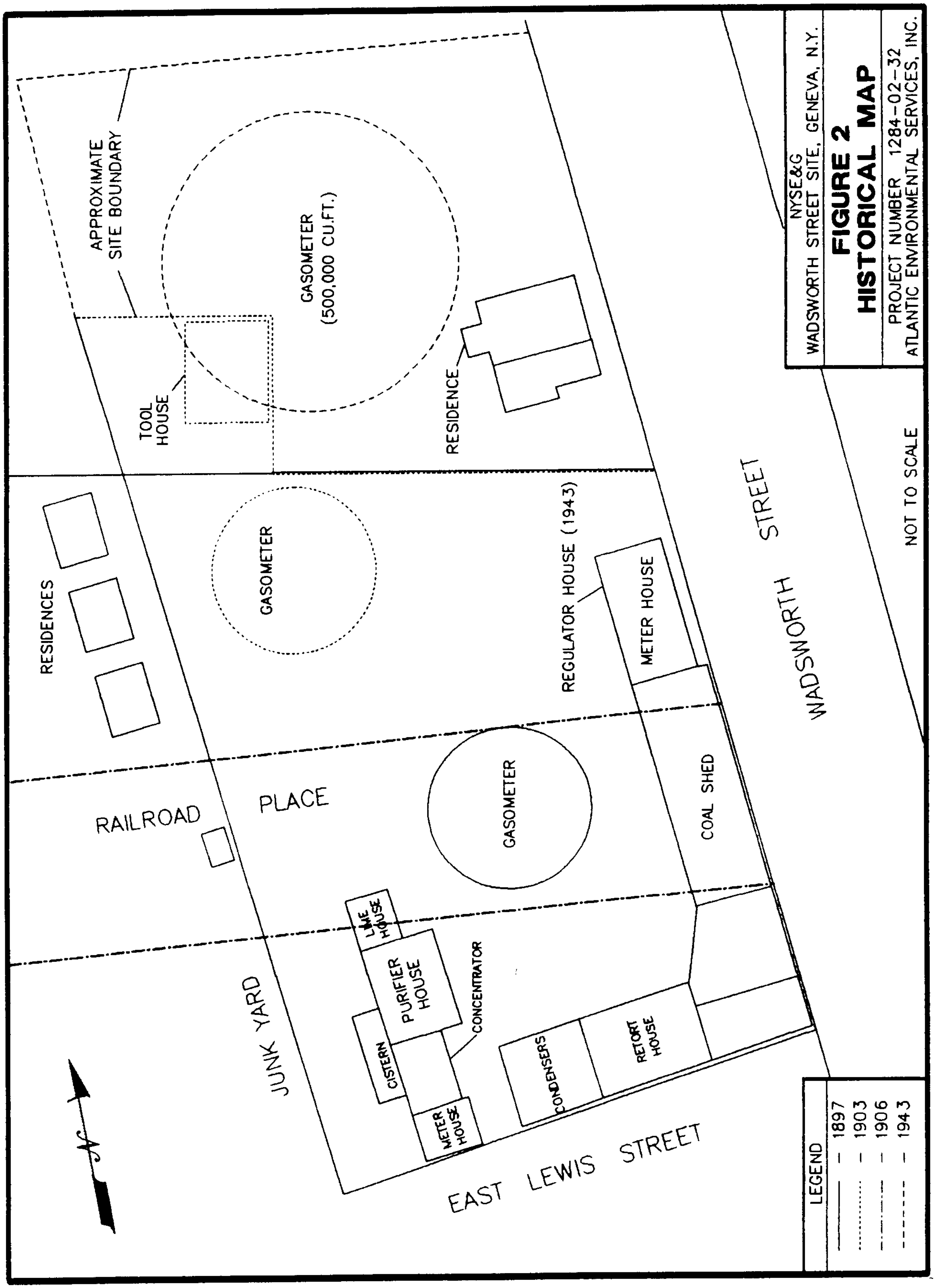
The Wadsworth Street Site is located in a mixed commercial/residential area in the east-central section of Geneva, New York (Figure 1). The closest residence is adjacent to the north of the site and Seneca Lake is about 900 feet southeast of the site. The site is bordered by Wadsworth Street to the east, Railroad Place to the south, Josephine's Restaurant to the west, and residential properties to the north. An adjacent land use map is provided as Figure 3. Concrete slabs from a former car wash are located east of Josephine's restaurant along the western site border. These pads are separated from the eastern part of the site by a fence. Public access to the site is not restricted. Cars, presumably belonging to people living in the adjacent homes, were parked in the northern part of the site. T and G Electrical Supply and a dry cleaners are located east of the site



NYSE&G
WADSWORTH STREET SITE, GENEVA, N.Y.

FIGURE 1
SITE LOCATION MAP

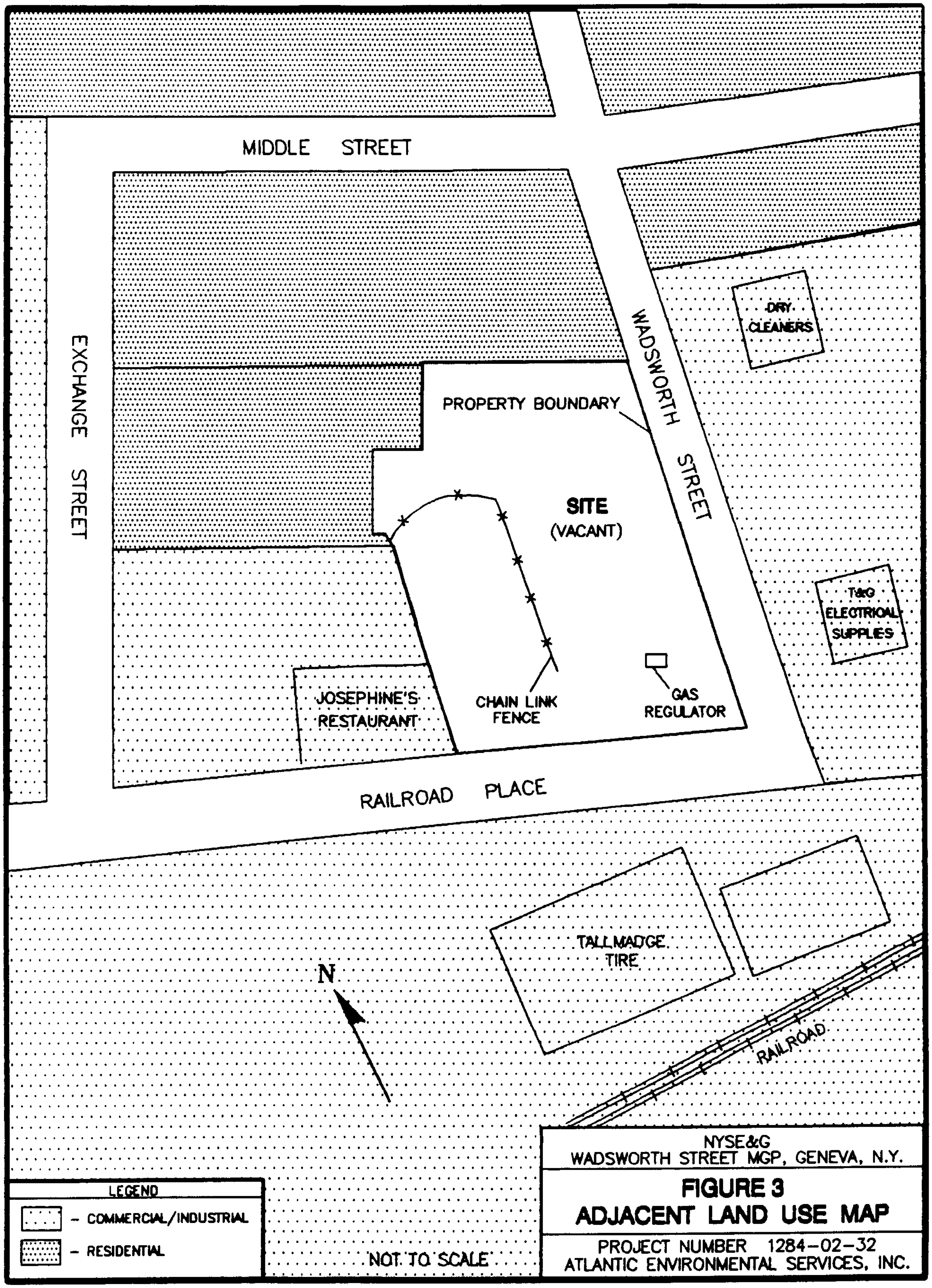
PROJECT NUMBER 1284-02-32
ATLANTIC ENVIRONMENTAL SERVICES, INC.



NYSE&G
WADSWORTH STREET SITE, GENEVA, N.Y.

FIGURE 2
HISTORICAL MAP

PROJECT NUMBER 1284-02-32
ATLANTIC ENVIRONMENTAL SERVICES, INC.



LEGEND

- ⬚ – COMMERCIAL/INDUSTRIAL
- ▩ – RESIDENTIAL

NYSE&G
WADSWORTH STREET MGP, GENEVA, N.Y.

FIGURE 3
ADJACENT LAND USE MAP

PROJECT NUMBER 1284-02-32
ATLANTIC ENVIRONMENTAL SERVICES, INC.

on the opposite side of Wadsworth Street. Tallmadge Tire is located south of the site across Railroad Place where the former gas works buildings previously existed.

The site is occupied by a gas regulator house surrounded by open land where foundation lines of a former building and a gas holder are visible. MGP related residues were not apparent at the surface of the Wadsworth Street Site. Xerox copies of aerial and ground photos of the site are included in the field data section of this report (Appendix C).

3.2.2 Physiography

The Wadsworth Street Site was surveyed by S.Y. Kim Land Surveyors, P.C., Latham, New York. Figure 4 is a reduced topographic map of the site. The Wadsworth Street Site base map is included in the pocket at the end of this report. Surveyor field notes are included in Appendix D.

The Wadsworth Street Site is generally level, sloping gently to the northeast. The average elevation across the site is approximately 454 feet above mean sea level (MSL). The southern two-thirds of the site is grass covered. The northwestern one-third of the site is barren with a dirt and loose gravel covering.

The maximum 24 hour rainfall measured at the Geneva Research Farm in 1989 was 2.3 inches. Surface water runoff will flow northeast across the site towards Wadsworth Street. Precipitation infiltration is not restricted at the site creating the potential for leaching and subsurface release. The wind speed at the site is greater than 4 meters per second. The grass cover in the southern portion of the site minimizes airborne dust particles.

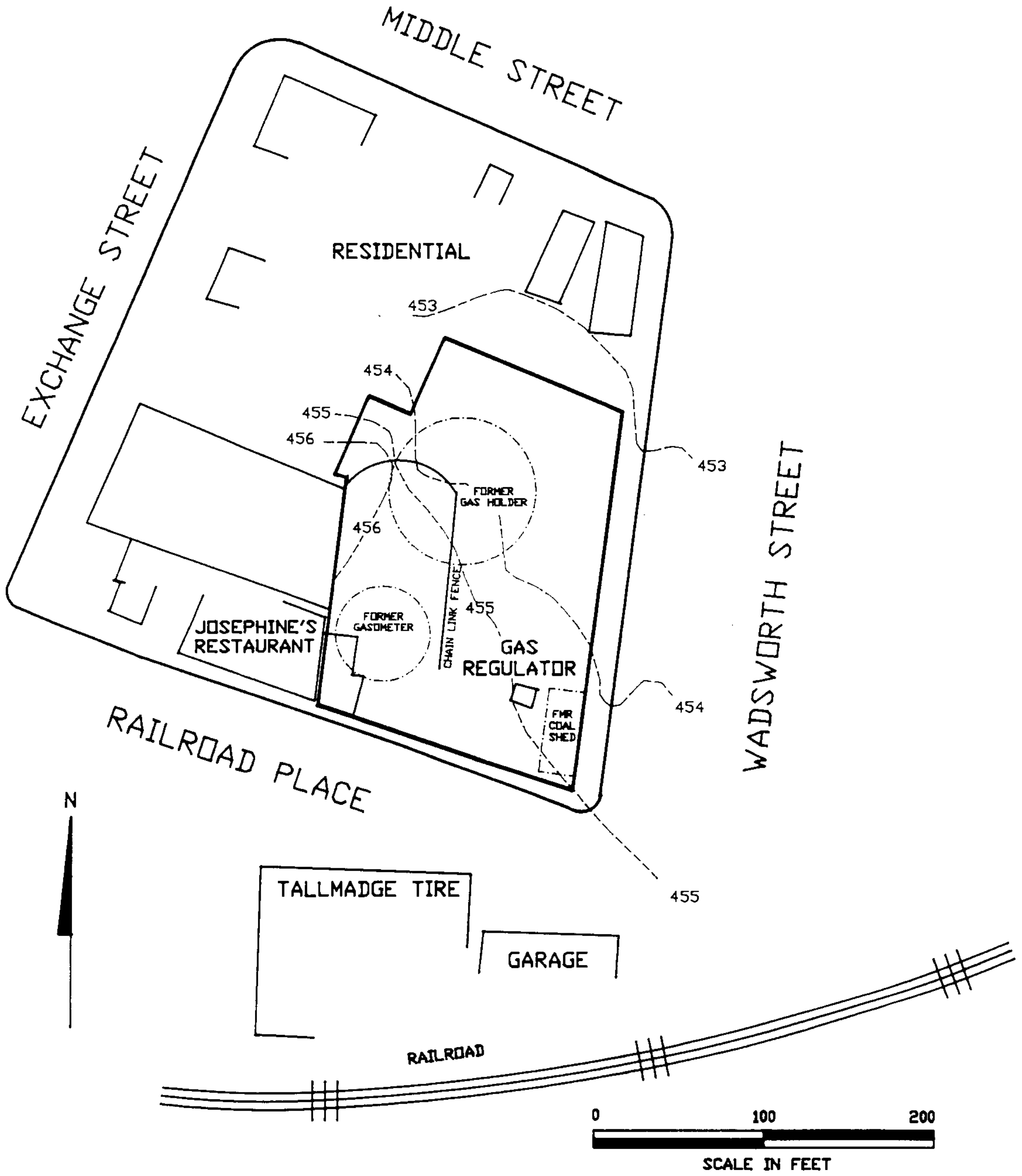
3.2.3 Hydrogeology

Preliminary geologic and hydrogeologic information on the Wadsworth Street Site has been obtained from Pearson and Cline (1958). The soils at the Wadsworth Street Site are mapped as the Lakemont Silty Clay Loam. The soils are poorly drained with a high lime content and a fine texture. The soils are developed on a parent material consisting of glacio-lacustrine silts and clays. These soils and subsoils are characterized by low permeability and the development of seasonal perched water tables. The bedrock underlying the Wadsworth Street Site would be either Onondaga Limestone or Salina Shale.

The depth to shallow ground water at the site is not known. Seneca Lake, approximately 900 feet southeast of the site, is approximately 5 feet below the average elevation of the site. Shallow ground water probably discharges to Seneca Lake. Therefore, the depth to shallow ground water should be within approximately 5 feet. MGP structures, mainly gas holders, were commonly constructed below grade and are assumed to be at least within 3 feet (1 meter) of the shallow aquifer at the site. Information concerning other aquifers at the site is unknown.

3.2.4 Ground Water and Surface Water Use

The Wadsworth Street Site in Geneva, New York is approximately 0.17 miles (0.27 kilometer (km)) northwest of Seneca Lake. NYSDEC has classified Seneca Lake as a Class A surface water body. Class A surface waters are sources of water supply for drinking, culinary or food processing purposes and any other usages according to NYSDEC Water Quality Rules and Regulations. The City of Geneva receives its potable water supply from Seneca Lake. The pumping station intake, as illustrated on the Geneva South 7.5 Minute Quadrangle Map (Figure 1), is located approximately 2.6



LEGEND

—— PRESENT STRUCTURES

- - - CONTOURS

—— BOUNDARY

-·-·- FORMER STRUCTURES

NOTE: THIS MAP IS BASED ON A SURVEYED SITE PLAN DEVELOPED BY S.Y. KIM LAND SURVEYORS DATED 01-26-91.

NYSE&G
WADSWORTH STREET SITE, GENEVA, N.Y.

FIGURE 4
SITE TOPOGRAPHIC MAP

PROJECT NUMBER 1284-02-32
ATLANTIC ENVIRONMENTAL SERVICES, INC.

miles south of the site on the western shore of Seneca Lake. The municipal water system served approximately 16,000 people in the early 1980s (Axelrod, 1984).

Several active wells exist in the Geneva, New York area. According to USGS well records, eight domestic wells, two commercial wells, four stock/agricultural wells, one unused well, and five wells of unknown usage exist within 3 miles (5 km) of the Wadsworth Street Site. There are three domestic wells, one commercial, one industrial, and one unused well listed with the USGS within approximately 2 miles (3 km) of the site. Tarr Mill Company owns and operates the only active well located within 0.6 miles (1 km) of the site according to USGS well records. The ground water from this well is used for industrial cooling purposes. There are three unused wells located within 0.6 miles (1 km) of the site according to USGS well records. The majority of these wells are located west of the Wadsworth Street Site with approximately an equal number of wells located to the north and south.

3.2.5 Sensitive Habitats

There are no federally regulated freshwater wetlands within 1.25 miles (2 km) of the Wadsworth Street Site. Several regulated freshwater wetlands exist within 1.5 to 5 miles (2.5 to 8 km) north-northeast of the site (NYSDEC Fish and Wildlife Branch Wetland Maps). No endangered species are known to exist within 2.5 miles (4 km) of the Wadsworth Street Site (NYSDEC Natural Heritage Files and Maps).

3.3 Field Activities

Prior to the performance of any field activities, a work plan, quality assurance/quality control document and health and safety plan were submitted to and approved by NYSEG. The Health and Safety Plan and the Quality Assurance/Quality Control Document are included in Appendices E and F, respectively.

The general approach used to investigate contamination at the Wadsworth Street Site was to identify routes of exposure which may result in direct contact with MGP residues and to chemically characterize the media associated with the exposure routes to evaluate potential health risks associated with the site.

Exposure routes with the potential for direct contact identified at the Wadsworth Street Site include:

- dermal contact/incidental ingestion of surface soils potentially contaminated by tars, fuel oil, coal pile leachate or purifier residues; and
- inhalation of indoor air in the basement of Josephine's Restaurant potentially contaminated by volatile aromatics emanating from subsurface soil or ground water contamination.

Surface soils were sampled at the Wadsworth Street Site. Surface water and streambed sediment samples were not collected due to the distance between the site and Seneca Lake. The basement of Josephine's Restaurant was inspected on November 21, 1990; no leaks or MGP odors were detected. Access to the basement is limited. Basement activity is primarily heating system maintenance and soft drink tank replacement. No wells for ground water sampling exist at the site. Subsurface investigations were not conducted as part of this study. Ground water and subsurface soil contamination at the site was estimated using geometric mean concentrations of selected parameters commonly found in the subsurface at MGP sites and the annual gas production at the Wadsworth Street MGP for purposes of completing the SSPS forms. Estimated quantities and the method from which they were derived are listed in Appendix A, questions 18 and 23. Surface soil sample locations and rationale are presented in Table 1.

3.3.1 Surface Soil Samples

A total of four (4) surface soil samples were collected at the Wadsworth Street Site on November 21, 1990. Sampling locations are illustrated on the Sampling Locations Map (Figure 5). Surface soils were collected from 0.0 to 0.5 foot depth using dedicated stainless steel sampling spoons. Three of the four sample locations (SS-2, SS-3 and SS-4) were gridded and consisted of 49 nodal points each. Five (5) nodes, randomly selected, were sampled and combined to produce each composite sample. Surface soil sample SS-1 was not gridded due to extensive gravel and rocks. Five locations were arbitrarily selected and sampled to form a composite sample for the SS-1 sample area. Sample areas and nodal selection are detailed in the field data section, Appendix C, of this report. Sample collection procedures are outlined in Atlantic Procedure 1020 (Appendix G).

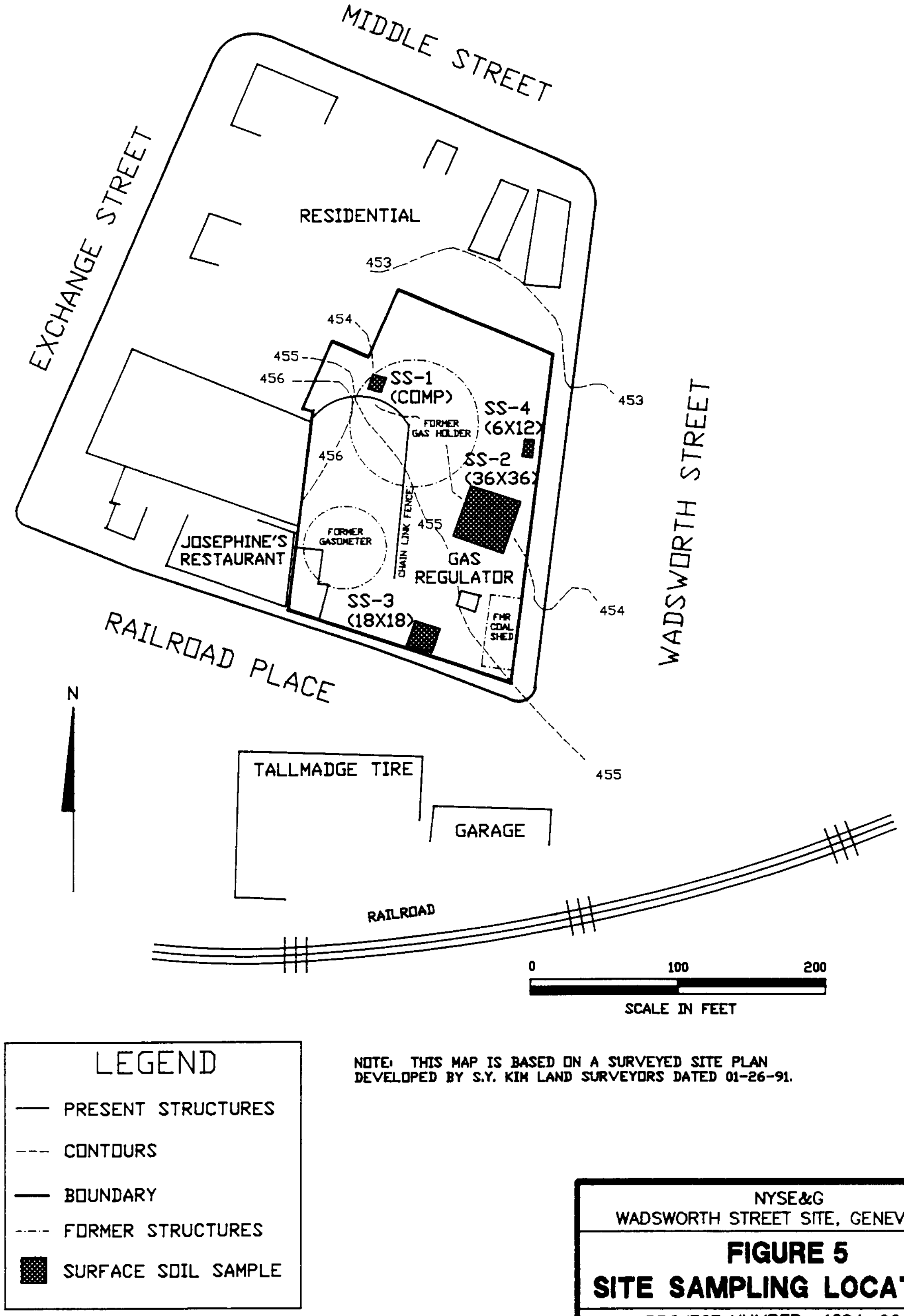
Surface soil sample SS-1 was collected directly north of the circular fence in the vicinity of a former gas holder. Surface soil sample SS-2 was taken in the grassy area generally downgradient (topographically) of the former gasometers. Surface soil sample SS-3 was taken in the grassy area north of Railroad Place, in the vicinity of the former southernmost gasometer (gasometer location currently covered by Railroad Place). Surface soil sample SS-4 was taken west of the former 500,000 cubic foot holder adjacent to Wadsworth Street. Surface soil samples could not be collected in the vicinity of the former gas works buildings, south of Railroad Place due to the presence of Tallmadge Tire and extensively paved and gravel-covered areas.

Surface soil samples were analyzed for volatile organic compounds (VOCs) using EPA Method 8240, semi-volatile organic compounds (SVOCs) using EPA Method 8270, metals using EPA Method 6010, lead using EPA Method 7191, chromium using EPA Method 7421, and cyanide using EPA Method 9010.

TABLE 1

SAMPLING LOCATIONS AND RATIONALE FOR THE WADSWORTH STREET SITE, GENEVA, NEW YORK

SAMPLE ID	LOCATION AND RATIONALE	ANALYSES
SURFACE SOILS		
SS-1	In the area near the second former gas holder to evaluate potential surficial contamination from holder contents.	VOCs-EPA Method 8240 SVOCs-EPA Method 8270 Metals-EPA Method 6010 Lead-EPA Method 7191 Chromium-EPA Method 7421 Cyanide-EPA Method 9010
SS-2	In the area topographically downgradient of the former gasometers, to evaluate potential contamination, from holder contents.	
SS-3	In the vicinity of the former southernmost holder location (currently covered by Railroad Place) to evaluate potential contamination from the former holder contents.	
SS-4	Taken adjacent to and east of the former 500,000 cubic foot holder to evaluate potential contamination from former holder contents.	



NOTE: THIS MAP IS BASED ON A SURVEYED SITE PLAN DEVELOPED BY S.Y. KIM LAND SURVEYORS DATED 01-26-91.

NYSE&G
WADSWORTH STREET SITE, GENEVA, N.Y.

FIGURE 5
SITE SAMPLING LOCATIONS

PROJECT NUMBER 1284-02-32
ATLANTIC ENVIRONMENTAL SERVICES, INC.

4.0 ANALYTICAL RESULTS

This section summarizes the analytical results of the sampling program conducted at the Wadsworth Street Site. Appendix H lists the results of the analyses performed by Wadsworth/Alert Laboratories, Inc. on the samples gathered from the surface soils at the site.

4.1 Surface Soil Analytical Results

Surface soil samples from the Wadsworth Street Site contained SVOCs, PAHs and C-PAHs, as shown in Table 2. Surface soil sample SS-2 contained 0.59 ppm toluene (VOC). Surface soil samples SS-1, SS-3, and SS-4 contained no detectable concentrations of VOCs. Bis(2-ethylhexyl)phthalate, butylbenzyl phthalate, dibenzofuran, and 2-methylnaphthalene were detected at varying concentrations in the surface soil sediments as illustrated in Table 2. These compounds were detected below quantification limits, and therefore the levels reported represent estimated values. The total concentrations of C-PAHs in surface soil samples SS-1, SS-2, SS-3 and SS-4 were 11.6 ppm, 3.19 ppm, 24.93 ppm, and 17.72 ppm, respectively (total concentrations include estimated (J) levels). PAHs (non-carcinogenic) were detected at 14.73 ppm, 3.55 ppm, 24.92 ppm, and 17.19 ppm in surface soil samples SS-1, SS-2, SS-3, and SS-4, respectively (total concentrations include estimated (J) levels).

Most of the surface soil samples contained elevated levels of various metals (Table 2) when compared to background concentrations of metals in the Geneva area as described by Shacklette and Boerngen (1984). Arsenic was detected at 18 ppm, 8.8 ppm, 52 ppm, and 11 ppm in surface soil samples SS-1, SS-2, SS-3, and SS-4, respectively. Mercury was also detected at levels above background concentrations in each of the four surface soil samples. Cyanide was detected at 37.0 ppm, 2.0 ppm, and 6.8 ppm in surface soil samples SS-1, SS-2, and SS-4, respectively.

The PAHs, C-PAHs, toluene, dibenzofuran, and 2-methylnaphthalene detected in the Wadsworth Street Site surficial soils may be related to former MGP residues. The elevated levels of metals in the surface soils at the Wadsworth Street Site could be associated with MGP residues, however the source currently is unknown. Cyanide may be indicative of former MGP residues. As the site is unfenced in a commercial area, other outside sources of contamination are possible.

TABLE 2

VOLATILE, SEMI-VOLATILE ORGANIC, AND INORGANIC COMPOUNDS DETECTED IN SURFACE SOILS AT THE WADSWORTH STREET SITE, GENEVA, NEW YORK

	(CONCENTRATIONS IN PPM)				
ELEMENT	**SS-1**	**SS-2**	**SS-3**	**SS-4**	**TYPICAL BACKGROUND CONCENTRATION AT SIMILAR SITES**
VOLATILE ORGANICS					
Toluene	--	0.59J	--	--	
TOTAL	--	0.59J	--	--	
SEMI-VOLATILE ORGANICS					
Bis(2-ethylhexyl)phthalate	0.35J	0.24J	--	0.42J	
Dibenzofuran	0.11J	--	0.18J	0.22J	
2-Methylnaphthalene	--	--	0.15J	0.20J	
Butylbenzyl phthalate	0.28J	--	0.22J	--	
NON-CARCINOGENIC PAHS					
Acenaphthene	0.096J	--	0.19J	--	
Acenaphthylene	0.18J	--	0.35J	0.24J	
Anthracene	0.58J	0.16J	1.20J	0.62J	
Fluoranthene	5.20	1.30	8.30	5.40	
Fluorene	0.17J	--	--	--	
Naphthalene	0.20J	--	0.38J	0.43J	
Phenanthrene	2.30	0.59J	5.60	3.00	
Pyrene	6.00	1.50	8.90	7.50	
TOTAL	14.73	3.55	24.92	17.19	10.00(1)
CARCINOGENIC PAHS					
Benzo(a)anthracene	2.50	--	4.40	3.30	
Benzo(b)fluoranthene	3.50	1.30	6.30	5.40	
Benzo(k)fluoranthene	1.70	0.59J	1.50	2.20	
Benzo(g,h,i)perylene	--	--	1.50	--	
Benzo(a)pyrene	--	--	4.50	1.00	
Chrysene	2.70	1.30	4.90	3.40	
Dibenzo(a,h)anthracene	--	--	0.43J	0.42J	
Indeno(1,2,3-cd)pyrene	1.20	--	1.40J	2.00	
TOTAL	11.60	3.19	24.93	17.72	10.00(1)
INORGANICS					**BACKGROUND CONCENTRATIONS**
Arsenic	18.00	8.80	52.00	11.00	2.60(2)
Beryllium	1.00	*	1.00	1.20	<1.00(2)
Calcium	74,000	54,000	55,000	20,000	5,200(2)
Mercury	2.00	0.39	1.70	1.30	0.13(2)
Cyanide	37.00	2.00	--	6.60	500(1)

-- None detected
* Detected, but below background concentration.
J Detected, but below quantification limit (estimated value).
(1) Level based on typical background concentrations at similar sites.
(2) Shacklette and Boerngen (1984)

5.0 SCREENING RESULTS

The Wadsworth Street Site is the location of the former Wadsworth Street MGP. Gas was produced by the coal carbonization method. Residuals commonly produced by the coal carbonization method of producing gas were coal tar, coke, ammoniacal liquor, ash and clinker, purifier residues, and phenolic compounds. PAHs and C-PAHs associated with MGP operations, combustion, and/or fuel oils were detected in surficial soils at the Wadsworth Street Site. Toluene, 2-methylnaphthalene, dibenzofuran, and cyanide were also detected in surficial soils and may be associated with MGP residues. However, due to the amount of time that has elapsed since the gas plant operated, the presence of volatile compounds in the surface soil being related to MGP residuals is remote. Cyanides at MGP sites are associated with purifier residue and are complex cyanides which are inert and stable under normal environmental conditions.

The Wadsworth Street Site in Geneva, New York received an actual risk score of 20.3 and a perceived risk score of 24.3 from the SSPS program. Direct contact with surficial soils was identified as the major route of exposure to MGP residues based on available information and the SSPS program. Public access to the site is not restricted. Land use adjacent to the site is residential and commercial. Several wells used for domestic, industrial, commercial and agricultural purposes exist in the site vicinity. Ground water may also be a potential route of exposure to MGP residues at the Wadsworth Street Site.

The SSPS scores reflect the assumptions that subsurface MGP residues exist at the Wadsworth Street Site, although no subsurface investigations were conducted. The answers to and assumptions used to answer specific SSPS questions in order to ensure consistency between sites are detailed in Appendix A. The breakdown of exposure route and individual question scores are also listed in Appendix A.

6.0 RECOMMENDATIONS

The major route of exposure to MGP residues at the Wadsworth Street Site according to the SSPS program was identified as direct contact with surficial soils. Surficial soils at the Wadsworth Street Site contained PAHs and C-PAHs associated with MGP operations, combustion by-products, and/or fuel oils, which can be harmful if ingested and through direct contact over extended periods of time. Toluene, dibenzofuran, 2-methyl-naphthalene and cyanide also were detected in surficial soils.

Due to the detection of potential MGP residues in the surficial soils at the Wadsworth Street Site and the sensitive adjacent land use, it is recommended that the site be fenced to lower the possible risks associated with the site at a relatively low cost. A more detailed investigation of ground water use in the site vicinity is also recommended to evaluate the potential for subsurface MGP residues to adversely affect the ground water quality of nearby wells. Based on the SSPS score of this site relative to other sites, no other field investigations at the Wadsworth Street Site currently are recommended. In the future, if changes in land use are proposed at the Wadsworth Street Site, a focused investigation should be conducted prior to any development. This investigation might include ground water and subsurface studies focusing in areas where former MGP structures existed and where VOCs, SVOCS, PAHs, C-PAHs, and cyanide compounds were detected during the screening process.

7.0 REFERENCES

Axelrod, David (Commissioner), Inventory - Community Water Systems New York State: Volume 1-Municipal; New York State Department of Health Bureau of Public Water Supply Protection Evaluation and Enforcement Section, 1984.

Menzie, C.A., Potocki, B.B. and Santodonato, J.; Ambient Concentrations and Exposure to Carcinogenic PAHs in the Environment; Menzie • Cura & Associates, Inc., Chelmsford, MA and New York State Electric and Gas Corporation, Binghamton, NY.

Pearson, C.S. and Cline, M.G., Soil Survey of Ontario and Yates Counties, New York; U.S. Government Printing Office, Washington, D.C., 1958.

Radian Corporation, Survey of Tar Waste Disposal and Locations of Town Gas Procedures; Prepared for the Office of Environmental Engineering and Technology, Office of Research and Development, USEPA (Unpublished).

Shacklette, H.T., and Boerngen, J.G., Element Concentrations in Soils and Other Surficial Materials of the Conterminous United States; U.S. Geological Survey Professional Paper 1270, U.S. Government Printing Office, Washington, D.C., 1984.

Stanley, T.W. and Verner, S.S., Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans, U.S. Department of Commerce National Technical Information Service, Office of Exploratory Research Report No. EPA-600/ 4-83-004, 1983.

Zambrano, J. (Originator), Ambient Water Quality Standards and Guidance Values, New York State Department of Environmental Conservation, Division of Water Technical and Operational Guidance Series 1.1.1, Revised 1990.

APPENDIX A

SSPS SCORES, ANSWERS AND ASSUMPTIONS QUESTIONNAIRE

SSPS DATA ENTRY FORM

Site Name:	GENEVA-WADSWORTH STREET SITE	Actual Risk:	20.3
Type of Site:	MGP SITE	Perceived Risk:	24.3

ACTUAL RISK:	20.3
Surface Water:	0.1
Target:	1.3
Runoff Potential:	1.0
Near-surface Contamination:	17.1
Containment:	25.0
Mobility:	22.2
Subsurface Release Potential:	6.5
Subsurface Contamination:	17.1
Containment:	100.0
Mobility:	38.1
Observed Release:	0.0
Ground Water:	8.0
Target:	10.7
Release Potential:	5.7
Subsurface Contamination:	17.1
Containment:	100.0
Mobility:	33.3
Observed Release:	75.0
Direct Contact:	39.7
Target:	57.8
Surface Contamination:	68.6
Air:	3.9
Target:	31.7
Release Potential:	12.3
Subsurface Contamination:	68.6
Containment:	30.0
Mobility:	60.0
Observed Release:	0.0
PERCEIVED RISK:	24.3
Site Characteristics:	57.8
Surface Water:	0.8
Target:	1.3
Runoff Potential:	5.7
Near-surface Contamination:	90.9
Containment:	25.0
Mobility:	25.0
Subsurface Release Potential:	60.6
Subsurface Contamination:	90.9
Containment:	100.0
Mobility:	66.7
Observed Release:	0.0

Ground Water:	10.7
Target:	10.7
Release Potential:	90.9
Subsurface Contamination:	90.9
Containment:	100.0
Mobility:	100.0
Observed Release:	100.0
Direct Contact:	57.8
Target:	57.8
Surface Contamination:	100.0
Air:	5.7
Target:	31.7
Release Potential:	18.0
Subsurface Contamination:	100.0
Containment:	30.0
Mobility:	60.0
Observed Release:	0.0
Community Characteristics:	0.4

Q1) Site Description: FORMER MGP SITE

Q2) Service Region: North Central
Service Division: Geneva
Neighborhood Type: Residential/Commercial

Q3) How is the surface water used?

- ___ Not currently used (score = 1)
- ___ Industrial (2)
- ___ Recreational (3)
- ___ Irrigation, food preparation, or fishing (4)
- X Drinking water (5)

Select the appropriate answer with the highest score.

Based on NYSDEC stream classifications. The closest surface water body to the Wadsworth Street Site is Seneca Lake. Seneca Lake is a Class A surface water body, which is used for drinking water.

Score: 5.0

Based on site observations and the USGS 7.5 Minute Quadrangle Map of south Geneva.

Score: 0.0

Q7) What is the expected maximum 24-hour rainfall over a year?

___ Less than 2 cm (0)
___ Less than 5 cm (1)
_X_ Less than 8 cm (2)
___ 8 cm or greater (3)

Based on the greatest of 24-hour rainfall in 1989 for Geneva, referenced in NOAA Climatological Data Annual Summary New York, 1989.

Score: 2.0

Q8) What is the distance to the nearest body of surface water?

___ Greater than 2 km (0)
___ Less than 2 km (1)
_X_ Less than 1/2 km (2)
___ Less than 100 meters (3)

Based on site observations and the Geneva South Quadrangle map.

Score: 2.0

Q9) What is the physical state of the wastes within one-tenth of one meter (10 cm) of the site surface?

_X_ Solid, consolidated and stabilized (0)
___ Solid, unconsolidated and unstabilized (1)
___ Powder or fine material (2)
___ Liquid, gas, or sludge (3)

Default value - solid, consolidated, and stabilized because the only waste observed at the site fell into this category.

Score: 0.0

Q10) How well is the site designed to reduce runoff?

___ Runoff blocked by high terrain (0)
X Waste covered (1)
___ Exposed waste, sound diversion system (2)
___ Exposed waste, poor diversion system (3)
___ Site in surface water (4)

Select the appropriate answer with the highest score.

> Based on site observations made by Atlantic Environmental Services, Inc.

Score: 1.0

Q11) Fill out the table below describing the wastes present within one-tenth of a meter (10 cm) of the surface of the site. If data is not known exactly, approximations must be made. Include up to six chemicals.

Chemical Waste Name	Concentration (ppm)	Established Values (ppm)	Persistence (0-3)	Quantity (kg)
Arsenic	52.0	2.6	3	0.898
Cyanide	37.0	50	3	0.458
Lead	500.0	700	3	15.0
C-PAH	26.22	10	3	0.5719
PAH	26.04	10	3	0.6074
Mercury	2.0	0.13	3	0.0539

> Chemical Waste: Types of wastes were determined by mutual consent. They are defined below with C-PAHs and PAHs broken down into the specific compound detected in the surface soils at the Wadsworth Street Site.
> Arsenic
> Cyanide
> Lead
> C-PAHs: Benzo(a)anthracene, benzo(b) fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, benzo(a)pyrene, chrysene, dibenzo(a,h)anthracene, indeno (1,2,3-cd)pyrene
> PAHs: Acenaphthene, acenaphthylene, anthracene, fluoranthene, fluorene, naphthalene, phenanthrene, pyrene
> Other: Mercury
>
> Concentration: The highest concentration detected in any of the samples was used. If none was detected, concentration = 0.

Concentration:	C-PAHs: Concentration represents the sum of the highest concentrations of all C-PAHs detected. PAHs: Concentration represents the sum of the highest concentrations of all PAHs detected, not including C-PAHs.
Established Values:	Arsenic, Lead, and Mercury - Used the background concentrations for arsenic and lead from Shacklette and Boerngen (1984). Cyanide, C-PAHs, PAHs - Used default values: Cyanide - 50 ppm (domestic land use) 500 ppm (industrial land use) C-PAHs - 10 ppm PAHs - 10 ppm
Persistence:	Based on values supplied in the SSPS help screen.
Quantity:	The quantity of waste represents the summation of the concentration of waste detected in each surface soil sample multiplied by the volume of soil contaminated. For samples SS-1 through SS-4, this volume was assumed to be 10 m^3 (10m x 10m x 10cm).

Score: 6.0

Q12) What is the physical state of all of the wastes at the site surface?

☒ Solid, consolidated and stabilized (0)
☐ Solid, unconsolidated and unstabilized (1)
☐ Powder or fine material (2)
☐ Liquid, gas, or sludge (3)

Default value - solid, consolidated and stabilized.

Score: 0.0

Q13) What is the distance from the bottom of the site to the top of the water table?

☐ Greater than 15 m (0)
☐ Less than 15 m (1)
☐ Less than 5 m (2)
☒ Less than 1 m (3)
☐ Site in water table (6)

Default value - less than 1m as established by mutual consent. Assumed former MGP structures were below land surface, placing the bottom of the site below grade and therefore closer to the water table.

Score: 3.0

Q14) What is the expected annual net precipitation?

___ Less than -25 cm (0)
___ Greater than -25 cm (1)
___ Greater than 10 cm (2)
_X_ Greater than 25 cm (3)

Default value - greater than 25 cm as established by mutual consent.

Score: 3.0

Q15) What is the permeability of the soil between the site and the water table?

_X_ Less than 1×10^{-7} (0)
___ Greater than 1×10^{-7} (1)
___ Greater than 1×10^{-5} (2)
___ Greater than 1×10^{-3} (3)

Value based on Soil Conservation Survey data for the Lakemont Silty Clay Loam.

Score: 0.0

Q16) What is the mobility of the primary chemicals in the saturated zone?

_X_ Greater than 10,000 (0)
___ Less than 10,000 (1)
___ Less than 100 (2)
___ Less than 1 (3)

Default value of greater than 10,000 - assuming the primary chemical to be benzene as established by mutual consent.

Score: 0.0

Q17) How well is the site designed to reduce leaching and subsurface release?

___ Non-permeable barrier and no ponding (0)
___ Non-permeable barrier and ponding (1)
_X_ Inadequate barrier and no ponding (2)
___ Inadequate barrier and ponding (3)

Based on site observations made by Atlantic Environmental Services, Inc. in 1990.

Score: 3.0

Q18) Fill out the table below describing all of the wastes present at the site. If data is not known exactly, approximations must be made. Include up to six chemicals.

Chemical Waste Name	Concentration (ppm)	Established Values (ppm)	Persistence (0-3)	Quantity (kg)
VOAs	706.6	1.0	2	7.25
PAH	52,889.0	10	3	542.64
Cyanide	0.0	50	3	0.0
Arsenic	52.0	2.6	3	0.9
Mercury	2.0	0.13	3	0.054

Chemical Waste:	Determined to be volatile organics, PAHs, cyanide and metals, as arrived at by mutual consent.
Concentration:	Used the geometric mean concentrations for tar waste, and conversion factor for tar (gallons) to tar (weight in kilograms) from the GRI EPRI data base. Cyanide concentration represents the highes level detected in surface soil samples. Metals concentration represents the highest level detected in surface soil samples.
Established Values:	Determined by mutual consent as follows: Volatile Organics - 1 ppm PAHs - 10 ppm Cyanide - 50 ppm (domestic land use) 500 ppm (industrial land use) Others: Arsenic and mercury - background concentrations based on Schacklette and Boerngen (1984).
Persistence:	Based on values supplied in the SSPS help screen.

Quantity: According to the Fact Sheet provided by NYSEG, the average gas production for the years that the Wadsworth Street MGP was in operation was 7 MCF. This average was multiplied by the years of operation (51) and then by a constant (7.3) representing the assumption that 730 gallons of tar are produced for every 1,000,000 ft^3 of gas manufactured (radian report) and approximately 1% is lost as waste onsite.

Score: 6.0

Q19) Fill out the table below describing wastes that have been detected in the nearest body of surface water. If wastes have not been detected, enter zeros for the concentrations. If a waste release was detected by sight or smell but not sampled analytically, an approximation must be made. Include up to six chemicals.

Chemical Waste Name	Concentration (ppb)	Government Standard (ppb)
VOCs	0	--

Surface water was not analyzed.

Score: 0.0

Q20) How is the ground water used?

___ Not currently used (score = 1)
___ Industrial with alternative (2)
X Drinking water with alternative or industrial with no alternative (6)
___ Drinking water with no alternative (9)

Select the appropriate answer with the highest score.

Assumed the use of ground water selected occurred within 5 km of the site. The selection is based on USGS well records and the following DOH publications:

1) Report on Ground Water Dependence in New York State, NYSDOH Division of Environmental Health Bureau of Public Water Supply, 1981.

2) Inventory of Community Water Systems - New York State Vol. 1 - Municipal, NYSDOH - Bureau of Public Water Supply, 1984.

3) Inventory of Community Water Systems - New York State Vol. 2 - Non-Municipal, NYSDOH - Bureau of Public Water Supply, 1984.

Score: 6.0

Q21) For each distance, check the appropriate row to indicate the number of people using the downgradient drinking water for the highest scoring purpose above:

	Distance				
Population	Within 5 km	Within 3 km	Within 1 km	Within 1/2 km	Onsite
0	___ (0)	___ (0)	___ (0)	x (0)	x (0)
1 to 100	___ (4)	x (6)	X (8)	___ (10)	___ (20)
101 to 1,000	x (8)	___ (12)	___ (16)	___ (20)	___ (30)
1,001 to 10,000	___ (12)	___ (18)	___ (24)	___ (30)	___ (40)
10,001 to 100,000	___ (16)	___ (24)	___ (32)	___ (35)	___ (45)
100,001 and up	___ (20)	___ (30)	___ (35)	___ (40)	___ (50)

Downgradient is defined as being within 45 degrees of the gradient. If the ground water direction is not known, assume the worst possible direction.

Assumed every direction was downgradient of the site since ground water flow direction is unknown. Estimated population figure based on USGS well records, Donnelly Demographics data, and the NYSDOH publications referenced in Question 20.

Score: 8.0

Q22) What is the distance from the bottom of the site to the top of the aquifer in use?

___ Greater than 50 m (0)
___ Less than 50 m (1)
___ Less than 25 m (2)
X Less than 5 m (3)
___ Site in aquifer (6)

> Used less than 5 m if ground water is being used. If ground water is not used in area, greater than 50 m is the default value.

Score: 3.0

Q23) Fill out the table below describing wastes that have been detected in the ground water. If wastes have not been detected, enter zeros for the concentrations. If a waste release was detected by sight or smell but not sampled analytically, an approximation must be made. Include up to six chemicals.

Chemical Waste Name	Concentration (ppb)	Government Standard (ppb)
Benzene	195.6	0.0
Xylene	214.1	5.0
Toluene	94.1	5.0
Cyanide	106.1	100.0
Naphthalene	237.6	10.0
Benzo(a)pyrene	32.9	0.0

Chemical Waste:	Benzene, xylene, toluene, cyanide, naphthalene, benzo(a)pyrene as determined by mutual consent.
Concentration:	Geometric mean concentration derived from the GRI EPRI data base.
Government Standard:	NYSDEC Class GA standards for ground water quality and NYSDOH MCLs.

Score: 75.0

Q24) Indicate the distance from the site to the nearest instance of each of the land uses below:

	Distance					
Land Use	Outside 4 km	Within 4 km	Within 2 km	Within 1 km	Within 1/2 km	Onsite
Commercial/ Industrial	(0)	(1)	(2)	(3)	x (6)	(9)
National Parks	x (0)	(1)	(1)	(2)	(3)	(4)
Agriculture	(0)	x (1)	(1)	(2)	(4)	(6)
Residential	(0)	(1)	(3)	(8)	X (8)	(15)

Based on USGS 7.5 Minute Quadrangle Maps and site observations made by Atlantic Environmental Services, Inc.

Score: 8.0

Q25) Indicate the number of people living or working within each of the specified distances.

	Distance				
Population	Within 5 km	Within 3 km	Within 1 km	Within 1/2 km	Onsite
0	(0)	(0)	(0)	(0)	x (0)
1 to 100	(9)	(12)	(15)	(18)	(28)
101 to 1,000	(12)	(15)	(18)	(21)	(31)
1,001 to 10,000	(15)	(18)	x (21)	X (24)	(34)
10,001 to 100,000	x (18)	x (21)	(24)	(27)	(37)
100,001 and up	(21)	(24)	(27)	(30)	(40)

Based on information from Donnelly Demographics.

Score: 24.0

Q26) Check the appropriate distance from the site to the nearest of each type of sensitive environments, without regard to direction:

	Distance				
Target	Outside 2 km	Within 2 km	Within 1 km	Within 1/2 km	Onsite
Coastal wetland	x (0)	(1)	(2)	(3)	(6)
Freshwater wetland	X (0)	(0)	(1)	(2)	(6)
Endangered species	x (0)	(0)	(1)	(2)	(6)

Based on NYSDEC regulated wetlands and federally designated endangered species.

Score: 0.0

Q27) What is the vapor pressure of the primary wastes?

___ 1 x 10^{-5} mm Hg or less (0)
___ Greater than 1 x 10^{-5} mm Hg (1)
___ Greater than 1 x 10^{-3} mm Hg (2)
_X_ Greater than 10 mm Hg (3)

Used default value for benzene assumed to be onsite.

Score: 3.0

Q28) What natural or artificial characteristics of the site prevent volatilization?

___ Covered by more than 10 cm of soil or other impermeable barrier (1)
_X_ Covered by 1 to 10 cm of soil (3)
___ Uncovered contaminated soil (7)
___ Covered by less than 1 cm soil (8)
___ Uncovered pure contaminants (10)

Select the appropriate answer with the highest score.

Based on site observations made by Atlantic Environmental Services, Inc.

Score: 3.0

Q29) What is the average wind speed at the site?

___ Less than 2 m/s (1)
___ More than 2 m/s (2)
_X_ More than 4 m/s (3)
___ More than 6 m/s (4)

Used default value from SSPS help screen for the region in which the site is located. More than 4 m/s.

Score: 3.0

Q30) What natural or artificial characteristics of the site prevent dust production?

___ Urban (1)
___ Woodland or forest (2)
_X_ Grassland (4)
___ Open field (10)

Select the appropriate answer with the highest score.

> Based on site observations made by Atlantic Environmental Services, Inc.

Score: 4.0

Q31) Fill out the table below describing the wastes present at the surface of the site. If the data is not known exactly, approximations must be made. Include up to six chemicals.

Chemical Waste Name	Concentration (ppm)	Established Values (ppm)	Persistence (0-3)	Contaminated Area (m^2)
Arsenic	52.0	2.6	3	400.0
Cyanide	37.0	500	3	300.0
Lead	500.0	700	3	400.0
C-PAH	26.22	10	3	400.0
PAH	26.04	10	3	400.0
Mercury	2.0	0.13	3	400.0

Chemical Waste:	Wastes are defined below with C-PAHs and PAHs broken down into the specific compound detected in the surface soils at the Wadsworth Street Site. Arsenic Cyanide Lead C-PAHs: Benzo(a)anthracene, benzo(b) fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, benzo(a)pyrene, chrysene, dibenzo(a,h)anthracene, indeno (1,2,3-cd)pyrene PAHs: Acenaphthene, acenaphthylene, anthracene, fluoranthene, fluorene, naphthalene, phenanthrene, pyrene Other: Mercury
Concentration:	The highest concentration detected in any of the samples was used. If none was detected, concentration = 0.

Concentration:	C-PAHs: Concentration represents the sum of the highest concentrations of all C-PAHs detected. PAHs: Concentration represents the sum of the highest concentrations of all PAHs detected (not including C-PAHs).
Established Values:	Arsenic, lead, and mercury - Used the background concentrations for arsenic and lead from Shacklette and Boerngen (1984). Cyanide, C-PAHs, PAHs - Used default values assigned at the NYSEG 12/12/90 meeting: Cyanide - 50 ppm (domestic land use) 500 ppm (industrial land use) C-PAHs - 10 ppm PAHs - 10 ppm
Persistence:	Based on values supplied in the SSPS help screen.
Contaminated Area:	Assumed 100 square meters for composite samples (SS-1 through SS-4).

Score: 24.0

Q32) Fill out the table below describing wastes that have been detected in the air. If wastes have not been detected, enter zeros for the concentrations. If a waste release was detected by sight or smell but not sampled analytically, an approximation must be made. Include up to six chemicals.

Chemical Waste Name	Concentration (ppm)	Government Standard (ppm)
None detected	0	--

No wastes were detected in the air.

Score: 0.0

Q33) What steps have been taken to reduce public access to the site?

___ Full barrier and guard (0)
___ Full barrier (1)
___ Guard (2)
___ Incomplete barrier (3)
X No barrier, no guard (4)

Based on site observations made by Atlantic Environmental Services, Inc. and site plan showing former and present structures.

Score: 4.0

Q34) What is the distance from the site to the nearest residence or gathering point for children?

___ 100 m or more (1)
_X_ 10 m to 100 m (2)
___ 0 to 10 meters (5)
___ Onsite (10)

Based on site observations made by Atlantic Environmental Services, Inc.

Score: 2.0

Q35) What is the distance from the site to the nearest ground water well in use?

___ 10 km or more (1)
_X_ 1 km to 10 km (3)
___ 100 m to 1 km (6)
___ less than 100 m (10)

Based on USGS well records.

Score: 3.0

Q36) What are the characteristics of the site wastes?

___ Other types of wastes (1)
___ Acute, deadly toxins (4)
_X_ Carcinogens (7)
___ Radioactive wastes (10)

Select the appropriate answer with the highest score.

Used carcinogenic PAHs as default value.

Score: 7.0

Q37) Is offsite contamination evident?

X No (1)
___ Yes, has been measured (7)
___ Yes, is visible (9)
___ Yes, has been smelled (10)

Select the appropriate answer with the highest score.

Used default value of no, unless wastes were detected in streambed sediment samples.

Score: 1.0

Q38) Describe the area near the site:

___ Rural (1)
___ Agricultural (2)
___ Industrial (3)
___ Commercial (4)
X Residential/Commercial (8)
___ Residential (9)
___ Urban (10)

Based on site observations made by Atlantic Environmental Services, Inc.

Score: 8.0

Q39) What is the total volume of soil that is contaminated above regulatory limits?

X Less than 10 m^3 (1)
___ More than 10 m^3 (2)
___ More than 100 m^3 (3)
___ More than 1,000 m^3 (4)
___ More than 10,000 m^3 (5)

Use default of less than 10 m^3. No applicable regulatory limit for soils in New York state.

Score: 1.0

Q40) How is onsite land used?

_X_ Other Gas regulator (1)
___ Agricultural (2)
___ Residential (6)
___ Industrial (9)

Based on site observations made by Atlantic Environmental Services, Inc.

Score: 1.0

APPENDIX B

SITE CHRONOLOGY AND HISTORICAL MAPS

GENEVA, N.Y. WADSWORTH MGP SITE

Location: Corner Wadsworth and Railroad Place
Owner: NYSEG ~~and Josephine's Restaurant~~

Acquisition, Organization & History

NYSEG
Empire **to**
~~Elmira~~ Gas & Electric Co.
Organized: April 11, 1911
Acquired: December 31, 1936
to
Inter-Urban Gas Co.
Organized: January 21, 1903
Acquired: August 11, 1911
to
Geneva Gas Co.
Organized: July 10, 1897
Acquired: January 11, 190?
to
Geneva Gas Light Co.
Organized: November 6, 1852
Acquired: July 19, 1897

Remarks

Operated 1853-1903. Gas holder present in 1946, removed before 1986. NYSEG regulator station on site.

Real Estate Divestments:

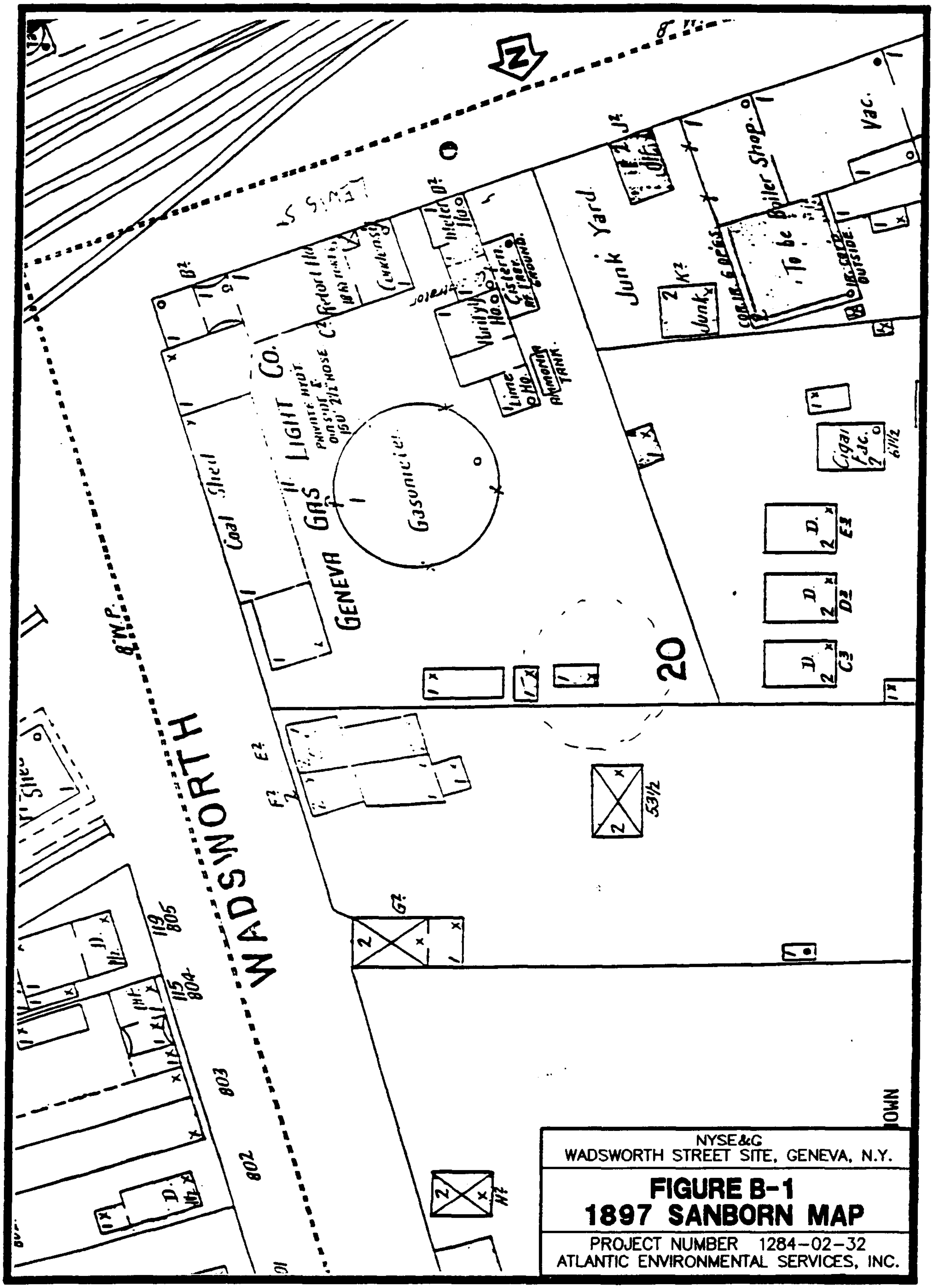
Present land use: 1990: parking lot for Josephine's Restaurant, and vacant land. NYSEG gas regulator station.

From NYS Commission of Gas & Electric, Second Annual Report, 1907:

- Inter Urban Gas Co. purchased: 46,566,100 cubic feet of coal gas (1906)
- Gas unaccounted for: 3.5%
- Gas probably purchased from Empire Coke of Geneva (Border City)
- 1906 - operated at deficit of $3,543.11

From Directory of Gas Utilities, Federal Power Commission 1942:

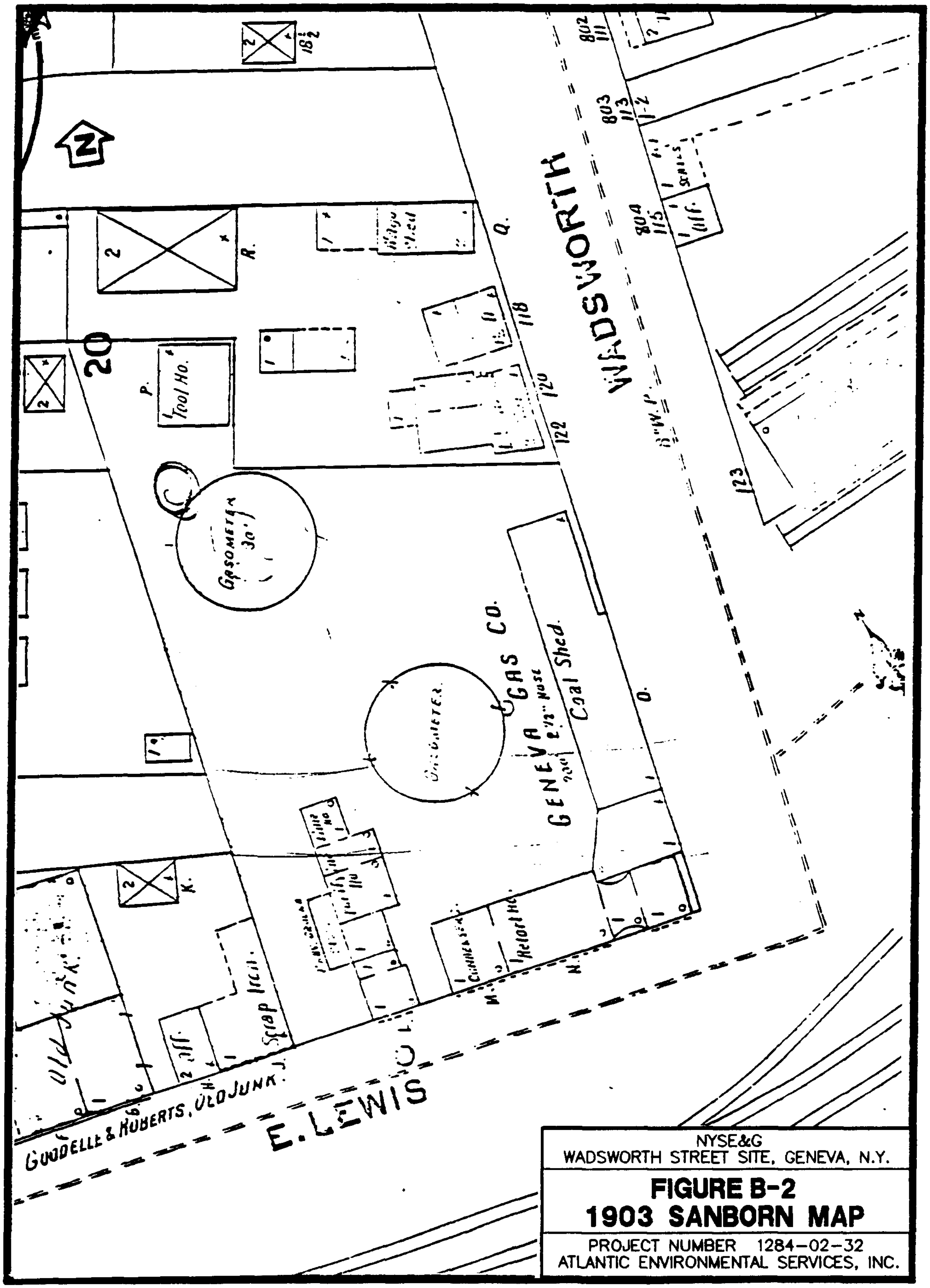
- On natural gas supplied by NYSEG



NYSE&G
WADSWORTH STREET SITE, GENEVA, N.Y.

FIGURE B-1
1897 SANBORN MAP

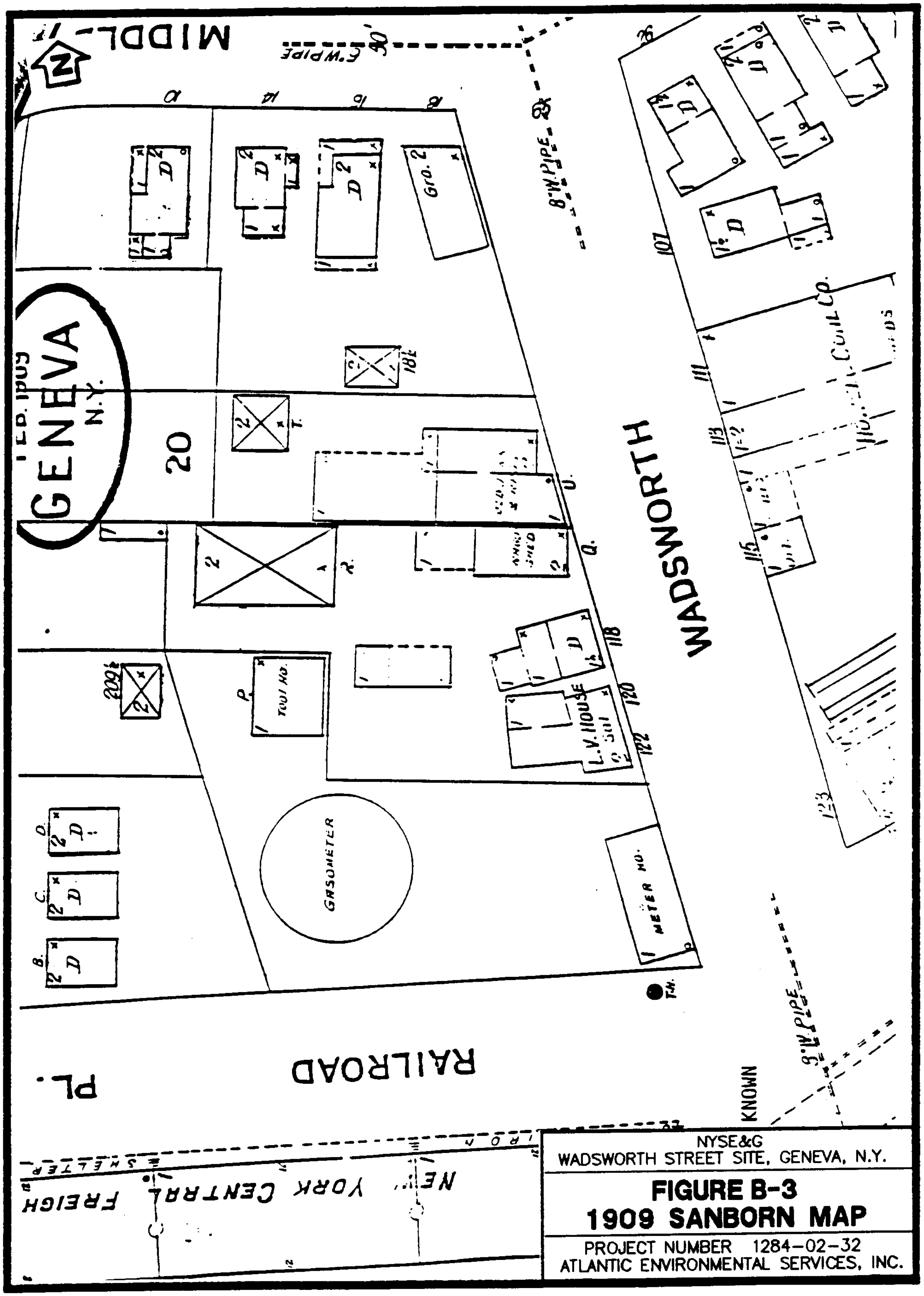
PROJECT NUMBER 1284-02-32
ATLANTIC ENVIRONMENTAL SERVICES, INC.



NYSE&G
WADSWORTH STREET SITE, GENEVA, N.Y.

FIGURE B-2
1903 SANBORN MAP

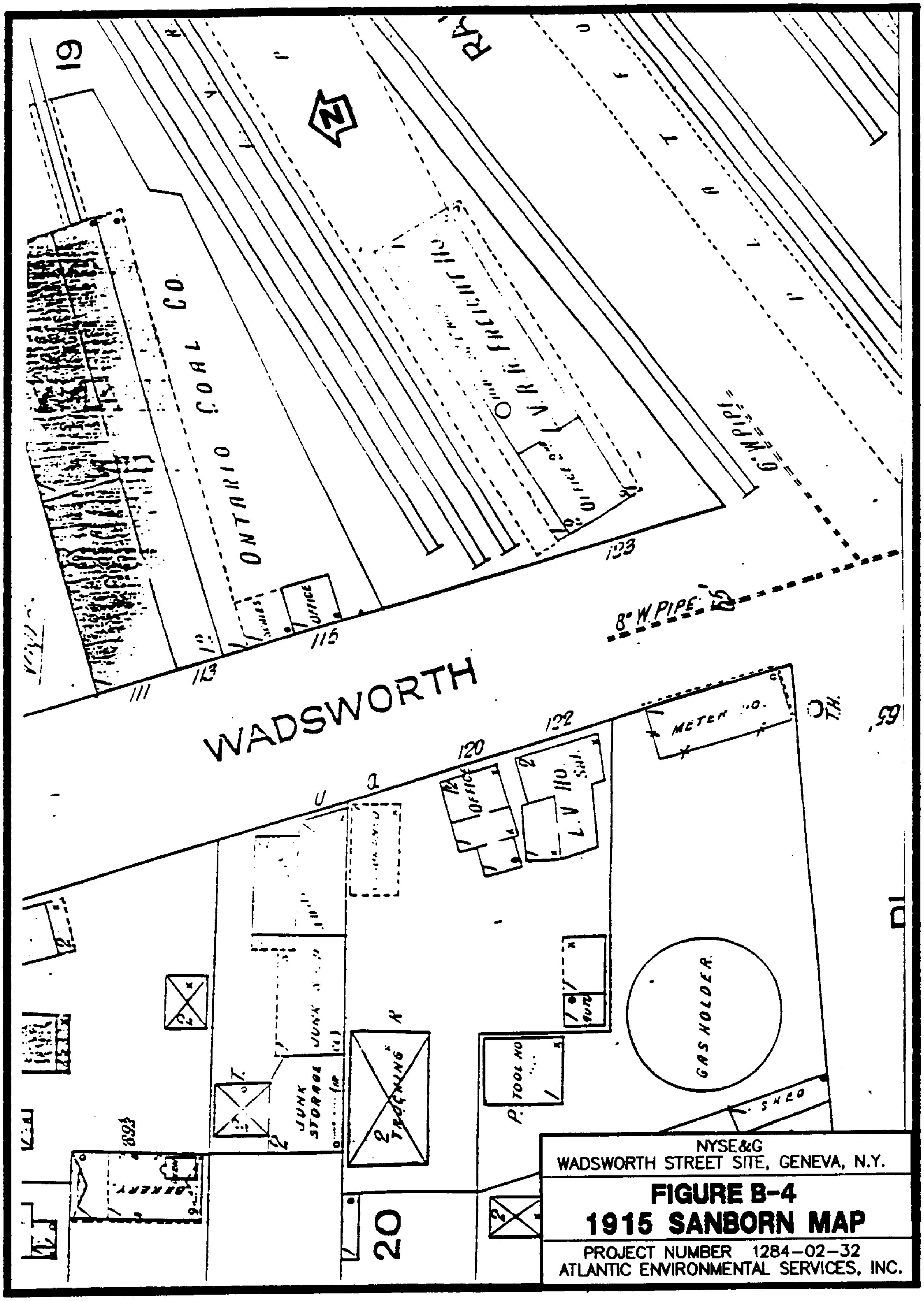
PROJECT NUMBER 1284-02-32
ATLANTIC ENVIRONMENTAL SERVICES, INC.



NYSE&G
WADSWORTH STREET SITE, GENEVA, N.Y.

FIGURE B-3
1909 SANBORN MAP

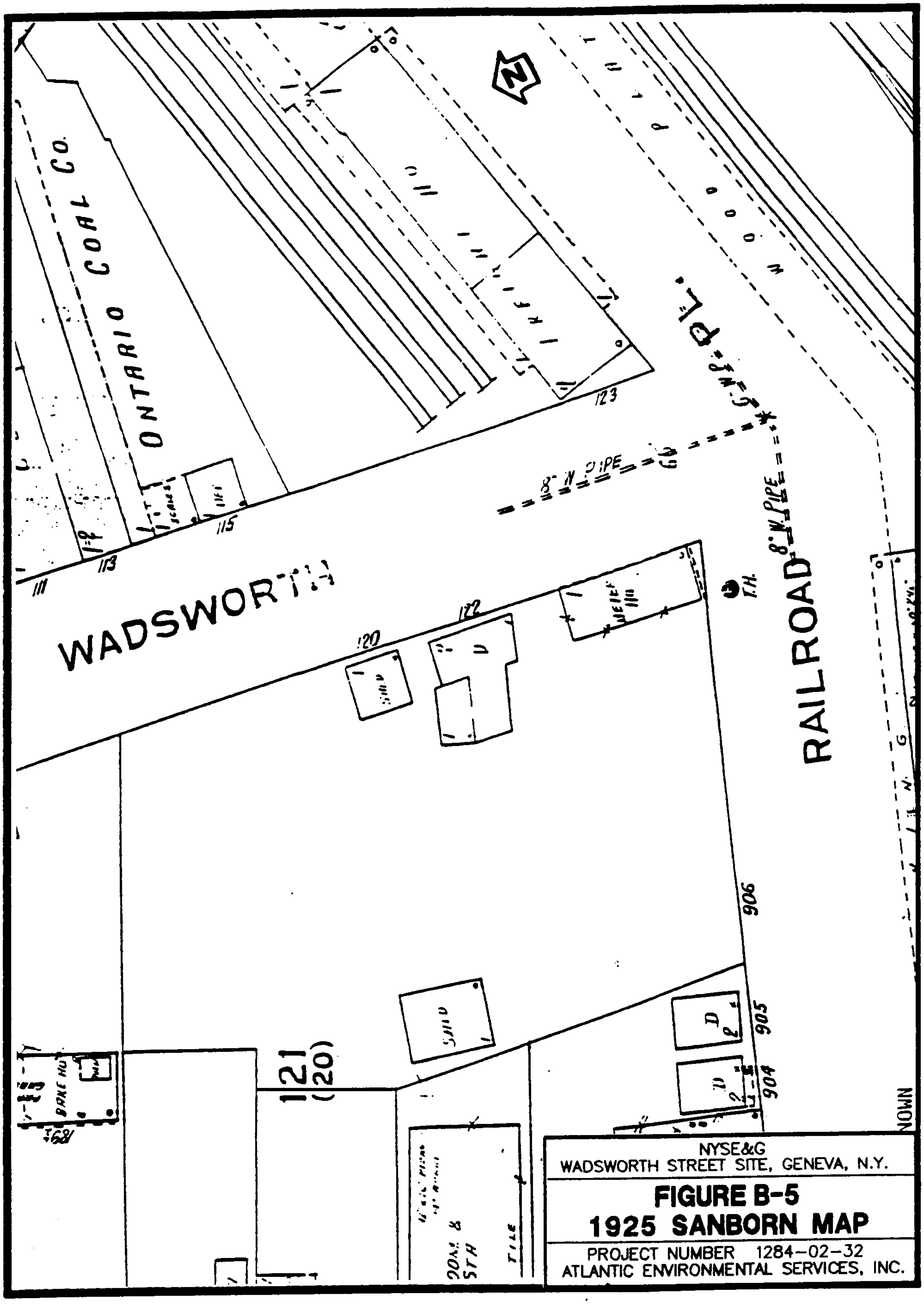
PROJECT NUMBER 1284-02-32
ATLANTIC ENVIRONMENTAL SERVICES, INC.



NYSE&G
WADSWORTH STREET SITE, GENEVA, N.Y.

FIGURE B-4
1915 SANBORN MAP

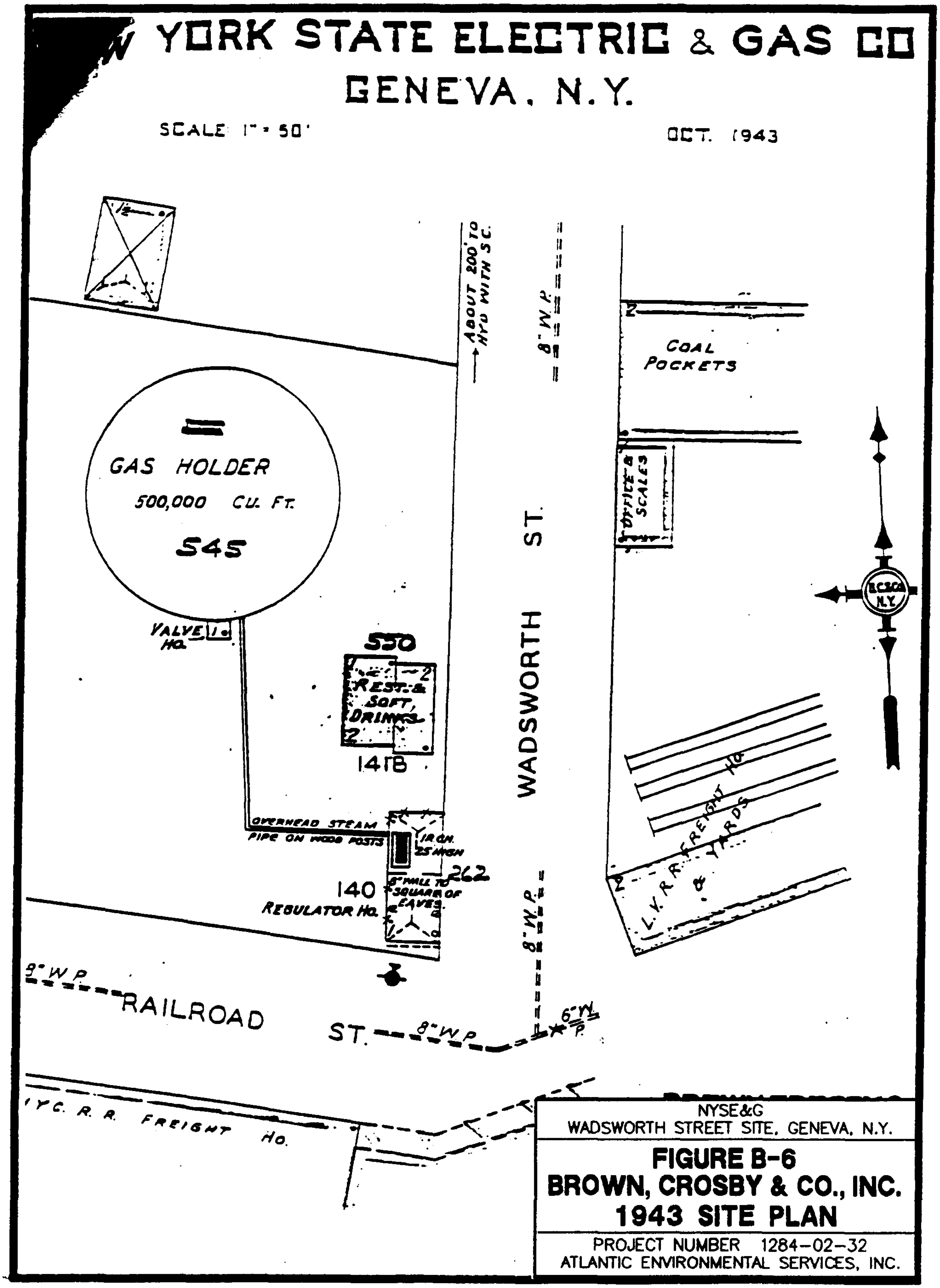
PROJECT NUMBER 1284-02-32
ATLANTIC ENVIRONMENTAL SERVICES, INC.



NYSE&G
WADSWORTH STREET SITE, GENEVA, N.Y.

FIGURE B-5
1925 SANBORN MAP

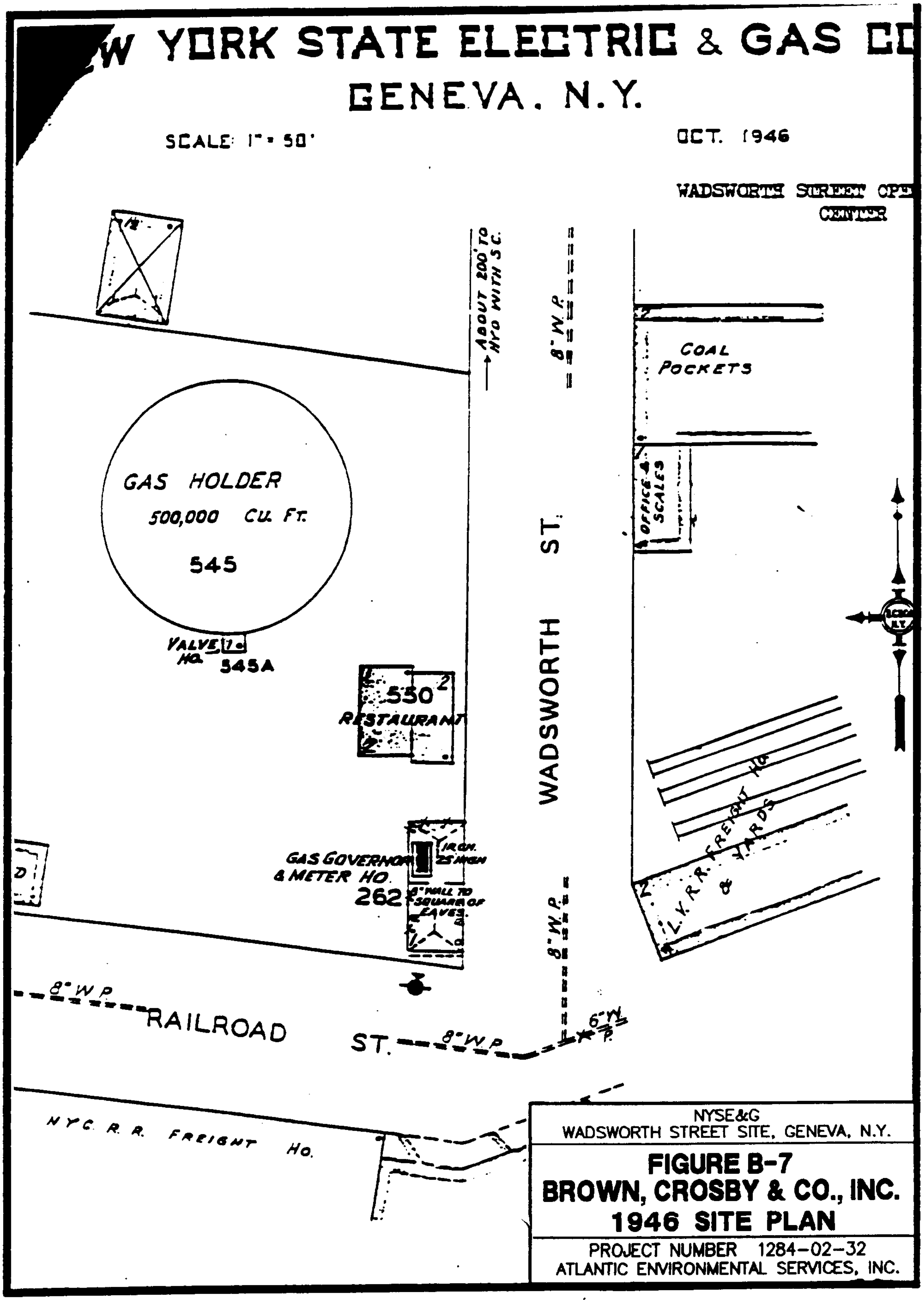
PROJECT NUMBER 1284-02-32
ATLANTIC ENVIRONMENTAL SERVICES, INC.



NYSE&G
WADSWORTH STREET SITE, GENEVA, N.Y.

FIGURE B-6
BROWN, CROSBY & CO., INC.
1943 SITE PLAN

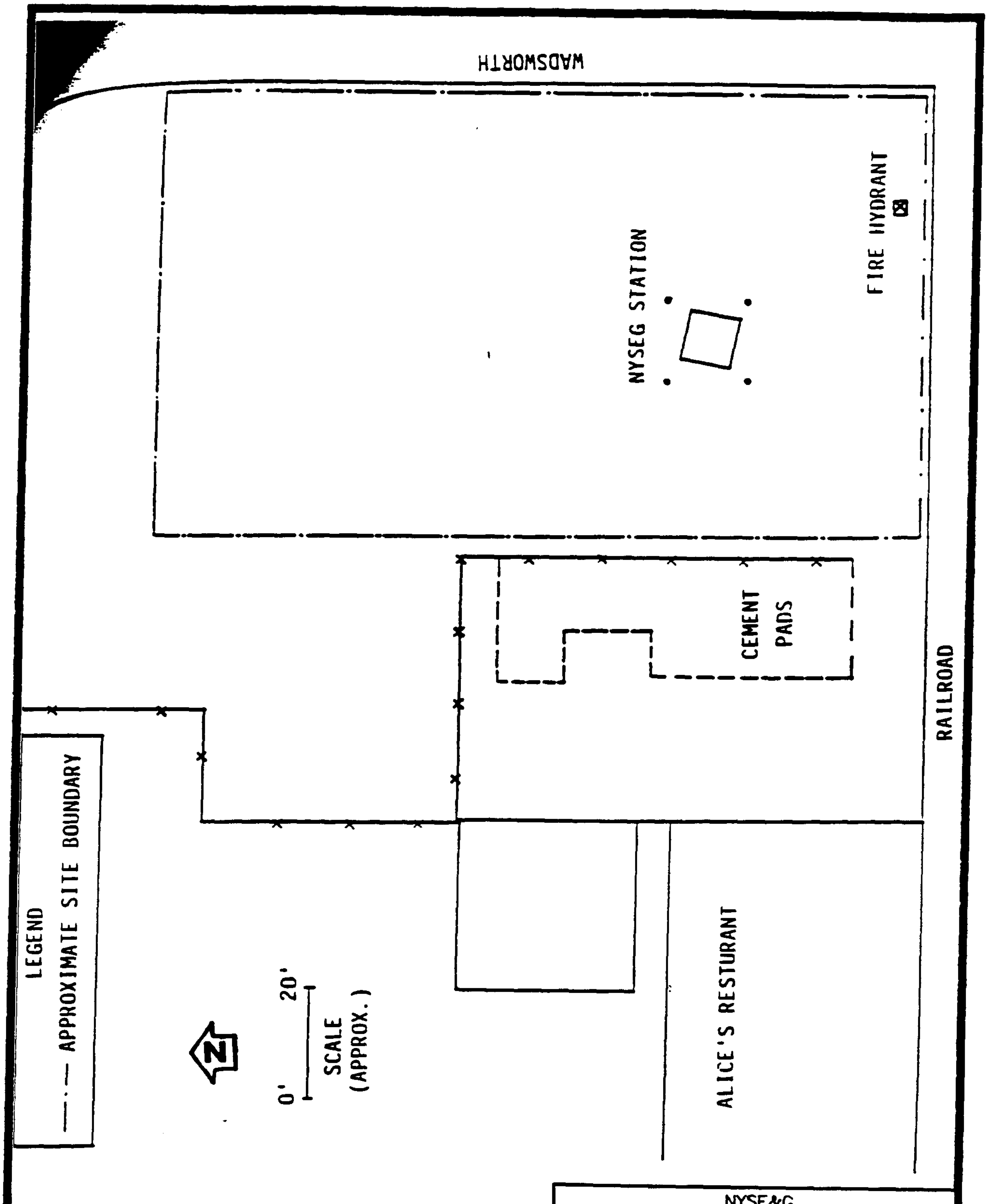
PROJECT NUMBER 1284-02-32
ATLANTIC ENVIRONMENTAL SERVICES, INC.



NYSE&G
WADSWORTH STREET SITE, GENEVA, N.Y.

FIGURE B-7
BROWN, CROSBY & CO., INC.
1946 SITE PLAN

PROJECT NUMBER 1284-02-32
ATLANTIC ENVIRONMENTAL SERVICES, INC.



Map provided by NYSEG.
(Original source unknown.)

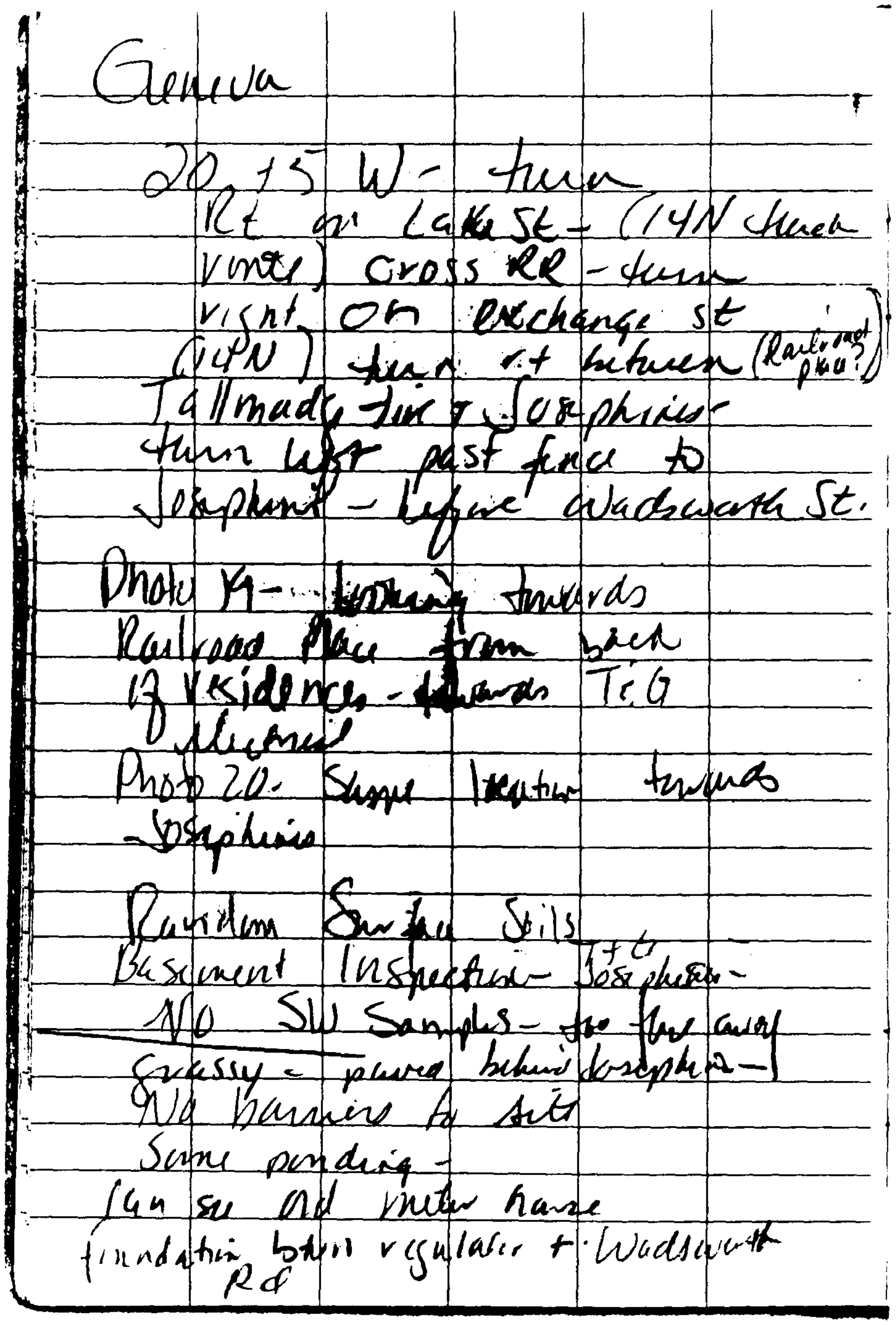
NYSE&G
WADSWORTH STREET SITE, GENEVA, N.Y.

FIGURE B-8
1986 SITE PLAN

PROJECT NUMBER 1284-02-32
ATLANTIC ENVIRONMENTAL SERVICES, INC.

APPENDIX C

ATLANTIC ENVIRONMENTAL SERVICES, INC.
SITE SURVEYS, SAMPLING FIELD DATA, AND AERIAL PHOTOGRAPHS



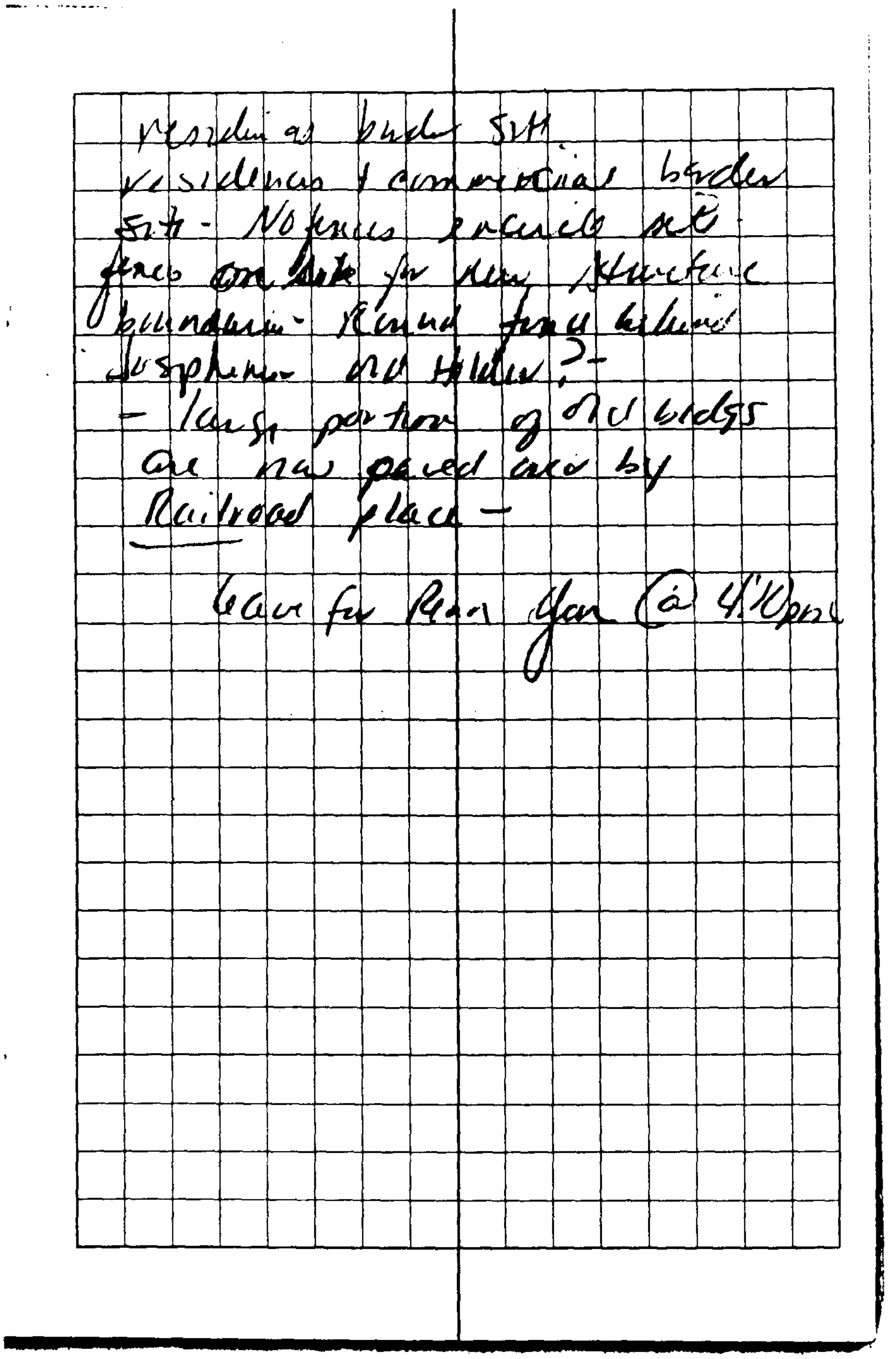
Geneva

20, 15 W - turn
Rt on Lake St - (14N church route) cross RR - turn
right on Exchange St
(14N) turn rt between (Railroad place?)
Tallmadge Tire & Josephine's -
turn left past fence to
Josephine's - before Wadsworth St.

Photo 19 - looking towards
Railroad Place from back
of residences - towards T&G
[illegible]
Photo 20 - Shop location towards
Josephine's

Random Surface Soils
Basement Inspection - T&G Josephine's -
No SW Samples - too far away
Grassy - paved behind Josephine's -
No barriers to site
Some ponding -
Can see old water house
foundation btwn regulator + Wadsworth Rd

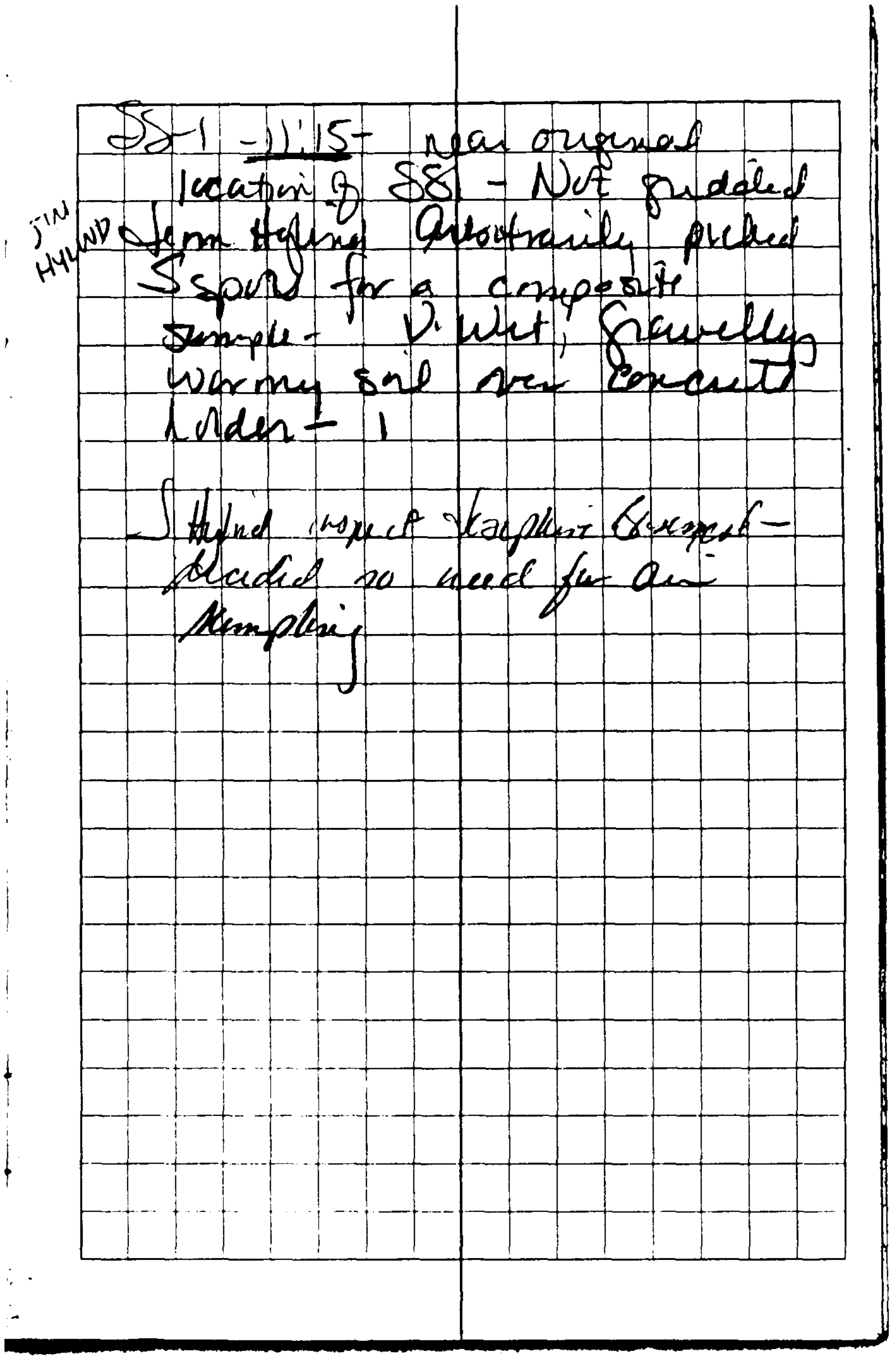
INITIAL SITE SURVEY NOTES
RECORDED BY ANNA SULLIVAN



residences border site.
residences & commercial border
site - No fences encircle site -
fences on site for new structure
boundaries - Round fence behind
Josephine and Holden? -
- large portion of old bldgs
are now paved area by
Railroad place -

Leave for [illegible] @ 4:10pm

INITIAL SITE SURVEY NOTES
RECORDED BY ANNA SULLIVAN



SS-1 - 11:15 - near original location of SS1 - Not gridded

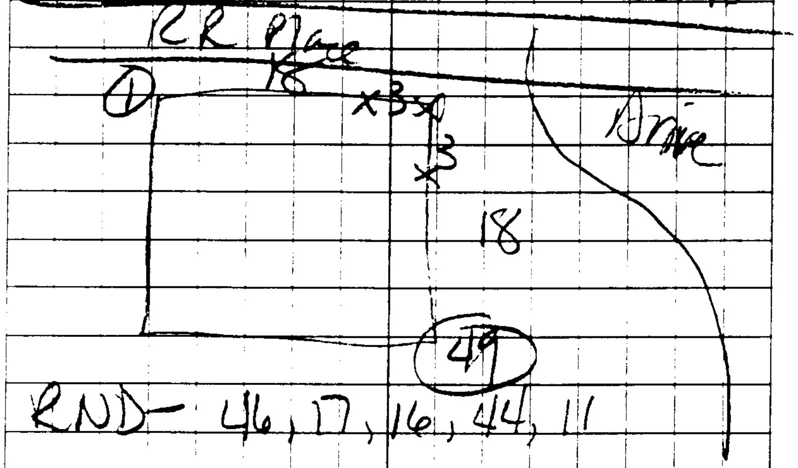
JIM HYLND Jim Hyland arbitrarily picked 5 spots for a composite sample - V. wet, gravelly wormy soil over concrete Ladder - 1

J Hyland inspect Kaplan Compound - decided no need for air sampling

SURFACE SOIL SAMPLE 1
SAMPLING FIELD NOTES
RECORDED BY ANNA SULLIVAN

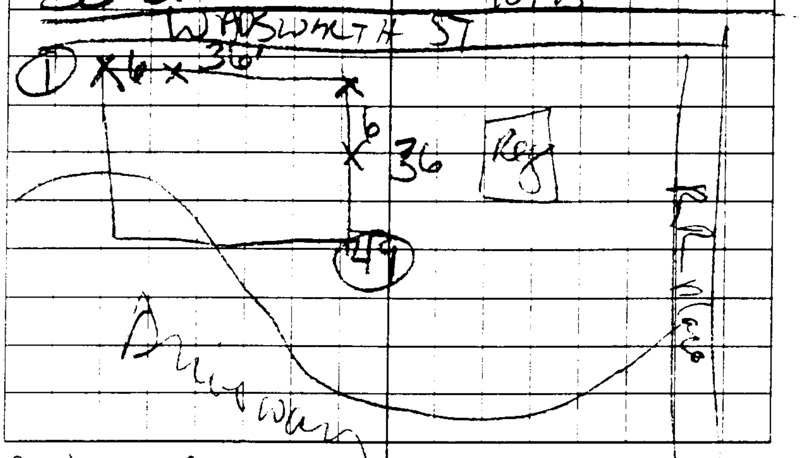
Geneva- 11-21-90

SS-3- along RR Place 10.45



RND- 46, 17, 16, 44, 11

SS-2 10'45



RND-39, 19, 37, 2, 31

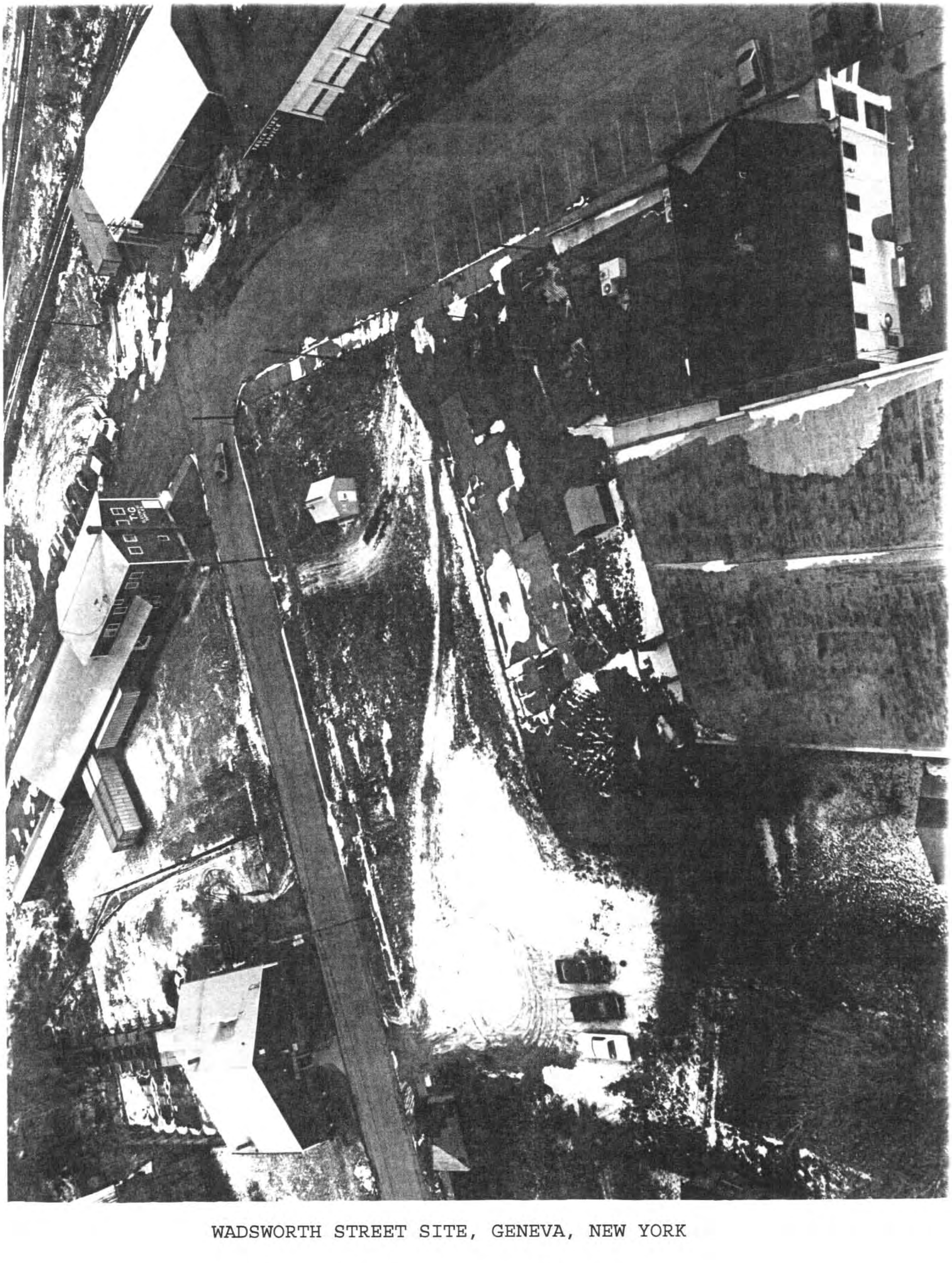
SURFACE SOIL SAMPLES 3 AND 2
SAMPLING FIELD NOTES
RECORDED BY ANNA SULLIVAN

PART OF FORMER HOLDER RIM AT WADSWORTH STREET SITE, GENEVA, NEW YORK

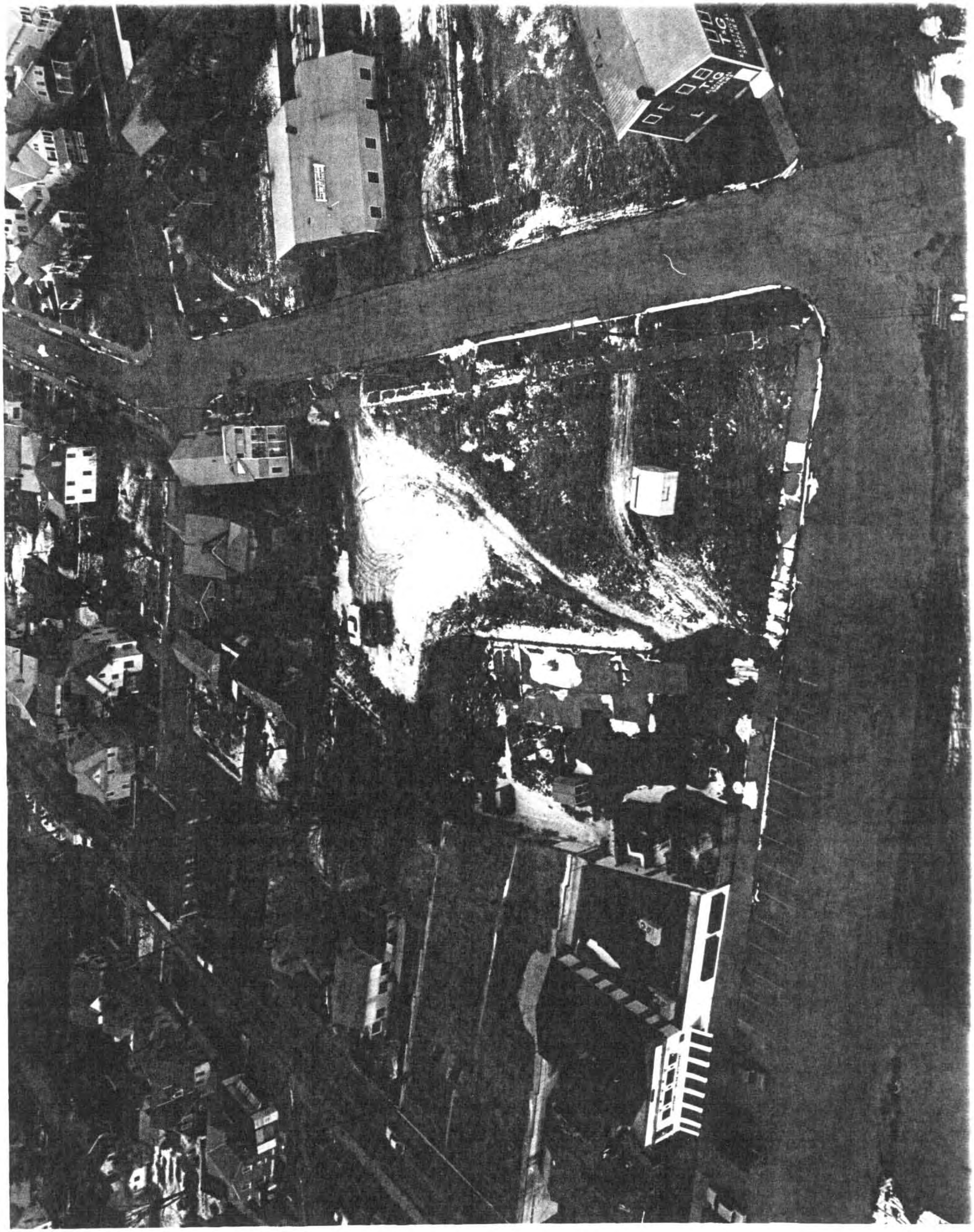
GAS REGULATOR AT WADSWORTH STREET SITE IN GENEVA, NEW YORK

WADSWORTH STREET SITE
GENEVA, NEW YORK

WADSWORTH STREET SITE
GENEVA, NEW YORK



WADSWORTH STREET SITE, GENEVA, NEW YORK



WADSWORTH STREET SITE, GENEVA, NEW YORK

APPENDIX D

S.Y. KIM LAND SURVEYOR, P.C.
FIELD DATA

1-4.91 GENEVA

92-8

18° SUNNY

MF
LR

STA	+	HI	-	ELEV	DESC
RM# 1	1.15	482.274		481.124	
TP# 1			14.62	467.654	
	0.51	468.164			
Tp# 2			10.66	457.504	
	4.14	461.644			
TBM# 1			3.88	457.764	3.98
	3.88	461.644			
TBM# 2			4.67	456.974	
	4.66	461.634			
Tp# 3			4.14	457.494	
	10.15	467.644			
Tp# 4			0.66	466.984	
	12.96	479.934			
Tp# 5			2.54	477.394	
	4.43	481.824			
RM# 1			0.70	481.124	(0.00) ✓

⊥ NUT HEAD BETWEEN MVE ⬡ [illegible]

⊥ NUT HEAD BETWEEN MATTHEWS & ELMIRA

1-4-91

ATLANTIC ENV.
- GENEVA -

⊼ @ B 10 0°00' on B 13 (379.901)
to: B 11 1) 91° 41' 30"
2) 183° 23' 00"
AVG= 91° 41' 30"

10-11 = 330.741

HI @ ⊼ = (456.974 TBM#2) - (+2.605) =

to:

STA	∢	DIST	DIE	ELEV	DESC
TBM#2 HYD	340-53	36.4	+2.605		20
End curb	03-29	153.8	1.2		0.0 ed 0.3" High 21
wood STOCKADE	06-33	155.6	1.0		end 22
-11-	15-26	154.5	1.3		Corn 23
-11-	22-28	167.9	1.5		Corn 24
BLDG Corn	23-09	190.4	1.5		@ E.P. P/lot 25
Corn P/LOT	23-07	181.6	1.3		-11- 26
BLDG Corn	24-43	190.4	1.7		-11- 27
Chain Link Corn	41-50	225.8	0.9		@ Bldg Cor 28
Wire Fence end	41-53	226.7	0.7		29
end Chain Link	44-33	230.0	4.7		1 FE T.O.S 30
P.C. fence	49-34	223.1	2.0		T.O.S 31
P.O.C fence	56-09	184.1	2.0		32
end fence	24-33	116.1	1.5		33
Back SV	02-06	103.4	1.1		@ E.P P/lot 34
end curb	00-47	124.9	0.8		@ E.P Rd 35
CGWW44#3	04-17	83.7	1.1		

160 ~~58~~

18° SUNNY

NF
LC

⊼ @ △10 0-00 △13

STA	∢	DIST	DIE	ELEV	DESC
P.P.	358-05	75.5			36
Bldg Corn	27-12	70.5	0.7		37
-11-	29-53	57.6	0.6		38
-11-	40-13	61.4	0.5		39
B.O.C.	52-28	133.0	0.0		40
-11-	59-53	179.5	-0.3		41
-11-	51-59	225.6	3.3		1 FE 42
CGWW55#1	55-03	219.4	2.9		1 FE 43
End wire fence	52-47	260.8	2.5		1 FE 44
Capped I.P.	64-55-20	271.297			45
Chain link corn	55-52	246.0	2.5		1 FE 46
-11- end	64-49	269.3	2.3		47
BLDG Corn	64-52	272.7	2.3		1 FE 48
-11-	61-15	291.6	2.8		-11- 49
Garage Corn	81-59	221.1	1.9		1 FE 50
-11-	86-55	218.3	-1.2		51
-11-	87-27	236.6	-1.4		52
I.P.	88-00-25	248.234			53
P.P.	78-44	242.0			54
HSE Corn	79-36	273.4	-1.4		55
℄ Rd 18' wide	92-25	209.1	-1.9		@ E.P. Rd. 56
end curb	92-24	192.9	-1.6		0.3" 57

ATLANTIC ENV.
- GENEVA -

∡ @ 10 0-00 △ 13

STA	∡	DIST	DIG	ELEV	DESC
℄ Rd	96-26	191.4	-14		58
P.P.	90-02	159.7			59
℄ Rd	98 04	150.0	-1.2		60
Back S.W.	84-20	119.7	-0.6		61
P.P.	78-01	35.9			62
Curb 0.3" 4.4"	89-21	35.3	-0.4		63
℄ Rd	113-44	36.2	-0.1		64
P.P.	297-22	20.4	"		65
Curb 0.3"	284-43	20.6	0.0		P.O.C. 66
℄ Rd.	256-06	50.8	0.7		℄ Rd 67
-11-	343-12	124.7	1.4		68
-11-	358-51	244.3	1.4		69
Bldg Corn	263-52	103.2	1.0		70
-11-	303-21	128.8	2.7		71
Bldg Corn	317-26	106.3	2.2		72
P.P.	285-24	86.6			73
℄ RxR	201-40	261.8	1.4		74
-11-	225-10	198.8	1.8		75
-11-	263-31	180.1	1.9		76
Coss WW #2	79-43	108.1	-1.1		77
Back Sw	316-00	26.9	0.5		@ Back S.W. 78
RxR Mon.	320-53-00	27.828			79
BLDG Corn	339-35	217.0	6.2		1FE 80

∡ @ PK 11 0°00" on PK 10 (330.751)
" to PK 12 1) 105°35'00"
2) 211°09'40"
AVG = 105°34'50"
11-12 = 302.457
HI @ ∡ (TBM#2 456.97) − (+4.583) =

STA	∡	DIST	DIE	ELEV	DESC
HSE Corn	10-11	78.9	0.3		81
-11-	32-13	23.1	0.4		82
-11-	69-57	36.6	0.9		83
HSE Corn	71-22	43.2	0.6		84
-11-	83-05	60.8			85
HSE Corn	92-23	70.2	0.6		86
-11-	95-59	92.3	0.6		87
HSE Corn	97-37	106.6	0.9		88
-11-	99-03	122.7	1.0		89
BLDG Corn	101-45	180.1	1.9		90
-11-	103-22	238.9	2.1		91
I.P.	100-10-30	131.729			92
□ BOLT	101-16-40	168.212			93
P.C. curb	108-24	237.8	1.2		94 0.3"
P.P.	108-09	230.5			95
℄ Rd	112-15	181.1	0.9		96
Curb cut	108-27	182.9	0.6		97

ATLANTIC ENV.
- GENEVA -

⊼ △ 11 0-00" ON △ 10

STA	∡	DIST	D/E	ELEV	DESC
Back and SW	105-36	167.3	1.0		@ EP B 98
P.P.	108-12	146.1			99
Curb Cut	108-36	101.1	0.4		100
end wire fence	99-49	64.7			101
P.P.	107-22	34.1			102
P.P	353-06	8.3			103
P.P	319-31	60.0			104
P.P	249-50	61.6			105
P.P.	186-55	92.2			106
℄ Rd	226-05	32.3	0.1		@ ℄ Rd 107
Back S.W	59-53	10.5	0.1		108 @ BACK
Curb	113-47	8.6	-0.2		109
Curb	343-54	19.6	-0.4		110
BACK S.W.	09-52	63.2	0.3		111

⊼ @ B 12 0-00" on B 11 (302.457)
to: B 13 1) 86° 12' 46"
2) 172° 25' 20"
AVG = 86° 12' 40"
12-13 = 432.330

(CON'T)

⊼ △ 12 0-00 on △ 11

to:

STA	∡	DIST	DESC
BLDG CORN	41-22	82.0	112
HSE CORN	48-03	104.6	113
HSE CORN	50-04	112.3	114
-11-	57-48	120.7	115
HSE CORN	59-01	134.7	116
-11-	62-51	150.6	117
-11-	65-17	163.0	118
HSE CORN	66-23	178.3	119
BLDG CORN	76-19	226.3	120
-11-	80-27	300.4	121
P.P	303-13	71.5	122
-11-	263°57	13.5	123
-11-	09-14	37.4	124
-11-	74-23	113.6	125
-11-	81-38	192.7	126
-11-	85-34	288.9	127
-11-	86-32	334.4	128
I.P.	70-44-20	171.021	129
end wire fence	80-49	220.2	130
P O L fence	72-07	230.6	131
BACK S.W.	355-00	44.2	132 @ BACK S.W.

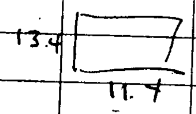
ATLANTIC ENV.
-GENEVA-

T △12 0:00" on △11

to:

STA	∢	DIST	
BACK S.W.	71-48	120.5	133
-11-	85-15	333.7	131
℄ Rd	305-50	31.7	@ ℄ Rd 135
℄ Rd	83-41	111.2	134
-11-	88-12	219.4	137
-11-	90-22	396.2	@ ℄ Rd 138
Curb P.T.	25-00	37.8	139
Curb	82-15	192.5	140
Curb P.T	86-58	348.4	141

T @ B 13 0°00' on B 12 (432.339)
to: B 10 1) 76°30'40"
2) 153°01'20"
~~Ag:~~ 76°30'40"
13-10: 379.905



T △13 0:00' on △12

STA	∢	DIST	
P.K. set	12-54-30	136.112	142
end w. rail	04-25	134.4	143
HSE Corn	24-03	143.2	144
-11-	28-00	118.4	145
-11-	33-38	104.0	146
-11-	42-40	115.1	147
-11-	44-35	118.9	148
BLDG Corn	55-07	128.9	149 @ Back S.W.
-11-	69-46	203.9	150
I.P.	70-04-40	205.633	151
Curb	52-16	106.3	0.5 152
-11-	71-00	191.6	0.5 153
BLDG Corn	120-51	251.3	154
P.P	70-18	211.4	155
P.P.	184-03	49.1	156
℄ RXR	121-40	301.2	157
-11-	135-57	249.7	158
-11-	188-02	187.2	@ E Prop 159

APPENDIX E

HEALTH AND SAFETY PLAN

HEALTH AND SAFETY PLAN

This Health and Safety Plan (HASP) addresses the health and safety practices that will be employed by all site workers participating in the preliminary investigation of the NYSEG manufactured gas plant sites. The HASP takes into account the specific hazards inherent to the sites and presents procedures to be followed by Atlantic Environmental Services, Inc. (Atlantic) and its subcontractors in order to avoid and, if necessary, deal with potential health and/or safety problems. All activities performed under this HASP will comply with OSHA Regulations 29 CFR Part 1926 and 1910, particularly 1910.26.

This plan is based on an initial assessment of health and safety risks associated with the sites. The plan will be updated if necessary as additional information is obtained on the materials present at the sites and their associated health and safety risks. For example, additional hazardous substance data sheets may need to be included as more data are gathered.

Medical Surveillance Program

Atlantic maintains a continuous in-house medical surveillance program designed specifically for field personnel engaged in work at sites where hazardous or toxic materials may be present. Atlantic employs a company physician, Dr. Martin Cherniak, who is a specialist in occupational health. Yearly comprehensive examinations are conducted on all field personnel on Atlantic's staff.

Dr. Cherniak's address and telephone number are:

Office:

Lawrence & Memorial Occupational Health Center
Suite 2B, 404 Thames Street
Groton, Connecticut 06340

Telephone: 203-445-4551

Upon employment with Atlantic and prior to performing any major site investigation activities, all field personnel undergo a complete physical examination, including a detailed medical and occupational history. The following tests are performed as part of the examination:

- Complete blood workup (38 analyses), including screens for particular toxicants anticipated at various types of sites (see Exhibit E-1 for list of recommended blood tests).
- Urine analysis, including screens for metals and indicators of proper kidney and liver function.
- Pulmonary Function
- Electrocardiogram
- Chest X-ray
- Hearing and eye exam

Upon completion of these tests, the physician certifies whether personnel are fit for field work in general, and fit to use all levels of respiratory protection, in particular.

In the event that an employee of Atlantic or any other member of the field team is exposed to some form of hazardous substance or wishes to be rechecked because he shows symptoms of exposure, he must inform the site safety supervisor who will send the employee for an examination. The company's physician also acts as a consultant to all subcontractors participating in the field effort and will provide information on health risks associated with various chemical substances when needed. Material Safety Data Sheets for potential site contaminants are presented in Exhibit E-2.

Preparation for Medical Emergencies

Before field work on the site commences, each person who will be working there or observing the operations will complete a medical data sheet that includes the following information:

1. Name, address, home phone
2. Age, height, weight
3. Name of person to be notified in case of emergency
4. All prescription and non-prescription medications currently being used
5. Allergies
6. Particular sensitivities
7. Does he/she wear contact lenses
8. Short medical history including list of previous illnesses
9. Name of personal physician and phone

These data sheets will be filled out before any work begins on the site. Their maintenance will be the responsibility of the designated site safety supervisor (see Exhibit E-3 for sample data sheet).

In the event of an incident where a team member becomes exposed to or suffers from an acute symptom of exposure to site materials, a copy of his/her medical data sheet will be presented to the attending physician upon arrival at the hospital.

First Aid for Injuries Incurred During Field Work

All injuries, no matter how slight, will be reported to the site safety supervisor immediately. An accident report (Exhibit E-4) will be completed by the safety supervisor for all accidents.

First-aid equipment will be available onsite under the control of the site safety supervisor.

When possible, site workers will refrain from administering first aid for serious injury or illness and await the arrival of professional paramedics at the site to take the appropriate action. Unless they are in immediate danger, injured persons will not be moved until paramedics can attend to them. Some injuries, such as severe cuts and lacerations or burns, may require immediate treatment. Any first aid instructions that can be obtained from doctors or paramedics, before an emergency-response squad arrives at the site or before the injured person can be transported to the hospital, will be followed closely.

First Aid Equipment List

The first aid kit that will be kept at the site will consist of a weatherproof container with individually sealed packages for each type of item. The kit will include at least the following items:

- Gauze roller bandages, 1 inch and 2 inch
- Gauze compress bandages, 4 inch
- Gauze pads, 2 inch
- Adhesive tape, 1 inch
- Bandaids, 1 inch
- Butterfly bandages
- Triangular bandages, 40 inch
- Ampules of ammonia inhalants
- Antiseptic applicators or swabs
- Burn dressing and sterilized towels
- Surgical scissors
- Eye dressing
- Emergency eye wash
- Tourniquet
- Alcohol
- Hydrogen peroxide

Record of Injuries Incurred Onsite

Occupational Injuries and Illnesses Form (OSHA 200)

All occupational injuries and illnesses that are required to be recorded under the Occupational Safety and Health Act will be registered on OSHA Form 200 (Exhibit E-5). Occupational injuries and illnesses will be recorded by the site safety supervisor within 48 hours of occurrence as required by statute.

Employer's First Report of Injury

This form (Exhibit E-6) will be completed by the site safety supervisor for all accidents involving worker injury at the site. Follow-up procedures will include investigation of each accident or near-miss by the safety engineer to assure that no similar accidents that may lead to injuries occur.

Training Programs

Formal health and safety training and specific onsite training are essential aspects of any successful investigation of a site suspected of containing hazardous or potentially hazardous materials. The following subsections address both formal health and safety training requirements and a specific onsite training program.

Health and Safety Training

All of Atlantic's field personnel have attended a health and safety training course in which they were taught the potential hazards of site work and how to avoid and deal with them. A list of Atlantic personnel who may work at the NYSEG sites are provided below with the titles and dates of the most recent safety courses they attended.

ATLANTIC PERSONNEL	COURSE	DATE
James Gould	Health and Safety Training for Hazardous Waste Activities - Geraghty and Miller	9/16/88
Anna Sullivan	Health and Safety Training for Hazardous Waste Activities - Geraghty and Miller	8/13/90
Peter Georgetti	Health and Safety Operations at Hazardous Materials Sites - Geo-Environmental Consultants	10/19/90

The training courses consist of classroom instruction, field demonstrations, use of respirators, use of appropriate protective clothing, and written and field tests. The training covers the OSHA and HAZWOPER requirements. They cover the following topics:

1. Identification of hazardous substances
2. Properties of hazardous substances
3. Routes of exposure
4. Toxicity of different substances and their synergistic effects
5. Practical considerations in health and safety management
6. Physical properties of chemicals
7. References for threshold limit values (TLV), lower explosion limits (LEL), toxicity data, cross references

8. Technical assistance organization
9. Air monitoring and survey instruments
10. Site entry and egress procedures
11. Heat stress monitoring
12. Levels of personal protection
13. Controlling access to work zones and other contaminated areas
14. Personnel decontamination
15. Equipment decontamination
16. Site/area safety planning

Everyone attending the courses was tested for the fit of their personal respirator and was trained in using self-contained breathing apparatus and Level B equipment. The courses also emphasized the importance and procedures of decontamination.

Health and safety training is an ongoing activity at Atlantic. Yearly refresher courses or site-specific training programs are presented as needed to keep field personnel up to date with proper health and safety practices.

Levels of Protection for Site Workers

Levels of protection specified by the EPA refer largely to requirements for respiratory protection. The lists below stipulate equipment for respiratory, clothing, and other types of protection that will be required for different tasks during the NYSEG site investigation. The designated levels of protection are based on evaluation of potential hazards and risks associated with work at the NYSEG site, and Atlantic's experience on other MGP sites.

Based on HNu (PID) readings in the work zone for each site activity, the criteria for maintaining or revising levels of protection are as follows:

Background (ambient)	Level D - Splash suit, rubber boots and goggles
5-50 ppm above ambient	Level C - Facepiece respirator, splash suit, rubber boots, gloves and goggles
50-500 ppm above ambient	Level B - Positive Pressure SCBA, hooded disposable coveralls, rubber boots, gloves and radio.
500-1000 ppm above ambient	Level A - Positive Pressure SCBA, chemical resistant encapsulated suit, inner and outer gloves and two-way radio.

If HNu (PID) readings greater than 50 ppm are detected, work will be stopped and workers will retreat and call for advice.

Anticipated Levels of Protection for Specific Site Activities

Site Activity	Health Risk	Level of Protection
1. Topographic Survey	Low	Modified D
2. Surface Soil Sampling	Low	Modified D
3. Surface Water Sampling	Low	Modified D
4. Sediment Sampling	Low	Modified D
5. Air Sampling	Low	Modified D

Modified Level D protection consists of long pants and shirts, and gloves and goggles (if needed) when sampling.

Signatures of Field Team Members and Observers

THIS SITE HEALTH AND SAFETY PLAN HAS BEEN READ BY:

(Signatures of site investigation team members and observers who have been through site safety briefing and have read this health and safety plan.)

Name	Signature	Date	Firm	Phone
Anna Sullivan	Anna Sullivan	11/1/90	Atlantic Env.	(203)537-0751
Peter Georgetti		11/13/90	Atlantic Env.	(203)537-0751

EXHIBIT E-1

RECOMMENDED BLOOD TESTS

EXHIBIT E-1 RECOMMENDED BLOOD TESTS

MEDICAL SURVEILLANCE PROGRAM		
FUNCTION	**TEST**	**EXAMPLE**
Liver:	Blood Tests	Total protein, albumin globulin, total bilirubin (direct bilirubin if total is elevated).
Kidney:	Blood Tests	Blood urea nitrogen (BUN), creatinine, uric acid.
Blood-Forming Function:	Blood Tests	Complete blood count (CBC) with differential and platelet evaluation, including white cell count (WBC), red blood count (RBC), hemoglobin (HGB), hematocrit or packed cell volume (HCT), and desired erythrocyte indices. Reticulocyte count may be appropriate if there is a likelihood of exposure to hemolytic chemicals.

NOTE: From *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*; October 1985; DHHS (NIOSH) Publication No. 85-115.

EXHIBIT E-2

MATERIAL DATA SAFETY SHEETS

Material Safety Data Sheet

From Genium's Reference Collection
Genium Publishing Corporation
1145 Catalyn Street
Schenectady, NY 12303-1836 USA
(518) 377-8855

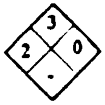
GENIUM PUBLISHING CORP.

No. 316

BENZENE
(Revision D)
Issued: November 1978
Revised: April 1988

SECTION 1. MATERIAL IDENTIFICATION

25



Material Name: BENZENE

Description (Origin/Uses): Used in the manufacture of medicinal chemicals, dyes, linoleum, airplane dopes, varnishes, and lacquers; and as a solvent for waxes, resins, and oils.

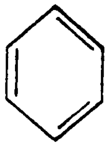
Other Designations: Benzol; Phene; Phenylhydride; C_6H_6; NIOSH *RTECS* No. CY1400000; CAS No. 0071-43-2

Manufacturer: Contact your supplier or distributor. Consult the latest edition of the *Chemicalweek Buyers' Guide* (Genium ref. 73) for a list of suppliers.

HMIS			
H	2		
F	3	R	1
R	0	I	4
PPG*		S	2
*See sect. 8		K	4

SECTION 2. INGREDIENTS AND HAZARDS

SECTION 2. INGREDIENTS AND HAZARDS	%	EXPOSURE LIMITS
Benzene, CAS No. 0071-43-2	Ca 100	**OSHA PEL** 8-Hr TWA: 1 ppm 15-Min Ceiling: 5 ppm Action Level: 0.5 ppm **ACGIH TLV, 1987-88** TLV-TWA: 10 ppm, 30 mg/m³ **Toxicity Data*** Human, Inhalation, LC$_{Lo}$: 2000 ppm/5 Min Human, Oral, TD$_{Lo}$: 130 mg/kg Human, Inhalation, TC$_{Lo}$: 210 ppm



*See NIOSH, *RTECS*, for additional data with references to irritative, mutagenic, tumorigenic, and reproductive effects.

SECTION 3. PHYSICAL DATA

Boiling Point: 176°F (80°C)
Melting Point: 42°F (5.5°C)
Vapor Pressure: 75 Torrs at 68°F (20°C)
Vapor Density (Air = 1): >1

Water Solubility (%): Slight
% Volatile by Volume: 100
Molecular Weight: 78 Grams/Mole
Specific Gravity (H_2O = 1): 0.87865 at 68°F (20°C)

Appearance and Odor: A colorless liquid; characteristic aromatic odor.

SECTION 4. FIRE AND EXPLOSION DATA

Flash Point and Method	Autoignition Temperature	Flammability Limits in Air	LOWER	UPPER
12°F (-11.1°C) CC	928°F (498°C)	% by Volume	1.3%	7.1%

Extinguishing Media: Use dry chemical, foam, or carbon dioxide to put out benzene fires. Water may be ineffective as an extinguishing agent because it can scatter and spread the fire. Use water to cool fire-exposed containers, flush spills away from exposures, disperse benzene vapor, and protect personnel attempting to stop an unignited benzene leak.
Unusual Fire or Explosion Hazards: Benzene vapor is heavier than air and can collect in low-lying areas such as sumps or wells. Eliminate all sources of ignition there to prevent a dangerous flashback to the original liquid benzene. **Danger:** Explosive and flammable benzene vapor-air mixtures can easily form at room temperature; always use this material in a way that minimizes dispersion of its vapor into general work areas.
Special Fire-fighting Procedures: Wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in the pressure-demand or positive-pressure mode.

SECTION 5. REACTIVITY DATA

Benzene is stable in closed containers during routine operations. It does not undergo hazardous polymerization.

Chemical Incompatibilities: Hazardous chemical reactions involving benzene and the following materials are reported in Genium reference 84: bromine pentafluoride, chlorine, chlorine trifluoride, chromic anhydride, nitryl perchlorate, oxygen, ozone, perchlorates, perchloryl fluoride and aluminum chloride, permanganates and sulfuric acid, potassium peroxide, silver perchlorate, and sodium peroxide.

Conditions to Avoid: Avoid all exposure to sources of ignition and to incompatible chemicals.

Hazardous Products of Decomposition: Toxic gases like carbon monoxide (CO) may be produced during benzene fires.

SECTION 6. HEALTH HAZARD INFORMATION

Benzene is listed as a suspected human carcinogen by the ACGIH.

Summary of Risks: Prolonged skin contact with benzene or excessive inhalation of its vapor may cause headache, weakness, loss of appetite, and lassitude. Continued exposure can cause collapse, bronchitis, and pneumonia. The most important health hazards are cancer (leukemia), bone marrow effects, and injuries to the blood-forming tissue from chronic low-level exposure.

Medical Conditions Aggravated by Long-Term Exposure: Ailments of the heart, lungs, liver, kidneys, blood, and central nervous system (CNS) may be worsened by exposure. Administer preplacement and periodic medical exams emphasizing these organs' functions and reassign workers who test positive. **Target Organs:** Blood, CNS, bone marrow, eyes, and upper respiratory tract (URT). **Primary Entry:** Skin contact, inhalation. **Acute Effects:** Dizziness, mental dullness, nausea, headache, fatigue, and giddiness. **Chronic Effects:** Possible cancer (leukemia).

FIRST AID

Eyes: Immediately flush eyes, including under the eyelids, gently but thoroughly with plenty of running water for at least 15 minutes.

Skin: Immediately wash the affected area with soap and water.

Inhalation: Remove the exposed person to fresh air; restore and/or support his or her breathing as needed.

Ingestion: Never give anything by mouth to someone who is unconscious or convulsing. Do not induce vomiting because of the possibility of aspiration.

GET MEDICAL HELP (IN PLANT, PARAMEDIC, COMMUNITY) FOR ALL EXPOSURES. Seek prompt medical assistance for further treatment, observation, and support after first aid.

SECTION 7. SPILL, LEAK, AND DISPOSAL PROCEDURES

Spill/Leak: Notify safety personnel, provide ventilation, and eliminate all sources of ignition immediately. Cleanup personnel need protection against contact with and inhalation of vapor (see sect. 8). Contain large spills and collect waste or absorb it with an inert material such as sand, earth, or vermiculite. Use nonsparking tools to place waste liquid or absorbent into closable containers for disposal. Keep waste out of sewers, watersheds, and waterways.

Waste Disposal: Contact your supplier or a licensed contractor for detailed recommendations for disposal. Follow Federal, state, and local regulations.

OSHA Designations

Air Contaminant (29 CFR 1910.1000 Subpart Z)

EPA Designations (40 CFR 302.4)

RCRA Hazardous Waste, No. U019

CERCLA Hazardous Substance, Reportable Quantity: 1000 lbs (454 kg)

SECTION 8. SPECIAL PROTECTION INFORMATION

Goggles: Always wear protective eyeglasses or chemical safety goggles. Where splashing is possible, wear a full face shield. Follow the eye- and face-protection guidelines in 29 CFR 1910.133. **Respirator:** Wear a NIOSH-approved respirator per the *NIOSH Pocket Guide to Chemical Hazards* for the maximum-use concentrations and/or the exposure limits cited in section 2. Follow the respirator guidelines in 29 CFR 1910.134. For emergency or nonroutine use (e.g., cleaning reactor vessels or storage tanks), wear an SCBA with a full facepiece operated in the pressure-demand or positive-pressure mode. **Warning:** Air-purifying respirators will *not* protect workers in oxygen-deficient atmospheres. **Other:** Wear impervious gloves, boots, aprons, gauntlets, etc., to prevent any possibility of skin contact with this suspected human carcinogen. **Ventilation:** Install and operate general and local ventilation systems powerful enough to maintain airborne levels of benzene below the OSHA PEL standard cited in section 2.

Safety Stations: Make eyewash stations, washing facilities, and safety showers available in use and handling areas. **Contaminated Equipment:** Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them. Do *not* wear contact lenses in any work area. Remove contaminated clothing and launder it before wearing it again; clean this material from shoes and equipment. **Comments:** Practice good personal hygiene; always wash thoroughly after using this material. Keep it off of your clothing and equipment. Avoid transferring it from your hands to your mouth while eating, drinking, or smoking. Do *not* eat, drink, or smoke in any work area. Do not inhale benzene vapor!

SECTION 9. SPECIAL PRECAUTIONS AND COMMENTS

Storage/Segregation: Store benzene in a cool, dry, well-ventilated area away from sources of ignition and incompatible chemicals.

Special Handling/Storage: Protect containers from physical damage. Electrically ground and bond all metal containers used in shipping or transferring operations. Follow all parts of 29 CFR 1910.1028.

Engineering Controls: All engineering systems (production, transportation, etc.) must be of maximum explosion-proof design (non-sparking, electrically grounded and bonded, etc.)

Comments: If possible, substitute less toxic solvents for benzene; use this material with extreme caution and only if it is absolutely essential.

Transportation Data (49 CFR 172.101-2)

DOT Shipping Name: Benzene

DOT Class: Flammable Liquid

DOT Label: Flammable Liquid

DOT ID No. UN1114

IMO Label: Flammable Liquid

IMO Class: 3.2

References: 1, 2, 12, 73, 84-94, 100, 103.

Prepared by PJ Igoe, BS

Industrial Hygiene Review: DJ Wilson, CIH

Medical Review: MJ Hardies, MD

Material Safety Data Sheet

Genium Publishing Corporation
1145 Catalyn Street
Schenectady, NY 12303-1836 USA
(518) 377-8855

GENIUM PUBLISHING CORP.

No. 317
TOLUENE
(Revision D)

Issued: August 1979
Revised: April 1986

SECTION 1. MATERIAL IDENTIFICATION

20

MATERIAL NAME: TOLUENE

OTHER DESIGNATIONS: Methyl Benzene, Methyl Benzol, Phenylmethane, Toluol, C_7H_8, CAS #0108-88-3

MANUFACTURER/SUPPLIER: Available from many suppliers, including:
Allied Corp., PO Box 2064R, Morristown, NJ 07960; Telephone: (201) 455-4400
Ashland Chemical Co., Industrial Chemicals & Solvents Div., PO Box 2219, Columbus, OH; Telephone: (614) 889-3844

HMIS
H: 2
F: 3
R: 0
PPE*
*See sect. 8

R 1
I 3
S 2
K 4

SECTION 2. INGREDIENTS AND HAZARDS

SECTION 2. INGREDIENTS AND HAZARDS	%	HAZARD DATA
Toluene 	ca 100	8-hr TLV: 100 ppm, or 375 mg/m^3* (Skin)** Man, Inhalation, TCLo: 100 ppm: Psychotropic*** Rat, Oral, LD_{50}: 5000 mg/kg Rat, Inhalation, LCLo: 4000 ppm/4 hrs. Rabbit, Skin, LD_{50}: 14 gm/kg Human, Eye: 300 ppm

* Current (1985-86) ACGIH TLV. The OSHA PEL is 200 ppm with an acceptable ceiling concentration of 300 ppm and an acceptable maximum peak of 500 ppm/10 minutes.

** Skin designation indicates that toluene can be absorbed through intact skin and contribute to overall exposure.

*** Affects the mind.

SECTION 3. PHYSICAL DATA

Boiling Point ... 231°F (111°C)
Vapor Pressure @ 20°C, mm Hg ... 22
Water Solubility @ 20°C, wt. % ... 0.05
Vapor Density (Air = 1) ... 3.14

Evaporation Rate (BuAc = 1) ... 2.24
Specific Gravity (H_2O = 1) ... 0.866
Melting Point ... -139°F (-95°C)
Percent Volatile by Volume ... ca 100
Molecular Weight ... 92.15

Appearance and odor: Clear, colorless liquid with a characteristic aromatic odor. The odor is detectable to most individuals in the range of 10 to 15 ppm. Because olfactory fatigue occurs rapidly upon exposure to toluene, odor is not a good warning property.

SECTION 4. FIRE AND EXPLOSION DATA

Flash Point and Method	Autoignition Temp.	Flammability Limits In Air	LOWER	UPPER
40°F (4°C) CC	896°F (480°C)	% by Volume	1.27	7.1

EXTINGUISHING MEDIA: Carbon dioxide, dry chemical, alcohol foam. Do not use a solid stream of water because the stream will scatter and spread the fire. Use water spray to cool tanks/containers that are exposed to fire and to disperse vapors.

UNUSUAL FIRE/EXPLOSION HAZARDS: This OSHA class IB flammable liquid is a dangerous fire hazard. It is a moderate fire hazard when exposed to oxidizers, heat, sparks, or open flame. Vapors are heavier than air and may travel a considerable distance to an ignition source and flash back.

SPECIAL FIRE-FIGHTING PROCEDURES: Fire fighters should wear self-contained breathing apparatus with full facepiece operated in a positive-pressure mode when fighting fires involving toluene.

SECTION 5. REACTIVITY DATA

CHEMICAL INCOMPATIBILITIES: Toluene is stable in closed containers at room temperature under normal storage and handling conditions. It does not undergo hazardous polymerization. This material is incompatible with strong oxidizing agents, dinitrogen tetraoxide, silver perchlorate, tetranitromethane, and uranium hexafluoride. Contact with these materials may cause fire or explosion. Nitric acid and toluene, especially in the presence of sulfuric acid, will produce nitrated compounds that are dangerously explosive.

CONDITIONS TO AVOID: Avoid exposure to sparks, open flame, hot surfaces, and all sources of heat and ignition. Toluene will attack some forms of plastics, rubber, and coatings. Thermal decomposition or burning produces carbon dioxide and/or carbon monoxide.

SECTION 6. HEALTH HAZARD INFORMATION TLV

Toluene is not considered a carcinogen by the NTP, IARC, or OSHA. SUMMARY OF RISKS: Vapors of toluene may cause irritation of the eyes, nose, upper respiratory tract, and skin. Exposure to 200 ppm for 8 hours causes mild fatigue, weakness, confusion, lacrimation (tearing) and paresthesia (a sensation of prickling, tingling, or creeping on the skin that has no objective cause). Exposure to higher concentrations may cause headache, nausea, dizziness, dilated pupils, and euphoria, and, in severe cases, may cause unconsciousness and death. The liquid is irritating to the eyes and skin. Contact with the eyes may cause transient corneal damage, conjunctival irritation, and burns if not promptly removed. Repeated and/or prolonged contact with the skin may cause drying and cracking. It may be absorbed through the skin in toxic amounts. Ingestion causes irritation of the gastrointestinal tract and may cause effects resembling those from inhalation of the vapor. Chronic overexposure to toluene may cause reversible kidney and liver injury. FIRST AID: EYE CONTACT: Immediately flush eyes, including under eyelids, with running water for at least 15 minutes. Get medical attention if irritation persists.* SKIN CONTACT: Immediately flush skin (for at least 15 minutes) while removing contaminated shoes and clothing. Wash exposed area with soap and water. Get medical attention if irritation persists or if a large area has been exposed.* INHALATION: Remove victim to fresh air. Restore and/or support breathing as required. Keep victim warm and quiet. Get medical help.* INGESTION: Give victim 1 to 2 glasses of water or milk. Contact a poison control center. Do not induce vomiting unless directed to do so. Transport victim to a medical facility. Never give anything by mouth to a person who is unconscious or convulsing. * GET MEDICAL ASSISTANCE = In plant, paramedic, community. Get medical help for further treatment, observation, and support after first aid, if indicated.

SECTION 7. SPILL, LEAK, AND DISPOSAL PROCEDURES

SPILL/LEAK: Notify safety personnel of large spills or leaks. Remove all sources of heat and ignition. Provide maximum explosion-proof ventilation. Limit access to spill area to necessary personnel only. Remove leaking containers to safe place if feasible. Cleanup personnel need protection against contact with liquid and inhalation of vapor (see sect. 8). WASTE DISPOSAL: Absorb small spills with paper towel or vermiculite. Contain large spills and collect if feasible, or absorb with vermiculite or sand. Place waste solvent or absorbent into closed containers for disposal using nonsparking tools. Liquid can be flushed with water to an open holding area for handling. Do not flush to sewer, watershed, or waterway. COMMENTS: Place in suitable container for disposal by a licensed contractor or burn in an approved incinerator. Consider reclaiming by distillation. Contaminated absorbent can be buried in a sanitary landfill. Follow all Federal, state, and local regulations. TLm 96: 100-10 ppm. Toluene is designated as a hazardous waste by the EPA. The EPA (RCRA) HW No. is U220 (40 CFR 261). The reportable quantity (RQ) is 1000 lbs/454 kg (40 CFR 117).

SECTION 8. SPECIAL PROTECTION INFORMATION

Provide general and local exhaust ventilation to meet TLV requirements. Ventilation fans and other electrical service must be nonsparking and have an explosion-proof design. Exhaust hoods should have a face velocity of at least 100 lfm (linear feet per minute) and be designed to capture heavy vapor. For emergency or nonroutine exposures where the TLV may be exceeded, use an organic chemical cartridge respirator if concentration is less than 200 ppm and an approved canister gas mask or self-contained breathing apparatus with full facepiece if concentration is greater than 200 ppm.
Safety glasses or splash goggles should be worn in all work areas. Neoprene gloves, apron, face shield, boots, and other appropriate protective clothing and equipment should be available and worn as necessary to prevent skin and eye contact. Remove contaminated clothing immediately and do not wear it until it has been properly laundered.

Eyewash stations and safety showers should be readily available in use and handling areas.

Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them.

SECTION 9. SPECIAL PRECAUTIONS AND COMMENTS

STORAGE SEGREGATION: Store in a cool, dry, well-ventilated area away from oxidizing agents, heat, sparks, or open flame. Storage areas must meet OSHA requirements for class IB flammable liquids. Use metal safety cans for handling small amounts. Protect containers from physical damage. Use only with adequate ventilation. Avoid contact with eyes, skin, or clothing. Do not inhale or ingest. Use caution when handling this compound because it can be absorbed through intact skin in toxic amounts. SPECIAL HANDLING/STORAGE: Ground and bond metal containers and equipment to prevent static sparks when making transfers. Do not smoke in use or storage areas. Use nonsparking tools. ENGINEERING CONTROLS: Preplacement and periodic medical exams emphasizing the liver, kidneys, nervous system, lungs, heart, and blood should be provided. Workers exposed to concentrations greater than the action level (50 ppm) should be examined at least once a year. Use of alcohol can aggravate the toxic effects of toluene.
COMMENTS: Emptied containers contain product residues. Handle accordingly!
Toluene is designated as a hazardous substance by the EPA (40 CFR 116). DOT Classification: Flammable liquid. UN1294.
Data Source(s) Code: 1-9, 12, 16, 20, 21, 24, 26, 34, 81, 32. CR

Approvals J.O. Reseacu, 11/86.
Indust. Hygiene/Safety DW 10-86
Medical Review Oct 86

Material Safety Data Sheet

From Genium's Reference Collection
Genium Publishing Corporation
1145 Catalyn Street
Schenectady, NY 12303-1836 USA
(518) 377-8855

GENIUM PUBLISHING CORP.

No. 318

XYLENE (Mixed Isomers)
(Revision D)
Issued: November 1980
Revised: August 1988

SECTION 1. MATERIAL IDENTIFICATION

26

Material Name: XYLENE (Mixed Isomers)

Description (Origin/Uses): Used as a raw material for the production of benzoic acid, phthalic anhydride, isophthalic and terephthalic acids and their dimethyl esters in the manufacture of polyester fibers; in sterilizing catgut; with Canadian balsam as oil-immersion in microscopy; and as a cleaning agent in microscopic techniques.

Other Designations: Dimethylbenzene; Xylol; C_8H_{10}; CAS No. 1330-20-7

Manufacturer: Contact your supplier or distributor. Consult the latest edition of the *Chemicalweek Buyers' Guide* (Genium ref. 73) for a list of suppliers.

Comments: Although there are three different isomers of xylene (*ortho*, *meta*, and *para*), the health and physical hazards of all three isomers are very similar. This MSDS is written for a xylene mixture of all three isomers, which is usually commercial xylene.

3
2 0
-
NFPA

HMIS
H 2
F 3
R 0
PPG*
*See sect. 8

R 1
I 3
S 2
K 3

SECTION 2. INGREDIENTS AND HAZARDS	%	EXPOSURE LIMITS
Xylene (Mixed Isomers), CAS No. 1330-20-7* *o-Xylene, CAS No. 0095-47-6 m-Xylene, CAS No. 0108-38-3 p-Xylene, CAS No. 0106-42-3 **Check with your supplier to determine if there are additions, contaminants, or impurities (such as benzene) that are present in reportable quantities per 29 CFR 1910. ***Immediately dangerous to life and health. **** See NIOSH, *RTECS* (No. ZE2100000), for additional data with references to reproductive, irritative, and mutagenic effects.	**	IDLH*** Level: 1000 ppm **OSHA PEL** 8-Hr TWA: 100 ppm, 435 mg/m³ **ACGIH TLVs, 1987-88** TLV-TWA: 100 ppm, 435 mg/m³ TLV-STEL: 150 ppm, 655 mg/m³ **Toxicity Data****** Human, Inhalation, TC_{Lo}: 200 ppm Man, Inhalation, LC_{Lo}: 10000 ppm/6 Hrs Rat, Oral, LD_{50}: 4300 mg/kg

SECTION 3. PHYSICAL DATA

Boiling Point: 275°F to 293°F (135°C to 145°C)*
Melting Point: -13°F (-25°C)
Evaporation Rate: 0.6 Relative to BuAc = 1
Specific Gravity (H_2O = 1): 0.86

Water Solubility (%): Insoluble
Molecular Weight: 106 Grams/Mole
% Volatile by Volume: Ca 100
Vapor Pressure: 7 to 9 Torrs at 68°F (20°C)
Vapor Density (Air = 1): 3.7

Appearance and Odor: A clear liquid; aromatic hydrocarbon odor.

*Materials with wider and narrower boiling ranges are commercially available.

SECTION 4. FIRE AND EXPLOSION DATA

Flash Point and Method	Autoignition Temperature	Flammability Limits in Air	LOWER	UPPER
81°F to 90°F (27°C to 32°C)	867°F (464°C)	% by Volume	1%	7%

Extinguishing Media: Use foam, dry chemical, or carbon dioxide. Use water sprays to reduce the rate of burning and to cool containers.

Unusual Fire or Explosion Hazards: Xylene vapor is heavier than air and may travel a considerable distance to a low-lying source of ignition and flash back.

Special Fire-fighting Procedures: Wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in the pressure-demand or positive-pressure mode.

SECTION 5. REACTIVITY DATA

Xylene is stable in closed containers during routine operations. It does not undergo hazardous polymerization.

Chemical Incompatibilities: This material may react dangerously with strong oxidizers.

Conditions to Avoid: Avoid any exposure to sources of ignition and to strong oxidizers.

Hazardous Products of Decomposition: Carbon monoxide (CO) may be evolved during xylene fires.

SECTION 6. HEALTH HAZARD INFORMATION

Xylene is not listed as a carcinogen by the IARC, NTP, or OSHA.

Summary of Risks: Liquid xylene is a skin irritant and causes erythema, dryness, and defatting; prolonged contact may cause blistering. Inhaling xylene can depress the central nervous system (CNS), and ingesting it can result in gastrointestinal disturbance; and possibly hematemesis (vomiting blood). Effects on the eyes, kidneys, liver, lungs, and the CNS are also reported. **Medical Conditions Aggravated by Long-Term Exposure:** Problems with eyes, skin, central nervous system, kidneys, and liver may be worsened by exposure to xylene. **Target Organs:** CNS, eyes, gastrointestinal tract, blood, liver, kidneys, skin. **Primary Entry:** Inhalation, skin contact/absorption. **Acute Effects:** Dizziness; excitement; drowsiness; incoordination; staggering gait; irritation of eyes, nose, and throat; corneal vacuolization; anorexia; nausea; vomiting; abdominal pain; and dermatitis. **Chronic Effects:** Reversible eye damage, headache, loss of appetite, nervousness, pale skin, and skin rash.

FIRST AID: Eyes. Immediately flush eyes, including under the eyelids, gently but thoroughly with plenty of running water for at least 15 minutes. **Skin.** Immediately wash the affected area with soap and water. **Inhalation.** Remove the exposed person to fresh air; restore and/or support his or her breathing as needed. Have a trained person administer oxygen. **Ingestion.** Never give anything by mouth to someone who is unconscious or convulsing. Vomiting may occur spontaneously, but do not induce it. If vomiting should occur, keep exposed person's head below his or her hips to prevent aspiration (breathing the liquid xylene into the lungs). Severe hemorrhagic pneumonitis with grave, possibly fatal, pulmonary injury can occur from aspiring very small quantities of xylene.

GET MEDICAL HELP (IN PLANT, PARAMEDIC, COMMUNITY) FOR ALL EXPOSURES. Seek prompt medical assistance for further treatment, observation, and support after first aid. If exposure is severe, hospitilization for at least 72 hours with careful monitoring for delayed onset of pulmonary edema is recommended.

SECTION 7. SPILL, LEAK, AND DISPOSAL PROCEDURES

Spill/Leak: Notify safety personnel, provide ventilation, and eliminate all sources of ignition immediately. Cleanup personnel need protection against contact with and inhalation of xylene vapor (see sect. 8). Contain large spills and collect waste or absorb it with an inert material such as sand, earth, or vermiculite. Use nonsparking tools to place waste liquid or absorbent into closable containers for disposal. Keep waste out of sewers, watersheds, and waterways.

Waste Disposal: Contact your supplier or a licensed contractor for detailed recommendations. Follow Federal, state, and local regulations.

OSHA Designations

Air Contaminant (29 CFR 1910.1000 Subpart Z)

EPA Designations (40 CFR 302.4)

RCRA Hazardous Waste, No. U239

CERCLA Hazardous Substance, Reportable Quantity: 1000 lbs (454 kg), per the Clean Water Act (CWA), section 311 (b) (9)

SECTION 8. SPECIAL PROTECTION INFORMATION

Goggles: Always wear protective eyeglasses or chemical safety goggles. Where splashing is possible, wear a full face shield as a supplementary protective measure. Follow OSHA eye- and face-protection regulations (29 CFR 1910.133). **Respirator:** Use a NIOSH-approved respirator per the *NIOSH Pocket Guide to Chemical Hazards* for the maximum-use concentrations and/or the exposure limits cited in section 2. Follow OSHA respirator regulations (29 CFR 1910.134). For emergency or nonroutine use (leaks or cleaning reactor vessels and storage tanks), wear an SCBA with a full facepiece operated in the pressure-demand or positive-pressure mode. **Warning:** Air-purifying respirators will *not* protect workers in oxygen-deficient atmospheres. **Other:** Wear impervious gloves, boots, aprons, gauntlets, etc., as required by the specifics of the work operation to prevent prolonged or repeated skin contact with xylene. **Ventilation:** Install and operate general and local maximum, explosion-proof ventilation systems powerful enough to maintain airborne levels of xylene below the OSHA PEL standard cited in section 2. Local exhaust ventilation is preferred because it prevents dispersion of xylene into general work areas by eliminating it at its source. Consult the latest edition of Genium reference 103 for detailed recommendations.

Safety Stations: Make eyewash stations, safety/quick-drench showers, and washing facilities available in areas of use and handling.

Contaminated Equipment: Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them. Do *not* wear contact lenses in any work area. Remove contaminated clothing and launder it before wearing it again; clean xylene from shoes and equipment. **Comments:** Practice good personal hygiene; always wash thoroughly after using this material. Keep it off of your clothing and equipment. Avoid transferring it from your hands to your mouth while eating, drinking, or smoking. Do *not* eat, drink, or smoke in any work area. Do not inhale xylene vapor.

SECTION 9. SPECIAL PRECAUTIONS AND COMMENTS

Storage/Segregation: Store xylene in a cool, dry, well-ventilated area away from sources of ignition and strong oxidizers. Protect containers from physical damage.

Special Handling/Storage: Make sure all engineering systems (production, transportation) are of maximum explosion-proof design. Ground and bond all containers, pipelines, etc., used in shipping, transferring, reacting, producing, and sampling operations.

Transportation Data (49 CFR 172.101-2)

DOT Shipping Name: Xylene
DOT ID No. UN1307
DOT Label: Flammable Liquid
DOT Hazard Class: Flammable Liquid
IMO Label: Flammable Liquid
IMO Class: 3.2 or 3.3

References: 1, 2, 12, 73, 84-94, 100, 103.

Prepared by PJ Igoe, BS

Industrial Hygiene Review: DJ Wilson, CIH

Medical Review: MJ Hardies, MD

Occupational Health Guideline for Coal Tar Pitch Volatiles

INTRODUCTION

This guideline is intended as a source of information for employees, employers, physicians, industrial hygienists, and other occupational health professionals who may have a need for such information. It does not attempt to present all data; rather, it presents pertinent information and data in summary form.

SUBSTANCE IDENTIFICATION

Anthracene

- Formula: $C_{14}H_{10}$
- Synonyms: None
- Appearance and odor: Pale green solid with a faint aromatic odor.

Phenanthrene

- Formula: $C_{14}H_{10}$
- Synonyms: None
- Appearance and odor: Colorless solid with a faint aromatic odor.

Pyrene

- Formula: $C_{16}H_{10}$
- Synonyms: None
- Appearance: Bright yellow solid

Carbazole

- Formula: $C_{12}H_9N$
- Synonyms: None
- Appearance and odor: Colorless solid with a faint aromatic odor.

Benzo(a)pyrene

- Formula: $C_{20}H_{12}$
- Synonyms: BaP, 3,4-benzopyrene
- Appearance and odor: Colorless solid with a faint aromatic odor.

PERMISSIBLE EXPOSURE LIMIT (PEL)

The current OSHA standard for coal tar pitch volatiles is 0.2 milligram of coal tar pitch volatiles per cubic meter of air (mg/m^3) averaged over an eight-hour work shift. NIOSH has recommended that the permissible exposure limit for coal tar products be reduced to 0.1 mg/m^3 (cyclohexane-extractable fraction) averaged over a work shift of up to 10 hours per day, 40 hours per week, and that coal tar products be regulated as occupational carcinogens. The NIOSH Criteria Document for Coal Tar Products and NIOSH Criteria Document for Coke Oven Emissions should be consulted for more detailed information.

HEALTH HAZARD INFORMATION

- **Routes of exposure**

Coal tar pitch volatiles can affect the body if they are inhaled or if they come in contact with the eyes or skin.

- **Effects of overexposure**

Repeated exposure to coal tar pitch volatiles has been associated with an increased risk of developing bronchitis and cancer of the lungs, skin, bladder, and kidneys. Pregnant women may be especially susceptible to exposure effects associated with coal tar pitch volatiles. Repeated exposure to these materials may also cause sunlight to have a more severe effect on a person's skin. In addition, this type of exposure may cause an allergic skin rash.

- **Reporting signs and symptoms**

A physician should be contacted if anyone develops any signs or symptoms and suspects that they are caused by exposure to coal tar pitch volatiles.

- **Recommended medical surveillance**

The following medical procedures should be made available to each employee who is exposed to coal tar pitch volatiles at potentially hazardous levels:

These recommendations reflect good industrial hygiene and medical surveillance practices and their implementation will assist in achieving an effective occupational health program. However, they may not be sufficient to achieve compliance with all requirements of OSHA regulations.

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service Centers for Disease Control
National Institute for Occupational Safety and Health

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

September 1978

1. Initial Medical Examination:

—A complete history and physical examination: The purpose is to detect pre-existing conditions that might place the exposed employee at increased risk, and to establish a baseline for future health monitoring. Examination of the oral cavity, respiratory tract, bladder, and kidneys should be stressed. The skin should be examined for evidence of chronic disorders, for premalignant and malignant lesions, and evidence of hyperpigmentation or photosensitivity.

—Urinalysis: Coal tar pitch volatiles are associated with an excess of kidney and bladder cancer. A urinalysis should be obtained to include at a minimum specific gravity, albumin, glucose, and a microscopic on centrifuged sediment, as well as a test for red blood cells.

—Urinary cytology: Coal tar pitch volatiles are associated with an excess of kidney and bladder cancer. Employees having 5 or more years of exposure or who are 45 years of age or older should have a urinary cytology examination.

—Sputum cytology: Coal tar pitch volatiles are associated with an excess of lung cancer. Employees having 10 or more years of exposure or who are 45 years of age or older should have a sputum cytology examination.

—14" x 17" chest roentgenogram: Coal tar pitch volatiles are associated with an excess of lung cancer. Surveillance of the lungs is indicated.

—FVC and FEV (1 sec): Coal tar pitch volatiles are reported to cause an excess of bronchitis. Periodic surveillance is indicated.

—A complete blood count: Due to the possibility of benzene exposure associated with coal tar pitch volatiles, a complete blood count is considered necessary to search for leukemia and aplastic anemia.

—Skin disease: Coal tar pitch volatiles are defatting agents and can cause dermatitis on prolonged exposure. Persons with pre-existing skin disorders may be more susceptible to the effects of these agents.

2. Periodic Medical Examination: The aforementioned medical examinations should be repeated on an annual basis, and semi-annually for employees 45 years of age or older or with 10 or more years' exposure to coal tar pitch volatiles.

- **Summary of toxicology**

Coal tar pitch volatiles (CTPV) are products of the destructive distillation of bituminous coal and contain polynuclear aromatic hydrocarbons (PNA's). These hydrocarbons sublime readily, thereby increasing the amounts of carcinogenic compounds in working areas. Epidemiologic evidence suggests that workers intimately exposed to the products of combustion or distillation of bituminous coal are at increased risk of cancer at many sites. These include cancer of the respiratory tract, kidney, bladder, and skin. In a study of coke oven workers, the level of exposure to CTPV and the length of time exposed were related to the development of cancer. Coke oven workers with the highest risk of cancer were those employed exclusively at topside jobs for 5 or more years, for whom the increased risk of dying from lung cancer was 10-fold; all coke oven workers had a 7-½-fold increase in risk of dying from kidney cancer. Although the causative agent or agents of the cancer in coke oven workers is unidentified, it is suspected that several PNA's in the CTPV generated during the coking process are involved. Certain industrial populations exposed to coal tar products have a demonstrated risk of skin cancer. Substances containing PNA's which may produce skin cancer also produce contact dermatitis; examples are coal tar, pitch, and cutting oils. Although allergic dermatitis is readily induced by PNA's in guinea pigs, it is only rarely reported in humans from occupational contact with PNA's; these have resulted largely from the therapeutic use of coal tar preparations. Components of pitch and coal tar produce cutaneous photosensitization; skin eruptions are usually limited to areas exposed to the sun or ultraviolet light. Most of the phototoxic agents will induce hypermelanosis of the skin; if chronic photodermatitis is severe and prolonged, leukoderma may occur. Some oils containing PNA's have been associated with changes of follicular and sebaceous glands which commonly take the form of acne. There is evidence that exposures to emissions at coke ovens and gas retorts may be associated with an increased occurrence of chronic bronchitis. Coal tar pitch volatiles may be associated with benzene, an agent suspected of causing leukemia and known to cause aplastic anemia.

CHEMICAL AND PHYSICAL PROPERTIES

- **Physical data—Anthracene**

1. Molecular weight: 178.2
2. Boiling point (760 mm Hg): 340 C (644 F)
3. Specific gravity (water = 1): 1.24
4. Vapor density (air = 1 at boiling point of anthracene): 6.15
5. Melting point: 217 C (423 F)
6. Vapor pressure at 20 C (68 F): Less than 1 mm Hg
7. Solubility in water, g/100 g water at 20 C (68 F): Insoluble
8. Evaporation rate (butyl acetate = 1): Not applicable

- **Physical data—Phenanthrene**

1. Molecular weight: 178.2
2. Boiling point (760 mm Hg): 340 C (644 F)
3. Specific gravity (water = 1): 1.18
4. Vapor density (air = 1 at boiling point of phenanthrene): 6.15
5. Melting point: 100.5 C (213 F)
6. Vapor pressure at 20 C (68 F): Less than 1 mm Hg
7. Solubility in water, g/100 g water at 20 C (68 F): Insoluble
8. Evaporation rate (butyl acetate = 1): Not applicable

- **Physical data—Pyrene**

1. Molecular weight: 202.3
2. Boiling point (760 mm Hg): Greater than 360 C (greater than 680 F)

3. Specific gravity (water = 1): 1.28

4. Vapor density (air = 1 at boiling point of pyrene): 6.9

5. Melting point: 150.4 C (303 F)

6. Vapor pressure at 20 C (68 F): Less than 1 mm Hg

7. Solubility in water, g/100 g water at 20 C (68 F): Insoluble

8. Evaporation rate (butyl acetate = 1): Not applicable

- **Physical data—Carbazole**

1. Molecular weight: 167.2

2. Boiling point (760 mm Hg): 355 C (671 F)

3. Specific gravity (water = 1): Greater than 1

4. Vapor density (air = 1 at boiling point of carbazole): 5.8

5. Melting point: 246 C (475 F)

6. Vapor pressure at 20 C (68 F): Less than 1 mm Hg

7. Solubility in water, g/100 g water at 20 C (68 F): Insoluble

8. Evaporation rate (butyl acetate = 1): Not applicable

- **Physical data—Benzo(a)pyrene**

1. Molecular weight: 252.3

2. Boiling point (760 mm Hg): Greater than 360 C (greater than 680 F)

3. Specific gravity (water = 1): Greater than 1

4. Vapor density (air = 1 at boiling point of benzo(a)pyrene): 8.7

5. Melting point: 179 C (354 F)

6. Vapor pressure at 20 C (68 F): Less than 1 mm Hg

7. Solubility in water, g/100 g water at 20 C (68 F): Insoluble

8. Evaporation rate (butyl acetate = 1): Not applicable

- **Reactivity**

1. Conditions contributing to instability: None hazardous

2. Incompatibilities: Contact with strong oxidizers may cause fires and explosions.

3. Hazardous decomposition products: None

4. Special precautions: None

- **Flammability**

1. Flash point: Anthracene: 121 C (250 F) (closed cup); Others: Data not available

2. Autoignition temperature: Anthracene: 540 C (1004 F); Others: Data not available

3. Flammable limits in air, % by volume: Anthracene: Lower: 0.6; Others: Data not available

4. Extinguishant: Foam, dry chemical, and carbon dioxide

- **Warning properties**

Grant states that "coal tar and its various crude fractions appear principally to cause reddening and squamous eczema of the lid margins, with only small erosions of the corneal epithelium and superficial changes in the stroma, which disappear in a month following exposure. Chronic exposure of workmen to tar fumes and dust has been reported to cause conjunctivitis and discoloration of the cornea in the palpebral fissure, either near the limbus or, in extreme cases, across the whole cornea. Occasionally, epithelioma of the lid margin has been attributed to contact with coal tar."

MONITORING AND MEASUREMENT PROCEDURES

- **General**

Measurements to determine employee exposure are best taken so that the average eight-hour exposure is based on a single eight-hour sample or on two four-hour samples. Several short-time interval samples (up to 30 minutes) may also be used to determine the average exposure level. Air samples should be taken in the employee's breathing zone (air that would most nearly represent that inhaled by the employee).

- **Method**

Coal tar products may be sampled by collection on a glass fiber filter with subsequent ultrasonic extraction and weighing. An analytical method for coal tar pitch volatiles is in the *NIOSH Manual of Analytical Methods*, 2nd Ed., Vol. 1, 1977, available from the Government Printing Office, Washington, D.C. 20402 (GPO No. 017-033-00267-3).

RESPIRATORS

- Good industrial hygiene practices recommend that engineering controls be used to reduce environmental concentrations to the permissible exposure level. However, there are some exceptions where respirators may be used to control exposure. Respirators may be used when engineering and work practice controls are not technically feasible, when such controls are in the process of being installed, or when they fail and need to be supplemented. Respirators may also be used for operations which require entry into tanks or closed vessels, and in emergency situations. If the use of respirators is necessary, the only respirators permitted are those that have been approved by the Mine Safety and Health Administration (formerly Mining Enforcement and Safety Administration) or by the National Institute for Occupational Safety and Health.
- In addition to respirator selection, a complete respiratory protection program should be instituted which includes regular training, maintenance, inspection, cleaning, and evaluation.

PERSONAL PROTECTIVE EQUIPMENT

- Employees should be provided with and required to use impervious clothing, gloves, face shields (eight-inch minimum), and other appropriate protective clothing necessary to prevent skin contact with condensed coal tar pitch volatiles, where skin contact may occur.
- If employees' clothing may have become contaminated with coal tar pitch volatiles, employees should change into uncontaminated clothing before leaving the work premises.
- Clothing contaminated with coal tar pitch volatiles

should be placed in closed containers for storage until it can be discarded or until provision is made for the removal of coal tar pitch volatiles from the clothing. If the clothing is to be laundered or otherwise cleaned to remove the coal tar pitch volatiles, the person performing the operation should be informed of coal tar pitch volatiles's hazardous properties.

- Employees should be provided with and required to use splash-proof safety goggles where condensed coal tar pitch volatiles may contact the eyes.

SANITATION

- Workers subject to skin contact with coal tar pitch volatiles should wash with soap or mild detergent and water any areas of the body which may have contacted coal tar pitch volatiles at the end of each work day.
- Employees who handle coal tar pitch volatiles should wash their hands thoroughly with soap or mild detergent and water before eating, smoking, or using toilet facilities.
- Areas in which exposure to coal tar pitch volatiles may occur should be identified by signs or other appropriate means, and access to these areas should be limited to authorized persons.

COMMON OPERATIONS AND CONTROLS

The following list includes some common operations in which exposure to coal tar pitch volatiles may occur and control methods which may be effective in each case:

Operation	Controls
Liberation from extraction and packaging from coal tar fraction of coking	Process enclosure; local exhaust ventilation; general dilution ventilation; personal protective equipment
Use as a binding agent in manufacture of coal briquettes used for fuel; use as a dielectric in the manufacture of battery electrodes, electric-arc furnace electrodes, and electrodes for alumina reduction	Process enclosure; local exhaust ventilation; general dilution ventilation; personal protective equipment
Use in manufacture of roofing felts and papers and roofing	Process enclosure; local exhaust ventilation; general dilution ventilation; personal protective equipment
Use for protective coatings for pipes for underground conduits and drainage; use as a coating on concrete as waterproofing and corrosion-resistant material; use in road paving and sealing	Process enclosure; local exhaust ventilation; general dilution ventilation; personal protective equipment
Use in manufacture and repair of refractory brick; use in production of foundry cores; use in manufacture of carbon ceramic items	Process enclosure; local exhaust ventilation; general dilution ventilation; personal protective equipment

EMERGENCY FIRST AID PROCEDURES

In the event of an emergency, institute first aid procedures and send for first aid or medical assistance.

- **Eye Exposure**

If condensed coal tar pitch volatiles get into the eyes, wash eyes immediately with large amounts of water, lifting the lower and upper lids occasionally. If irritation is present after washing, get medical attention. Contact lenses should not be worn when working with these chemicals.

- **Skin Exposure**

If condensed coal tar pitch volatiles get on the skin, wash the contaminated skin using soap or mild detergent and water. Be sure to wash the hands before eating or smoking and to wash thoroughly at the close of work.

- **Breathing**

If a person breathes in large amounts of coal tar pitch volatiles, move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. Get medical attention as soon as possible.

- **Rescue**

Move the affected person from the hazardous exposure. If the exposed person has been overcome, notify someone else and put into effect the established emergency rescue procedures. Do not become a casualty. Understand the facility's emergency rescue procedures and know the locations of rescue equipment before the need arises.

SPILL AND DISPOSAL PROCEDURES

- Persons not wearing protective equipment and clothing should be restricted from areas of releases until cleanup has been completed.
- If coal tar pitch volatiles are released in hazardous concentrations, the following steps should be taken:

1. Ventilate area of spill.

2. Collect released material in the most convenient and safe manner for reclamation or for disposal in sealed containers in a secured sanitary landfill.

- Waste disposal method:

Coal tar pitch volatiles may be disposed of in sealed containers in a secured sanitary landfill.

REFERENCES

- American Conference of Governmental Industrial Hygienists: "Coal Tar Pitch Volatiles," *Documentation of the Threshold Limit Values for Substances in Workroom Air* (3rd ed., 2nd printing), Cincinnati, 1974.
- Bingham, E.: "Environmental Carcinogens," *Archives of Environmental Health*, 19:779-85, DES 1969.
- Bingham, E.: "Thresholds in Cancer Inductions," *Archives of Environmental Health*, 22:692-95, June 1971.
- 'Coke Oven Emissions," *Federal Register*, 40:32268-32282, July 31, 1975.
- Committee on Biologic Effects of Atmospheric Pollutants, Division of Medical Sciences, National Research Council: *Particulate Polycyclic Organic Matter*, National Academy of Sciences, Washington, D.C., 1972.
- Fannick, N., et al.: "Exposure to Coal Tar Pitch Volatiles at Coke Ovens," *American Industrial Hygiene Association Journal*, 33:461-468, 1972.
- Grant, W. M.: *Toxicology of the Eye* (2nd ed.), C. C. Thomas, Springfield, Illinois, 1974.
- Hittle, D. C., and Stukel, J. J.: "Particle Size Distribution and Chemical Composition of Coal-Tar Fumes," *American Industrial Hygiene Association Journal*, 37:199-204, 1976.
- *Hygienic Information Guide No. 89 - Coal Tar Pitch Volatiles*, Commonwealth of Pennsylvania, Department of Environmental Resources, Bureau of Occupational Health, 1972.
- International Labour Office: *Encyclopedia of Occupational Health and Safety*, McGraw-Hill, New York, 1971.
- Lloyd, J. W.: "Long-Term Mortality Study of Steelworkers. V. Respiratory Cancer in Coke Plant Workers," *Journal of Occupational Medicine*, 13:53-68, 1971.
- Mazumdar, S., et al.: "An Epidemiological Study of Exposure to Coal Tar Pitch Volatiles among Coke Oven Workers," *Journal of the Air Pollution Control Association*, 25:382-389, 1975.
- National Institute for Occupational Safety and Health, U.S. Department of Health, Education, and Welfare: *Criteria for a Recommended Standard .... Occupational Exposure to Coal Tar Products.* HEW Publication No. (NIOSH) 78-107, U.S. Government Printing Office, Washington, D.C., 1977.
- National Institute for Occupational Safety and Health, U.S. Department of Health, Education, and Welfare: *Criteria for a Recommended Standard .... Occupational Exposure to Coke Oven Emissions.* HEW Publication No. HSM 73-11016, GPO No. 017-033-00015, U.S. Government Printing Office, Washington, D.C., 1973.
- Redmond, C. K., et al.: "Long-Term Mortality Study of Steelworkers. VI. Mortality from Malignant Neoplasms Among Coke Oven Workers," *Journal of Occupational Medicine*, 14:621-629, 1972.
- Scala, R. A.: "Toxicology of PPOM," *Journal of Occupational Medicine*, 17:784-788, 1975.
- Tye, R., and Stemmer, K. L.: "Experimental Carcinogenesis of the Lung. II. Influence of Phenols in the Production of Carcinoma," *Journal of the National Cancer Institute*, 39:175-179, 1967.

RESPIRATORY PROTECTION FOR COAL TAR PITCH VOLATILES

Condition	Minimum Respiratory Protection* Required Above 0.2 mg/m³
Particulate and Vapor Concentration	
2 mg/m³ or less	A chemical cartridge respirator with an organic vapor cartridge(s) and with a fume or high-efficiency filter. Any supplied-air respirator. Any self-contained breathing apparatus.
10 mg/m³ or less	A chemical cartridge respirator with a full facepiece and an organic vapor cartridge(s) and with a fume or high-efficiency filter. A gas mask with a chin-style or a front- or back-mounted organic vapor canister and with a full facepiece and a fume or high-efficiency filter. Any supplied-air respirator with a full facepiece, helmet, or hood. Any self-contained breathing apparatus with a full facepiece.
200 mg/m³ or less	A Type C supplied-air respirator operated in pressure-demand or other positive pressure or continuous-flow mode. A powered air-purifying respirator with an organic vapor cartridge and a high-efficiency particulate filter.
400 mg/m³ or less	A Type C supplied-air respirator with a full facepiece operated in pressure-demand or other positive pressure mode or with a full facepiece, helmet, or hood operated in continuous-flow mode.
Greater than 400 mg/m³ or entry and escape from unknown concentrations	Self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive pressure mode. A combination respirator which includes a Type C supplied-air respirator with a full facepiece operated in pressure-demand or other positive pressure or continuous-flow mode and an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive pressure mode.
Fire Fighting	Self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive pressure mode.
Escape	Any gas mask providing protection against organic vapors and particulates, including pesticide respirators which meet the requirements of this class. Any escape self-contained breathing apparatus.

*Only NIOSH-approved or MSHA-approved equipment should be used.

Occupational Health Guideline for Naphtha (Coal Tar)

INTRODUCTION

This guideline is intended as a source of information for employees, employers, physicians, industrial hygienists, and other occupational health professionals who may have a need for such information. It does not attempt to present all data; rather, it presents pertinent information and data in summary form.

SUBSTANCE IDENTIFICATION

- Formula: $C_7H_8 - C_8H_{10}$ (approximately)
- Synonyms: Naphtha, 49 degrees Be-coal tar type; crude solvent coal tar naphtha; high-solvent coal tar naphtha
- Appearance and odor: Reddish-brown, mobile liquid with an aromatic odor.

PERMISSIBLE EXPOSURE LIMIT (PEL)

The current OSHA standard for coal tar naphtha is 100 parts of coal tar naphtha per million parts of air (ppm) averaged over an eight-hour work shift. This may also be expressed as 400 milligrams of coal tar naphtha per cubic meter of air (mg/m^3).

HEALTH HAZARD INFORMATION

- **Routes of exposure**

Coal tar naphtha can affect the body if it is inhaled, comes in contact with the eyes or skin, or is swallowed.

- **Effects of overexposure**

1. Short-term Exposure: Overexposure to coal tar naphtha can cause lightheadedness, drowsiness, and unconsciousness. It also may cause mild irritation of the eyes, nose, and skin.

2. Long-term Exposure: Prolonged overexposure to coal tar naphtha may cause irritation of the skin.

3. Reporting Signs and Symptoms: A physician should be contacted if anyone develops any signs or symptoms and suspects that they are caused by exposure to coal tar naphtha.

- **Recommended medical surveillance**

The following medical procedures should be made available to each employee who is exposed to coal tar naphtha at potentially hazardous levels:

1. Initial Medical Screening: Employees should be screened for history of certain medical conditions (listed below) which might place the employee at increased risk from coal tar naphtha exposure.

—Skin disease: Coal tar naphtha is a defatting agent and can cause dermatitis on prolonged exposure. Persons with pre-existing skin disorders may be more susceptible to the effects of this agent.

—Liver disease: Although coal tar naphtha is not known as a liver toxin in humans, the importance of this organ in the biotransformation and detoxification of foreign substances should be considered before exposing persons with impaired liver function.

—Kidney disease: Although coal tar naphtha is not known as a kidney toxin in humans, the importance of this organ in the elimination of toxic substances justifies special consideration in those with impaired renal function.

—Chronic respiratory disease: In persons with impaired pulmonary function, especially those with obstructive airway diseases, the breathing of coal tar naphtha might cause exacerbation of symptoms due to its irritant properties.

2. Periodic Medical Examination: Any employee developing the above-listed conditions should be referred for further medical examination.

- **Summary of toxicology**

Coal tar naphtha vapor is narcotic. Rats survived continuous exposure at 3200 ppm for two months; at 1800 ppm some animals showed damage to the liver and kidneys; above 1000 ppm there was evidence of narcotic action. Rats exposed at 567 ppm and 312 ppm for 18 to 20 hours a day for 7 days had some reduction in blood leukocytes, possibly the result of the presence of benzene. There are few if any well documented reports of industrial injury resulting from the inhalation of

---

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service Centers for Disease Control
National Institute for Occupational Safety and Health

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

September 1978

naphtha. However, exposure to high concentrations might be expected to cause lightheadedness, drowsiness, and possibly irritation of the eyes, nose, and throat. Repeated or prolonged contact with the liquid may result in drying and cracking skin due to defatting action. Coal tar (naphtha) is a non-uniform mixture of aromatic hydrocarbons and may contain benzene.

CHEMICAL AND PHYSICAL PROPERTIES

- **Physical data**

1. Molecular weight: 110 (approximately)
2. Boiling point (760 mm Hg): 110 to 190 C (230 to 374 F)
3. Specific gravity (water = 1): 0.97
4. Vapor density (air = 1 at boiling point of coal tar naphtha): 3 (approximately)
5. Melting point: Data not available
6. Vapor pressure at 20 C (68 F): Less than 5 mm Hg
7. Solubility in water, g/100 g water at 20 C (68 F): Insoluble
8. Evaporation rate (butyl acetate = 1): Greater than 1

- **Reactivity**

1. Conditions contributing to instability: Heat
2. Incompatibilities: Contact with strong oxidizing agents may cause fires and explosions.
3. Hazardous decomposition products: Toxic gases and vapors (such as carbon monoxide) may be released in a fire involving coal tar naphtha.
4. Special precautions: Coal tar naphtha will attack some forms of plastics, rubber, and coatings.

- **Flammability**

1. Flash point: 38 to 43 C (100 to 109 F) (closed cup)
2. Autoignition temperature: 482 to 510 C (900 to 950 F)
3. Flammable limits in air, % by volume: Data not available
4. Extinguishant: Dry chemical, foam, carbon dioxide

- **Warning properties**

1. Odor Threshold: Since the odor thresholds of the main constituents of coal tar naphtha are below their permissible exposure limits, the odor threshold of coal tar naphtha is assumed to be below the permissible exposure limit.
2. Eye Irritation Level: According to Grant, Gafafer states that the naphthas cause conjunctival irritation. Two of the main constituents of coal tar naphtha, xylene and toluene, cause noticeable eye irritation at concentrations of 200 and 300 ppm, respectively.
3. Evaluation of Warning Properties: Since the odor threshold of the main constituents of coal tar naphtha are well below their permissible exposure limits, coal tar naphtha is treated as a material with adequate warning properties.

MONITORING AND MEASUREMENT PROCEDURES

- **General**

Measurements to determine employee exposure are best taken so that the average eight-hour exposure is based on a single eight-hour sample or on two four-hour samples. Several short-time interval samples (up to 30 minutes) may also be used to determine the average exposure level. Air samples should be taken in the employee's breathing zone (air that would most nearly represent that inhaled by the employee).

- **Method**

Sampling and analyses may be performed by collection of coal tar naphtha vapors using an adsorption tube with subsequent desorption with carbon disulfide and gas chromatographic analysis. Also, detector tubes certified by NIOSH under 42 CFR Part 84 or other direct-reading devices calibrated to measure coal tar naphtha may be used. An analytical method for coal tar naphtha is in the *NIOSH Manual of Analytical Methods*, 2nd Ed., Vol. 3, 1977, available from the Government Printing Office, Washington, D.C. 20402 (GPO No. 017-033-00261-4).
026).

RESPIRATORS

- Good industrial hygiene practices recommend that engineering controls be used to reduce environmental concentrations to the permissible exposure level. However, there are some exceptions where respirators may be used to control exposure. Respirators may be used when engineering and work practice controls are not technically feasible, when such controls are in the process of being installed, or when they fail and need to be supplemented. Respirators may also be used for operations which require entry into tanks or closed vessels, and in emergency situations. If the use of respirators is necessary, the only respirators permitted are those that have been approved by the Mine Safety and Health Administration (formerly Mining Enforcement and Safety Administration) or by the National Institute for Occupational Safety and Health.
- In addition to respirator selection, a complete respiratory protection program should be instituted which includes regular training, maintenance, inspection, cleaning, and evaluation.

PERSONAL PROTECTIVE EQUIPMENT

- Employees should be provided with and required to use impervious clothing, gloves, face shields (eight-inch minimum), and other appropriate protective clothing necessary to prevent repeated or prolonged skin contact with liquid coal tar naphtha.
- Clothing wet with liquid coal tar naphtha should be placed in closed containers for storage until it can be discarded or until provision is made for the removal of

coal tar naphtha from the clothing. If the clothing is to be laundered or otherwise cleaned to remove the coal tar naphtha, the person performing the operation should be informed of coal tar naphtha's hazardous properties.

- Non-impervious clothing which becomes wet with liquid coal tar naphtha should be removed promptly and not reworn until the coal tar naphtha is removed from the clothing.
- Employees should be provided with and required to use splash-proof safety goggles where liquid coal tar naphtha may contact the eyes.

SANITATION

- Skin that becomes wet with liquid coal tar naphtha should be promptly washed or showered with soap or mild detergent and water to remove any coal tar naphtha.

COMMON OPERATIONS AND CONTROLS

The following list includes some common operations in which exposure to coal tar naphtha may occur and control methods which may be effective in each case:

Operation	Controls
Use in preparation of coal-tar paints	Process enclosure; general dilution ventilation; personal protective equipment
Use in preparation of coumarone and indene	General dilution ventilation; personal protective equipment
Use as a solvent in rubber industry in manufacture of water-proof cloth, shoe adhesives, and rubber tires	Process enclosure; general dilution ventilation; local exhaust ventilation; personal protective equipment
Use as a solvent, diluent, or thinner in paint, varnish, and lacquer industries	General dilution ventilation; local exhaust ventilation; personal protective equipment
Use in formulations of nitrocellulose and ethylcellulose	General dilution ventilation; local exhaust ventilation; personal protective equipment
Use as a solvent for polymerized styrol, short-oil phenolic varnishes, urea, resins, melamine, and other synthetic resins; use as a solvent for pesticides as DDT and Gammexane	General dilution ventilation; local exhaust ventilation; personal protective equipment

EMERGENCY FIRST AID PROCEDURES

In the event of an emergency, institute first aid procedures and send for first aid or medical assistance.

- **Eye Exposure**

If coal tar naphtha gets into the eyes, wash eyes immediately with large amounts of water, lifting the lower and upper lids occasionally. If irritation persists after washing, get medical attention. Contact lenses should not be worn when working with this chemical.

- **Skin Exposure**

If coal tar naphtha gets on the skin, promptly wash the contaminated skin using soap or mild detergent. If coal tar naphtha soaks through the clothing, remove the clothing immediately and wash the skin using soap or mild detergent. If irritation persists after washing, get medical attention.

- **Breathing**

If a person breathes in large amounts of coal tar naphtha, move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. Get medical attention as soon as possible.

- **Swallowing**

If coal tar naphtha has been swallowed, do not induce vomiting. Get medical attention immediately.

- **Rescue**

Move the affected person from the hazardous exposure. If the exposed person has been overcome, notify someone else and put into effect the established emergency rescue procedures. Do not become a casualty. Understand the facility's emergency rescue procedures and know the locations of rescue equipment before the need arises.

SPILL, LEAK, AND DISPOSAL PROCEDURES

- Persons not wearing protective equipment and clothing should be restricted from areas of spills or leaks until cleanup has been completed.
- If coal tar naphtha is spilled or leaked, the following steps should be taken:

1. Remove all ignition sources.
2. Ventilate area of spill or leak.
3. For small quantities, absorb on paper towels. Evaporate in a safe place (such as a fume hood). Allow sufficient time for evaporating vapors to completely

clear the hood ductwork. Burn the paper in a suitable location away from combustible materials. Large quantities can be collected and atomized in a suitable combustion chamber. Coal tar naphtha should not be allowed to enter a confined space, such as a sewer, because of the possibility of an explosion.

- Waste disposal methods:

Coal tar naphtha may be disposed of:

1. By absorbing it in vermiculite, dry sand, earth or a similar material and disposing in a secured sanitary landfill.
2. By atomizing in a suitable combustion chamber.

REFERENCES

- American Conference of Governmental Industrial Hygienists: "Naphtha (Coal Tar)," *Documentation of the Threshold Limit Values for Substances in Workroom Air* (3rd ed., 2nd printing), Cincinnati, 1974.
- American Industrial Hygiene Association: "Benzene." *Hygienic Guide Series*, Detroit, Michigan, 1970.
- American Industrial Hygiene Association: "Ethyl Benzene." *Hygienic Guide Series*, Detroit, Michigan, 1969.
- American Industrial Hygiene Association: "Petroleum Naphtha." *Hygienic Guide Series*, Detroit, Michigan, 1963.
- American Industrial Hygiene Association: "Toluene." *Hygienic Guide Series*, Detroit, Michigan, 1964.
- American Industrial Hygiene Association: "Xylene." *Hygienic Guide Series*, Detroit, Michigan, 1971.
- Browning, E.: *Toxicity and Metabolism of Industrial Solvents*, Elsevier, New York, 1965.
- Grant, W. M.: *Toxicology of the Eye* (2nd ed.), C. C. Thomas, Springfield, Illinois, 1974.
- Sax, N. I.: *Dangerous Properties of Industrial Materials* (3rd ed.), Van Nostrand Reinhold, New York, 1968.

RESPIRATORY PROTECTION FOR NAPHTHA (COAL TAR)

Condition	Minimum Respiratory Protection* Required Above 100 ppm
Vapor Concentration	
1000 ppm or less	A chemical cartridge respirator with a full facepiece and an organic vapor cartridge(s).
5000 ppm or less	A gas mask with a chin-style or a front- or back-mounted organic vapor canister. Any supplied-air respirator with a full facepiece, helmet, or hood. Any self-contained breathing apparatus with a full facepiece.
10,000 ppm or less	A Type C supplied-air respirator with a full facepiece operated in pressure-demand or other positive pressure mode or with a full facepiece, helmet, or hood operated in continuous-flow mode.
Greater than 10,000 ppm or entry and escape from unknown concentrations	Self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive pressure mode. A combination respirator which includes a Type C supplied-air respirator with a full facepiece operated in pressure-demand or other positive pressure or continuous-flow mode and an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive pressure mode.
Fire Fighting	Self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive pressure mode.
Escape	Any gas mask providing protection against organic vapors. Any escape self-contained breathing apparatus.

*Only NIOSH-approved or MSHA-approved equipment should be used.

Material Safety Data Sheet

from Genium's Reference Collection
Genium Publishing Corporation
1145 Catalyn Street
Schenectady, NY 12303-1836 USA
(518) 377-8855

GENIUM PUBLISHING CORP.

No. 351

STYRENE MONOMER

(Revision C)
Issued: August 1979
Revised: November 1988

SECTION 1. MATERIAL IDENTIFICATION

27

Material Name: STYRENE MONOMER

Description (Origin/Uses): Used widely in making polystyrene plastics, protective coatings, styrenated polyesters, copolymer resins, and as a chemical intermediate. Styrene-butadiene rubber (SBR) is the most extensively used type of synthetic rubber.

Other Designations: Phenyl Ethylene; Vinyl Benzene; Cinnamene; Ethylenylbenzene; Styrol; $C_6H_5CH{=}CH_2$; CAS No. 0100-42-5

Manufacturer: Contact your supplier or distributor. Consult the latest edition of the *Chemicalweek Buyers' Guide* (Genium ref. 73) for a list of suppliers.

HMIS			
H	2	R	1
F	3	I	3
R	2	S	2
PPG*		K	0

*See sect. 8

SECTION 2. INGREDIENTS AND HAZARDS

SECTION 2. INGREDIENTS AND HAZARDS	%	EXPOSURE LIMITS
Styrene, CAS No. 0100-42-5 *This material can be absorbed through intact skin, which contributes to overall exposure. **See NIOSH, *RTECS* (WL3675000), for additional data with references to reproductive, mutagenic, tumorigenic, and irritative effects.	Ca 100	**OSHA PELs** 8-Hr TWA: 50 ppm, 215 mg/m^3 15-Min STEL: 100 ppm, 425 mg/m^3 **ACGIH TLVs (Skin*), 1988-89** TLV-TWA: 50 ppm, 215 mg/m^3 TLV-STEL: 100 ppm, 425 mg/m^3 **Toxicity Data**** Human, Inhalation, LC_{Lo}: 10000 ppm (30 Mins) Human, Inhalation, TC_{Lo}: 600 ppm

SECTION 3. PHYSICAL DATA

Boiling Point: 293°F (145°C)
Melting Point: -23.08°F (-30.6°C)
Vapor Density (Air = 1): 3.6
Vapor Pressure: 4.3 Torrs at 59°F (15°C) and 10 Torrs at 87.44°F (30.8°C)
Evaporation Rate (n-Butylacetate = 1): 0.5
Molecular Weight: 104 Grams/Mole
Solubility in Water (%): Slight
Specific Gravity (H_2O = 1): 0.9059 at 68°F (20°C)
% Volatile by Volume: Ca 100

Appearance and Odor: A colorless-to-yellow, oily liquid; sweet, pleasant aromatic odor at low concentrations and unpleasant odor at high concentrations. The odor recognition threshold (100% of test panel, unfatigued) is 0.15 ppm in air.

SECTION 4. FIRE AND EXPLOSION DATA

Flash Point and Method: 88°F (31°C) CC	Autoignition Temperature: 914°F (490°C)	LEL: 1.1% v/v	UEL: 6.1% v/v

Extinguishing Media: Use foam, dry chemical, or carbon dioxide. Use water spray to cool fire-exposed containers, to disperse the styrene vapor, and to protect personnel who are attempting to stop a styrene leak. In the case of large fires the fire-fighting should be done from a distance or from a remote, explosion-proof position. **Unusual Fire or Explosion Hazards:** Styrene vapor is heavier than air and may travel a considerable distance to a low-lying source of ignition and flash back to its origin. Violent polymerization inside heated containers of styrene can occur at elevated temperatures; explosive rupturing of these containers is possible. Styrene vapor is uninhibited and can form polymers that will block the vents or flame arresters of storage tanks. **Special Fire-fighting Procedures:** Wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in the pressure-demand or positive-pressure mode.

SECTION 5. REACTIVITY DATA

Stability/Polymerization: Styrene is stable in closed containers during routine operations. Hazardous polymerization can occur if the inhibitor fails or if the styrene monomer is exposed to excessive heat, light, or catalytic materials such as peroxides and strong acids. **Chemical Incompatibilities:** Styrene reacts dangerously with oxidizing materials such as chlorosulfonic acid, oleum, and sulfuric acid. Additionally, it can self-polymerize if the inhibitor becomes depleted, is removed, or is otherwise rendered ineffective. **Conditions to Avoid:** Avoid any exposure to sources of ignition and to incompatible chemicals, especially catalytic materials that can initiate or promote hazardous polymerization. **Hazardous Products of Decomposition:** Toxic gases such as carbon monoxide are formed by the thermal-oxidative decomposition of styrene during fires.

SECTION 6. HEALTH HAZARD INFORMATION

Carcinogenicity: Styrene is not listed as a carcinogen by the NTP, IARC, or OSHA. Some studies indicate that styrene may be mutagenic and teratogenic. **Summary of Risks:** Workers exposed to styrene vapor at 200 to 700 ppm experienced drowsiness, nausea, headache, fatigue, dizziness, and possibly a metallic taste in their mouths. Exposures above 800 ppm are immediately irritating to the eyes, nose, and the respiratory system. Repeated or prolonged skin contact with liquid styrene can cause defatting, dermatitis, and irritation. Excessive exposure through inhalation can cause narcotic effects and even death. A death has been reported from a 30-minute exposure at 10000 ppm. "Styrene sickness" has been described with symptoms of nausea, vomiting, and an intoxicated sensation. **Medical Conditions Aggravated by Long-Term Exposure:** None reported. **Target Organs:** Skin, eyes, respiratory system, and the central nervous sytem (CNS). **Primary Entry:** Inhalation, skin contact and absorption. **Acute Effects:** Skin and eye irritation; depression of the CNS symptomized by drowsiness,

SECTION 6. HEALTH HAZARD INFORMATION, cont.

unsteady gait, weakness, and loss of coordination. **Chronic Effects:** None reported. **FIRST AID: Eyes.** Immediately flush eyes, including under the eyelids, gently but thoroughly with flooding amounts of running water for at least 15 minutes. **Skin.** Rinse the affected area with flooding amounts of water and then wash it with soap and water. If large skin areas are involved, continue to carefully monitor the exposed person for signs of developing depression of the CNS, because liquid styrene can penetrate intact skin rapidly by absorption. **Inhalation.** Remove the exposed person to fresh air; restore and/or support his or her breathing as needed. Have qualified medical personnel administer oxygen as required. **Ingestion.** Unlikely. Should this type of exposure occur, slowly give the exposed person 4 to 8 glasses of milk or water to dilute the material, but do *not* induce vomiting. Never give anything by mouth to someone who is unconscious or convulsing. **Get medical help (in plant, paramedic, community) for all exposures.** Seek prompt medical assistance for further treatment, observation, and support after first aid. **Note to Physician:** Treat CNS effects symptomatically. Styrene is excreted as hippuric acid; urine levels of this metabolite can be useful in determining the level of exposure to the styrene.

SECTION 7. SPILL, LEAK, AND DISPOSAL PROCEDURES

Spill/Leak: Notify safety personnel, evacuate unnecessary personnel, eliminate all sources of ignition immediately, and provide adequate ventilation. Cleanup personnel need protection against skin or eye contact with this liquid as well as inhalation of its vapor (see sect. 8). Contain large spills and collect waste or absorb it with an inert material such as sand, earth, or vermiculite. Use nonsparking tools to place waste liquid or absorbent into closable containers for disposal. Keep waste out of sewers, watersheds, and waterways. **Waste Disposal:** Dispose of contaminated styrene promptly; do not store contaminated liquid styrene for any length of time. Reclamation of spilled liquid styrene is not recommended; its reactivity and the possibility of contaminant-induced polymerization make reclamation unattractive. Contact your supplier or a licensed contractor for detailed recommendations. Follow Federal, state, and local regulations.

OSHA Designations
Listed as an Air Contaminant (29 CFR 1910.1000 Subpart Z).
EPA Designations (40 CFR 302.4)
CERCLA Hazardous Substance, Reportable Quantity: 1000 lbs (454 kg), per the Clean Water Act (CWA), § 311 (b) (4).

SECTION 8. SPECIAL PROTECTION INFORMATION

Goggles: Always wear protective eyeglasses or chemical safety goggles. Where splashing is possible, wear a full face shield. Follow OSHA eye- and face-protection regulations (29 CFR 1910.133). **Respirator:** Use a NIOSH-approved respirator per Genium reference 88 for the maximum-use concentrations and/or the exposure limits cited in section 2. Follow OSHA respirator regulations (29 CFR 1910.134). For emergency or nonroutine operations (spills or cleaning reactor vessels and storage tanks), wear an SCBA. **Warning:** Air-purifying respirators will *not* protect workers in oxygen-deficient atmospheres. **Other:** Wear impervious gloves, boots, aprons, and gauntlets, etc., to prevent prolonged or repeated skin contact with this material. **Ventilation:** Install and operate general and local maximum, explosion-proof ventilation systems powerful enough to maintain airborne levels of this material below the OSHA PEL standard cited in section 2. Local exhaust ventilation is preferred because it prevents dispersion of the contaminant into the general work area by eliminating it at its source. Consult the latest edition of Genium reference 103 for detailed recommendations. **Safety Stations:** Make emergency eyewash stations, safety/quick-drench showers, and washing facilities available in work areas. **Contaminated Equipment:** Contact lenses pose a special hazard; soft lenses may absorb irritants, and all lenses concentrate them. Do *not* wear contact lenses in any work area. Remove contaminated clothing and launder it before wearing it again; clean this material from your shoes and equipment. **Comments:** Practice good personal hygiene; always wash thoroughly after using this material and before eating, drinking, smoking, using the toilet, or applying cosmetics. Keep it off your clothing and equipment. Avoid transferring it from your hands to your mouth while eating, drinking, or smoking. Do *not* eat, drink, or smoke in any work area. Do not inhale its vapor.

SECTION 9. SPECIAL PRECAUTIONS AND COMMENTS

Storage/Segregation: Store styrene in closed containers in a cool, dry, well-ventilated area away from sources of ignition and strong oxidizers. Keep them out of direct sunlight. Protect containers from physical damage. Outside, isolated, or detached storage is recommended. **Special Handling/Storage:** Contamination of storage facilities, especially with polymerization initiators, must not occur. Store styrene in its original containers and remove from the storage area only the amount that is immediately needed. Control inventory carefully. Prolonged storage is strongly discouraged, and a first-in, first-out rotation system may be useful for proper stock rotation requirements. Check the styrene at least weekly to determine the inhibitor and polymer content if the material is being stored for any period of time in excess of 30 days at 90°F (32°C). Large tanks of styrene should be stored under a nitrogen blanket. **Engineering Controls:** Make sure all engineering systems (production, transportation) are of maximum explosion-proof design. Ground and bond all containers and pipelines, etc., used in shipping, transferring, reacting, production, and sampling operations to prevent static sparks. **Other:** Inhibited styrene can polymerize from frictional heat in a running centrifugal pump if the flow of the liquid is stopped.

Transportation Data (49 CFR 172.101-2)

DOT Shipping Name: Styrene Monomer, Inhibited
DOT Hazard Class: Flammable Liquid
ID No. UN2055
DOT Label: Flammable Liquid
DOT Packaging Exceptions: 49 CFR 173.118

IMO Shipping Name: Styrene Monomer, Inhibited
IMO Label: Flammable Liquid
IMO Hazard Class: 3.3
IMDG Packaging Group: II

References: 1, 38, 84-94, 100, 116, 117, 120, 122.

Prepared by PJ Igoe, BS

Industrial Hygiene Review: DJ Wilson, CIH

Medical Review: MJ Hardies, MD

MATERIAL SAFETY DATA SHEET

GENIUM PUBLISHING CORPORATION
1145 CATALYN ST., SCHENECTADY, NY 12303 USA (518) 377-8854

From Genium's MSDS Collection, to be used as a reference.

MSDS # 355

PHENOL (Revision B)

Issued: September, 1980
Revised: September, 1985

SECTION 1. MATERIAL IDENTIFICATION

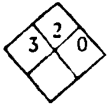
1⁻

MATERIAL NAME: PHENOL

OTHER DESIGNATIONS: Carbolic Acid, Hydrobenzene, Oxybenzene, Phenic acid, Phenyl Hydrate, Phenyl hydroxide, Phenylic acid, Phenyl alcohol, CAS #000 108 952, C_6H_5OH

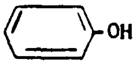
MANUFACTURER/SUPPLIER: Available from many suppliers, including;

Dow Chemical USA
2020 Dow Center
Midland MI 48640 (517) 636-1000



SECTION 2. INGREDIENTS AND HAZARDS

SECTION 2. INGREDIENTS AND HAZARDS	%	HAZARD DATA
PHENOL	ca 100	8 hr TWA: 5 ppm, 19 mg/m^3 (Skin) STEL: 10 ppm, 38 mg/m^{3*}
		Human, Oral LDLo: 140 mg/kg
		Rat, oral LDLo: 414 mg/kg
		Rat, skin LD50: 669 mg/kg



* Current OSHA PEL and ACGIH TLV/STEL (1984-85) (Skin) notation indicates a potential contribution to overall exposure via absorption through the skin.

NIOSH recommends a 10 hr. TWA of 20 mg/m^3 with a ceiling of 60 mg/m^3 for any 15 minute period.

SECTION 3. PHYSICAL DATA

Boiling Point @ 1 atm .... 359.4°F (181.9°C)
Vapor pressure @ 25°C 0.35
Vapor density (Air=1) 3.24
Solubility in water (% by wt.) ... 8.4 @ 20°C
(Sol. in all proportion @ temp. >66°C)

APPEARANCE & ODOR: White crystalline solid with a characteristic sharp medicinal sweet, tangy odor which is detectable above 0.05 ppm. Phenol turns pink or red if it contains impurities or if it is exposed to heat or light.

Specific Gravity (H_2O=1):
Solid: 1.017 @ 25/4°C
Liquid: 1.0576 @ 41/4°C
Melting point .... 109.4°F (43°C)
Volatiles, % by vol @ 20°C .. ca 100
Evaporation rate (BuAc=1) ... <0.03
Viscosity, CPS, @ 80°C 1.51
Molecular weight 94.12

SECTION 4. FIRE AND EXPLOSION DATA

Flash Point and Method	Autoignition Temp.	Flammability Limits in Air	Lower	Upper
175°F (79°C) C.C.	1319°F (715°C)	% by volume	1.5	8.6

EXTINGUISHING MEDIA: Carbon dioxide, dry chemical, or alcohol type foam. Do not use a solid stream of water since the stream will scatter and spread the fire. Use water spray to cool fire-exposed tanks/containers. Phenol presents a moderate fire hazard when exposed to heat, flame, or oxidizers. When heated, it remits toxic fumes and vapors which will form explosive mixtures with air. Solid phenol burns with difficulty, giving off a heavy smoke.

Firefighters should wear self-contained breathing apparatus and full protective clothing when fighting fires involving phenol. NOTE: Water containing phenol can cause severe chemical burns.

SECTION 5. REACTIVITY DATA

This material is stable at room temperature under normal handling and storage conditions. It does not undergo hazardous polymerization. Phenol is incompatible with strong oxidizing agents and halogens. Reaction with calcium hypochlorite is exothermic and produces toxic fumes which may ignite. Hot phenol is corrosive to many metals, including aluminum, lead, magnesium, and zinc. Reaction with these materials causes phenol to become discolored. Do not heat phenol above 122°F (90°C).

Thermal decomposition or burning produces oxides of carbon and water.

Revised 9/85

MSDS # 355 Issued 9/80 PHENOL (Rev. B)

SECTION 6. HEALTH HAZARD INFORMATION

TLV 5 ppm or 19 mg/m^3 (Skin)

Phenol is a general protoplasmic poison which is corrosive to body tissue. Poisoning can occur via skin absorption, vapor inhalation, or ingestion. Vapors of phenol are irritating to the eyes, nose, and throat. The liquid is rapidly absorbed through the skin. Contact with the skin causes a white wrinkled discoloration followed by a severe burn or systemic poisoning if not properly removed. Intense burning and pain from skin contact may be delayed. Absorption of phenol through skin may cause sudden collapse, or death. Symptoms develop rapidly. When ingested, phenol causes burning of the gastrointestinal tract, and blotches on the lips and in the mouth. Headache, nausea, dizziness, dyspnea, shock, convulsions, and death may follow exposures by any route. Chronic exposure to low concentrations of phenol may cause digestive disturbances, nervous disorders, skin eruptions, and death due to liver and kidney damage. The TLV is set to prevent systemic poisoning.

FIRST AID: EYE CONTACT: Immediately flush eyes, including under eyelids, with copious amounts of running water for at least 30 minutes. Get medical attention! (Inplant, community, paramedic). SKIN CONTACT: Immediately flush skin for at least 30 minutes while removing contaminated clothing and shoes. Get medical attention! INHALATION: Remove victim to fresh air. Restore and/or support breathing as necessary. Keep person warm and quiet. Transport to a medical facility. INGESTION: Give victim large quantities of milk or water as quickly as possible. Induce vomiting by touching back of throat with finger. Do not give fluids or induce vomiting if victim is unconscious or is having convulsions. Contact a physician or Poison Control Center and transport to a medical facility.

SECTION 7. SPILL, LEAK AND DISPOSAL PROCEDURES

Notify safety personnel of spills or leaks. Remove all sources of heat and ignition. Provide maximum explosion-proof ventilation. Evacuate all personnel from area, except for those involved in clean-up. Close the leak immediately, if possible. Absorb small spills on paper, vermiculite or other absorbent and place in a closed metal container for disposal. Dike large spills and allow material to cool and solidify. Shovel solid into steel containers for disposal. Flush spill area thoroughly with water and collect flushings and wash water for disposal. Do not allow phenol to enter sewer, watersheds, or waterways! Notify proper authorities including the National Response Center (800-424-8802). Clean-up personnel must wear a self-contained breathing apparatus and full personal protective clothing and equipment. DISPOSAL: Burn contaminated waste in an approved incinerator. Phenol may be recovered by charcoal absorption, solvent extraction or steam stripping. A concentration of 1% by weight is required for economical recovery. Phenol is water soluble and is amenable to biological or chemical oxidation. Solutions can be chemically oxidized by chlorine, chlorine dioxide, or other oxidants. Phenol content of water supply not to exceed 0.001 mg/L. (DO NOT flush phenol down drains.) RCRA Hazardous Waste # U188 Reportable Spill Quantity ... 1000 lbs.

SECTION 8. SPECIAL PROTECTION INFORMATION

Provide general and local exhaust ventilation (explosion-proof) to meet TLV requirements. When phenol is heated, vapor inhalation can be a serious hazard without proper precaution. For emergency or nonroutine exposures where the TLV may be exceeded, use an appropriate NIOSH-approved full face respirator. Fume hoods should maintain a minimum face velocity of 100 lfm. All electrical service in use or storage areas should have an explosion-proof design.

DANGER! Avoid any contact with this material. Full protective equipment, including splash goggles, faceshield, impervious gloves, apron, boots, impervious shirt and trousers, hard hat with brim, acid suit and respirator should be available and worn as appropriate. Remove contaminated clothing immediately and do not reuse until it has been properly laundered.

Eyewash stations and safety showers should be readily available in use and handling areas.

Contact lenses pose a special hazard; soft lenses may absorb and all lenses concentrate irritants.

SECTION 9. SPECIAL PRECAUTIONS AND COMMENTS

Store in closed containers in a cool, dry, well-ventilated area away from heated surfaces, open flame and ignition sources. Outside or detached storage is preferred. Protect containers from physical damage.

Phenol is a very dangerous compound. Do not breathe vapor or allow liquid to come in contact with the skin. Wear appropriate protective equipment and remove contaminated clothing immediately. Use extreme caution when transporting phenol to prevent leaks. Vent containers before heating and do not heat above 140°F (60°C). Do not eat or smoke in areas where this material is being used or handled. Do not allow employees who have diseases of the central nervous system, liver, kidney, or lungs to work in area of phenol exposure. Provide preplacement and periodic medical exams to employees working with phenol. Do not allow untrained workers to handle this material (see also ASTM D2286-Sampling and Handling Phenol).

ICC & DOT - Class B Poison. LABEL: POISON

DATA SOURCE(S) CODE (See Glossary) 2-12, 15, 19, 23-24, 31, 34, 37, 38, 59, 79, R.

APPROVALS	11/85
INDUST. HYGIENE/SAFETY	11-85
MEDICAL REVIEW:	Dec 85

Material Safety Data Sheet

from Genium's Reference Collection
Genium Publishing Corporation
1145 Catalyn Street
Schenectady, NY 12303-1836 USA
(518) 377-8855

GENIUM PUBLISHING CORP.

No. 385

ETHYL BENZENE
(Revision A)
Issued: August 1978
Revised: November 1988

SECTION 1. MATERIAL IDENTIFICATION 27

Material Name: ETHYL BENZENE

Description (Origin/Uses): Used as a solvent and as an intermediate in the production of styrene monomer.

Other Designations: Phenylethane; Ethylbenzol; $C_2H_5C_6H_5$; CAS No. 0100-41-4

Manufacturer: Contact your supplier or distributor. Consult the latest edition of the *Chemicalweek Buyers' Guide* (Genium ref. 73) for a list of suppliers.

3
2 0
-
NFPA

HMIS
H 2
F 3
R 0
PPG*
*See sect. 8

R 1
I 3
S 2
K 4

SECTION 2. INGREDIENTS AND HAZARDS	%	EXPOSURE LIMITS
Ethyl Benzene, CAS No. 0100-41-4 *See NIOSH, *RTECS* (DA0700000), for additional data with references to reproductive, irritative, and mutagenic effects.	Ca 100	**OSHA PELs** 8-Hr TWA: 100 ppm, 435 mg/m^3 15- Min STEL: 125 ppm, 545 mg/m^3 **ACGIH TLVs, 1988-89** TLV-TWA: 100 ppm, 435 mg/m^3 TLV-STEL: 125 ppm, 545 mg/m^3 **Toxicity Data*** Human, Inhalation, TC_{Lo}: 100 ppm (8 Hrs) Rat, Oral, LD_{50}: 3500 mg/kg

SECTION 3. PHYSICAL DATA

Boiling Point: 277°F (136°C)
Melting Point: -139°F (-95°C)
Vapor Pressure: 7.1 Torrs at 68°F (20°C)
Vapor Density (Air = 1): 3.7
% Volatile by Volume: Ca 100

Molecular Weight: 106 Grams/Mole
Solubility in Water (%): Slight
Specific Gravity (H_2O = 1): 0.86258 at 77°F (25°C)

Appearance and Odor: A clear, colorless, flammable liquid; characteristic aromatic hydrocarbon odor.

SECTION 4. FIRE AND EXPLOSION DATA

Flash Point and Method: 64°F (18°C) CC	Autoignition Temperature: 810°F (432.22°C)	LEL: 1% v/v	UEL: 6.7% v/v

Extinguishing Media: Use foam, dry chemical, or carbon dioxide to put out ethyl benzene fires. A water spray may be ineffective in extinguishing the fire, because it can scatter and spread the burning liquid. Use water spray to cool fire-exposed containers of ethyl benzene, to disperse ethyl benzene vapor, and to protect personnel attempting to stop an ethyl benzene leak. **Unusual Fire or Explosion Hazards:** This liquid can readily form explosive vapor-air mixtures, especially when heated. Ethyl benzene vapor is heavier than air and may travel a considerable distance to a low-lying source of ignition and flash back to its origin. **Special Fire-fighting Procedures:** Wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in the pressure-demand or positive-pressure mode.

SECTION 5. REACTIVITY DATA

Stability/Polymerization: Ethyl benzene is stable in closed containers during routine operations. Hazardous polymerization cannot occur. **Chemical Incompatibilities:** Hazardous chemical reactions can occur between ethyl benzene and strong oxidizing agents, acids, ammonia, and bases. **Conditions to Avoid:** Avoid any exposure to sources of ignition such as heat, sparks, open flame, and lighted tobacco products, etc., and to incompatible chemicals. Use caution when entering confined spaces, particularly low-lying areas where explosive concentrations of ethyl benzene vapor may be present. Provide good ventilation to such areas to prevent the concentration of this vapor. **Hazardous Products of Decomposition:** Thermal-oxidative degradation can include toxic gases such as carbon monoxide and/or aromatic hydrocarbon gases.

SECTION 6. HEALTH HAZARD INFORMATION

Carcinogenicity: Ethyl benzene is not listed as a carcinogen by the NTP, IARC, or OSHA.
Summary of Risks: Ethyl benzene vapor is severely irritating to the eyes and to the mucous membranes of the respiratory system. Sustained inhalation of excessive levels can cause depression of the central nervous system (CNS) characterized by dizziness, headache, narcosis, and coma. Skin contact with liquid ethyl benzene causes irritation; dermatitis and defatting can also develop. The acute oral toxicity of ethyl benzene is low; however, ingestion of it presents a serious aspiration hazard. Aspirating even a small amount into the lungs can result in extensive edema (lungs filled with fluid) and hemorrhaging of the lung tissue. No systemic effects are expected at the levels that produce pronounced, unignorable, disagreeable skin and eye irritation. The TLVs cited in section 2 are set to prevent this intolerable irritation. **Medical Conditions Aggravated by Long-Term Exposure:** None reported. **Target Organs:** Skin, eyes, respiratory system, and CNS. **Primary Entry:** Inhalation, skin contact **Acute Effects:** Irritation of the skin, eyes, and respiratory system. Also, cardiac-rhythm disturbance due to sensitization; acute bronchitis, bronchospasm, pulmonary and laryngeal edema; euphoria; headache; giddiness; dizziness; and incoordination, as well as possible depression; confusion; and coma. **Chronic Effects:** None reported. **First Aid:** Eyes. Immediately

SECTION 6. HEALTH HAZARD INFORMATION, cont.

flush eyes, including under the eyelids, gently but thoroughly with flooding amounts of running water for at least 15 minutes. **Skin.** Rinse the affected area with plenty of water, then wash it with soap and water. **Inhalation.** Remove the exposed person to fresh air; restore and/or support his or her breathing as needed. Have qualified medical personnel administer oxygen as required. **Ingestion.** Unlikely. Should this type of exposure occur, the aspiration hazard must be considered. Do not induce vomiting unless directed to do so by a physician. To prevent aspiration by spontaneous vomiting, keep the victim's head low (between his or her knees). **Get medical help (in plant, paramedic, community) for all exposures.** Seek prompt medical assistance for further treatment, observation, and support after first aid. **Note to Physician:** Professional judgment is required as to whether or not to induce vomiting because of the possibility of aspiration. A gastric lavage may be administered, followed by saline catharsis, if this procedure is appropriate to the specific incident. Monitor cardiac and pulmonary functions.

SECTION 7. SPILL, LEAK, AND DISPOSAL PROCEDURES

Spill/Leak: Notify safety personnel, evacuate unnecessary personnel, eliminate all sources of ignition immediately, and provide adequate explosion-proof ventilation. Cleanup personnel need protection against skin or eye contact with this liquid as well as inhalation of its vapor (see sect. 8). Contain large spills and collect waste or absorb it with an inert material such as sand, earth, or vermiculite. Use nonsparking tools to place waste liquid or absorbent into closable containers for disposal. Keep waste out of sewers, watersheds, and waterways. **Waste Disposal:** Contact your supplier or a licensed contractor for detailed recommendations. Follow Federal, state, and local regulations.

OSHA Designations

Listed as an Air Contaminant (29 CFR 1910.1000 Subpart Z).

EPA Designations (40 CFR 302.4)

CERCLA Hazardous Substance, Reportable Quantity: 1000 lbs (454 kg), per the Clean Water Act (CWA), §§ 311 (b) (4) and 307 (a).

SECTION 8. SPECIAL PROTECTION INFORMATION

Goggles: Always wear protective eyeglasses or chemical safety goggles. Where splashing is possible, wear a full face shield. Follow OSHA eye- and face-protection regulations (29 CFR 1910.133). **Respirator:** Wear a NIOSH-approved respirator per Genium reference 88 for the maximum-use concentrations and/or the exposure limits cited in section 2. Follow OSHA respirator regulations (29 CFR 1910.134). For emergency or nonroutine operations (spills or cleaning reactor vessels and storage tanks), wear an SCBA. **Warning:** Air-purifying respirators will *not* protect workers in oxygen-deficient atmospheres. **Other:** Wear impervious gloves, boots, aprons, and gauntlets, etc., to prevent prolonged or repeated skin contact with this material. **Ventilation:** Install and operate general and local maximum, explosion-proof ventilation systems powerful enough to maintain airborne levels of this material below the OSHA PEL standard cited in section 2. Local exhaust ventilation is preferred because it prevents dispersion of the contaminant into the general work area by eliminating it at its source. Consult the latest edition of Genium reference 103 for detailed recommendations. **Safety Stations:** Make emergency eyewash stations, safety/quick-drench showers, and washing facilities available in work areas. **Contaminated Equipment:** Contact lenses pose a special hazard; soft lenses may absorb irritants, and all lenses concentrate them. Do *not* wear contact lenses in any work area. Remove contaminated clothing and launder it before wearing it again; clean this material from shoes and equipment. **Comments:** Practice good personal hygiene; always wash thoroughly after using this material and before eating, drinking, smoking, using the toilet, or applying cosmetics. Keep it off your clothing and equipment. Avoid transferring it from your hands to your mouth while eating, drinking, or smoking. Do *not* eat, drink, or smoke in any work area. Do not inhale ethyl benzene vapor.

SECTION 9. SPECIAL PRECAUTIONS AND COMMENTS

Storage/Segregation: Store ethyl benzene in closed containers in a cool, dry, well-ventilated area away from sources of ignition and strong oxidizers. Protect containers from physical damage. **Special Handling/Storage:** Outside, isolated, detached, or remote storage is recommended for large quantities of ethyl benzene. Isolate bulk storage areas from acute fire hazards. **Engineering Controls:** Make sure all engineering systems (production, transportation) are of maximum explosion-proof design. To prevent static sparks, electrically ground and bond all containers, pipelines, etc., used in shipping, transferring, reacting, production, and sampling operations. **Other:** Use safety cans for transferring small amounts of ethyl benzene.

Transportation Data (49 CFR 172.101-2)

DOT Shipping Name: Ethyl Benzene
DOT Hazard Class: Flammable Liquid
ID No. UN1175
DOT Label: Flammable Liquid
DOT Packaging Exceptions: 49 CFR 173.118
DOT Packaging Requirements: 49 CFR 173.119

IMO Shipping Name: Ethylbenzene
IMO Hazard Class: 3.2
IMO Label: Flammable Liquid
IMDG Packaging Group: II

References: 1, 26, 38, 84-94, 100, 116, 117, 120, 122.

Prepared by PJ Igoe, BS

Industrial Hygiene Review: DJ Wilson, CIH

Medical Review: W Silverman, MD

Material Safety Data Sheet

From Genium's Reference Collection

Genium Publishing Corporation
1145 Catalyn Street
Schenectady, NY 12303-1836 USA
(518) 377-8855

GENIUM PUBLISHING CORP.

No. 409

CRESOL
(Revision A)
Issued: December 1978
Revised: August 1988

SECTION 1. MATERIAL IDENTIFICATION

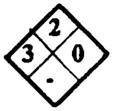
26

Material Name: CRESOL*

Description (Origin/Uses): Used as a solvent, disinfectant, fumigant; in photographic developers and explosives; and to make synthetic resins.

Other Designations: Cresylic Acid; $CH_3C_6H_4OH$; CAS No. 1319-77-3

Manufacturer: Contact your supplier or distributor. Consult the latest edition of the *Chemicalweek Buyers' Guide* (Genium ref. 73) for a list of suppliers.
*See Genium Industrial MSDS 560 for data specific to *ortho*-cresol.
**Fire diamond for Cresol mixture Not Found.



ortho**
NFPA

meta* and *para**
NFPA

HMIS
H 3
F 2
R 1
PPG*
*See sect. 8

R 1
I 4
S 4
K 1

SECTION 2. INGREDIENTS AND HAZARDS

Ingredient	%
Cresol, CAS No. 1319-77-3	*
ortho-Cresol, CAS No. 0095-48-7	*
meta-Cresol, CAS No. 0108-39-4	*
para-Cresol, CAS No. 0106-44-5	*

*Cresol is a commercial mixture of three isomers (*ortho*, *meta*, and *para*). Contact your supplier to determine the percent by weight of each isomer and to determine if hazardous ingredients/contaminants such as phenol, xylene, or benzene are present in reportable quantities.
**This material can be absorbed through intact skin, which contributes to overall exposure.
***See NIOSH, *RTECS* (GO5950000, mixed cresol; GO6125000, *meta*; GO6300000, *ortho*; GO6475000, *para*), for additional data with references to reproductive, tumorigenic, mutagenic, and irritative effects.

EXPOSURE LIMITS

OSHA PEL (Skin)**
8-Hr TWA: 5 ppm, 22 mg/m³ (All Isomers)

ACGIH TLV (Skin), 1987-88**
TLV-TWA: 5 ppm, 22 mg/m³

Toxicity Data***
Rat, Oral, LD_{50}: 1454 mg/kg
Mouse, Oral, LD_{50}: 760 mg/kg
Rabbit, Skin, LD_{50}: 2000 mg/kg

SECTION 3. PHYSICAL DATA

Boiling Point*
Specific Gravity (H_2O = 1): 1.1
Vapor Pressure*

Water Solubility (%): Slight
Molecular Weight: 108 Grams/Mole
pH: Acidic

Appearance and Odor: A colorless, yellowish, brownish yellow, or pinkish liquid that darkens upon exposure to air and light; phenolic odor. Appearance and odor depend upon the supplier and the exact composition of the purchased cresol.

*Contact your supplier to determine the specific physical properties of the cresol product.

SECTION 4. FIRE AND EXPLOSION DATA

Flash Point and Method	Autoignition Temperature	Flammability Limits in Air	LOWER	UPPER
*	*	% by Volume	*	*

Extinguishing Media: *Contact your supplier for this data. Cresol burns; treat it as a moderate fire hazard and a slight explosion hazard when exposed to heat or flame. Use foam, dry chemical, carbon dioxide, and water spray to extinguish cresol fires.

Special Fire-fighting Procedures: Wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in the pressure-demand or positive-pressure mode.

SECTION 5. REACTIVITY DATA

Cresol is stable in closed containers at room temperature under normal storage and handling conditions. It cannot undergo hazardous polymerization.

Chemical Incompatibilities: This material reacts dangerously with chlorosulfonic acid, nitric acid, oleum, and strong oxidizing agents.

Conditions to Avoid: Hot cresol can attack copper, aluminum, magnesium, zinc, and lead. Stainless steel is recommended for use with cresol. Avoid direct contact with incompatible chemicals or exposure to sources of ignition. Many organic polymers will dissolve or soften when exposed to hot cresol.

Hazardous Products of Decomposition: Toxic gases such as carbon monoxide and heated cresol and/or cresol derivatives like phenol may be produced during fires.

SECTION 6. HEALTH HAZARD INFORMATION

Cresol is not listed as a carcinogen by the NTP, IARC, or OSHA.
Summary of Risks: Cresol is corrosive to any body tissue it touches. Skin absorption can occur and may lead to delayed, possibly fatal, systemic poisoning. Absorption of cresol causes central nervous system (CNS) depression characterized by mental confusion, depression, dyspnea, irregular and rapid respiration, and weak pulse. Damage to the liver, kidneys, lungs, skin, and eyes are also expected from exposure to cresol. Exposures to cresol are emergencies; immediately consult a qualified physician.
Medical Conditions Aggravated by Long-Term Exposure: Preexisting kidney or hepatic (liver) problems.
Primary Entry: Skin absorption/contact, inhalation. **Acute Effects:** Skin and eye burns, difficulty in breathing, and respiratory failure. **Chronic Effects:** Infrequently, prolonged skin contact with cresol results in a chronic disorder called ochronosis, which is a darkening of the skin, conjunctiva, and cartilage of the nose and ears.
FIRST AID: Eyes. Immediately flush eyes, including under the eyelids, gently but thoroughly with plenty of running water for at least 15 minutes. Treat for eye burns. **Skin.** Immediately wash the affected area with soap and water because of the increased exposure hazard from skin absorption. Watch for chemical skin burns and treat them accordingly. If contact is gross, remove contaminated clothes and shoes *under* the safety shower. Further washing of skin with isopropyl alcohol or 20% glycerine in water, followed by a water rinse, may be useful. **Inhalation.** Remove exposed person to fresh air; restore and/or support his or her breathing as needed. Have trained personnel administer oxygen. **Ingestion.** Call a poison control center. Never give anything by mouth to someone who is unconscious or convulsing. If he or she is responsive, give exposed person 1 to 2 glasses of milk or water to drink to dilute the material. Induce vomiting with emetic.
GET MEDICAL HELP (IN PLANT, PARAMEDIC, COMMUNITY) FOR ALL EXPOSURES. Seek prompt medical assistance for further treatment, observation, and support after first aid. NOTE TO PHYSICIAN: Wash the affected skin area with a mixture of polyethylene glycol 300/industrial methylated spirits (PEG 300/IMS-2:1 by volume) or a similar preparation that will absorb the phenolic component. Personnel administering this treatment should wear rubber gloves. Hospitalize persons with serious exposures to monitor acidosis, shock, convulsions, and fluid balance. Thorough cleaning of the exposed person is required, especially matted hair, skin folds, and underneath fingernails, where the cresol may concentrate.

SECTION 7. SPILL, LEAK, AND DISPOSAL PROCEDURES

Spill/Leak: Notify safety personnel, provide ventilation, and eliminate all sources of ignition immediately. Limit access to the spill area to necessary personnel only. Cleanup personnel need protection against contact with and inhalation of cresol (see sect. 8). Contain large spills and collect waste. Use water spray to direct cresol away from incompatible chemicals (see sect. 5). Absorb the waste with sand, earth, or vermiculite and place it into containers suitable for eventual disposal or reclamation. Do not flush waste to a sewer.
Waste Disposal: Consider reclamation, recycling, or destruction rather than disposal in a landfill. Contact your supplier or a licensed contractor for detailed recommendations. Follow Federal, state, and local regulations.

OSHA Designations
Air Contaminant (29 CFR 1910.1000 Subpart Z)
EPA Designations (40 CFR 302.4)
RCRA Hazardous Waste; No. U052
CERCLA Hazardous Substance, Reportable Quantity: 1000 lbs (454 kg), per the Clean Water Act (CWA), Section 311 (b) (4) and the Resource Conservation and Recovery Act (RCRA), Section 3001

SECTION 8. SPECIAL PROTECTION INFORMATION

Goggles: Always wear protective eyeglasses or chemical safety goggles. Where splashing is possible, wear a full face shield as a supplementary protective measure. Follow OSHA eye- and face-protection regulations (29 CFR 1910.133).
Respirator: Wear a NIOSH-approved respirator per the *NIOSH Pocket Guide to Chemical Hazards* (Genium ref. 88) for the maximum-use concentrations and/or the exposure limits cited in section 2. Follow OSHA respirator regulations (29 CFR 1910.134). For emergency or nonroutine operations (leaks or cleaning reactor vessels and storage tanks), wear an SCBA with a full facepiece operated in the pressure-demand or positive-pressure mode. **Warning:** Air-purifying respirators will *not* protect workers in oxygen-deficient atmospheres. **Other:** Wear impervious gloves, boots, aprons, gauntlets, etc., to prevent skin contact with cresol. **Ventilation:** Install and operate both general and local exhaust ventilation systems powerful enough to maintain airborne concentrations of cresol below the OSHA PEL standard cited in section 2. **Safety Stations:** Make emergency eyewash stations, safety/quick-drench showers, and washing facilities available in work areas. **Contaminated Equipment:** Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them. Do *not* wear contact lenses in any work area. Remove contaminated clothing and launder it before wearing it again; clean this material from shoes and equipment. **Comments:** Practice good personal hygiene; always wash thoroughly after using this material. Keep it off your clothing and equipment. Avoid transferring it from your hands to your mouth while eating, drinking, or smoking. Do *not* eat, drink, or smoke in any work area.

SECTION 9. SPECIAL PRECAUTIONS AND COMMENTS

Storage/Segregation: Store cresol in a cool, dry, well-ventilated area away from incompatible chemicals (see sect. 5) and sources of ignition.
Special Handling/Storage: Preplan for routine use and emergency response. Build all storage facilities of nonflammable materials that are resistant to chemical attack by cresol. Protect containers from physical damage. Avoid using alloys of zinc, copper, or brass in storage and processing equipment that could be in contact with cresol.

Transportation Data (49 CFR 172.101-2)
DOT Shipping Name: Cresol
DOT Hazard Class: Corrosive Material
DOT Label: Corrosive
DOT ID No. UN2076
IMO Class: 6.1
IMO Label: Poison

References: 1, 2, 26, 38, 84-94, 100, 112, 113, 114.

Prepared by PJ Igoe, BS
Industrial Hygiene Review: DJ Wilson, CIH
Medical Review: MJ Hardies, MD

Material Safety Data Sheet

From Genium's Reference Collection

Genium Publishing Corporation
1145 Catalyn Street
Schenectady, NY 12303-1836 USA
(518) 377-8855

GENIUM PUBLISHING CORP.

No. 624

NAPHTHALENE

Issued: November 1987

SECTION 1. MATERIAL IDENTIFICATION

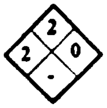
24

Material Name: NAPHTHALENE

Description (Origin/Uses): Used as a moth repellant and in many industrial processes.

Other Designations: Naphthalin; Naphthene; Tar Camphor; $C_{10}H_8$;
NIOSH *RTECS* No. QJ0525000; CAS No. 0091-20-3

Manufacturer: Contact your supplier or distributor. Consult the latest edition of the *Chemicalweek Buyer's Guide* (Genium ref. 73) for a list of suppliers.

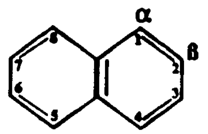


HMIS
H 2
F 2
R 0
PPG*
*See sect. 8

R 1
I 4
S 1
K 2

SECTION 2. INGREDIENTS AND HAZARDS

Naphthalene, CAS No. 0091-20-3



*Immediately dangerous to life and health
**See NIOSH *RTECS* for additional data with references to irritative, mutagenic, reproductive, and tumorigenic effects.

%

ca 100

EXPOSURE LIMITS

IDLH* Level: 500 ppm

ACGIH TLVs, 1987-88
TLV-TWA: 10 ppm, 50 mg/m^3
OSHA PEL
8-Hr TWA: 10 ppm, 50 mg/m^3
Toxicity Data**
Child, Oral, LD_{Lo}: 100 mg/kg
Man, Unknown, LD_{Lo}: 74 mg/kg
Rat, Oral, LD_{50}: 1250 mg/kg

SECTION 3. PHYSICAL DATA

Boiling Point: 424°F (218°C)
Vapor Density (Air = 1): 4.4
Vapor Pressure: 0.087 Torr at 77°F (25°C)
Water Solubility: Insoluble

Specific Gravity (H_2O = 1): 1.162 at 68°F (20°C)
Melting Point: 176°F (80°C)
Molecular Weight: 128 Grams/Mole
% Volatile by Volume: ca 100

Appearance and Odor: White crystalline flakes; strong coal tar odor.

SECTION 4. FIRE AND EXPLOSION DATA

Flash Point and Method	Autoignition Temperature	Flammability Limits in Air	LOWER	UPPER
174°F (79°C) OC; 190°F (88°C) CC	979°F (526°C)	% by Volume	0.9	5.9

Extinguishing Media: Use water spray, dry chemical, or carbon dioxide to fight fires involving naphthalene. **Caution:** Foam or direct water spray applied to molten naphthalene may cause extensive foaming.

Unusual Fire or Explosion Hazards: Naphthalene is a volatile solid that gives off flammable vapor when heated (as in fire situations). This vapor is much denser than air and will collect in enclosed or low-lying areas like sumps. In these areas an explosive air-vapor mixture may form, and extra caution is required to prevent any ignition sources from starting an explosion or fire.

Special Fire-fighting Procedures: Wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in the pressure-demand or positive-pressure mode.

SECTION 5. REACTIVITY DATA

Naphthalene is stable in closed containers at room temperature under normal storage and handling conditions. It does not undergo hazardous polymerization.

Chemical Incompatibilities: Naphthalene is incompatible with strong oxidizing agents, chromic anhydride, and mixtures of aluminum trichloride and benzoyl chloride.

Conditions to Avoid: Ignition sources like open flame, unprotected heaters, excessive heat, lighted tobacco products, and electric sparks must not occur in work areas where naphthalene vapor may become concentrated.

Hazardous Products of Decomposition: Toxic gases like carbon monoxide are produced during fire conditions. Irritating, flammable vapor forms below the melting point because even solid naphthalene has a significant vapor pressure.

SECTION 6. HEALTH HAZARD INFORMATION

Naphthalene is not listed as a carcinogen by the NTP, IARC, or OSHA.
Summary of Risks: Renal shutdown (kidney failure), hemolytic effects (breakdown of red blood cells), hematuria (blood in the urine), oliguria (low volume of urine), jaundice, eye damage, and depression of the central nervous system (CNS) are the primary health concerns associated with exposure to naphthalene. The ACGIH TLVs in section 2 are set to prevent eye damage. These recommended exposure limits may not be low enough to prevent blood changes in genetically hypersensitive individuals.
Medical Conditions Aggravated by Long-Term Exposure: Diseases of the blood, liver, and kidneys. Administer medical exams emphasizing these organs. **Target Organs:** Eyes, skin, kidneys, liver, blood (red blood cell effects), and CNS.
Primary Entry: Inhalation, skin contact. **Acute Effects:** Inhalation of naphthalene vapor causes excitement, confusion, headache, nausea, and loss of appetite. **Chronic Effects:** Increased incidence of cataracts.
FIRST AID
Eye Contact: Immediately flush eyes, including under the eyelids, gently but thoroughly with plenty of running water for at least 15 minutes to remove particles.
Skin Contact: Immediately wash the affected area with soap and water.
Inhalation: Remove victim to fresh air; restore and/or support his breathing as needed.
Ingestion: Call a poison control center. Never give anything by mouth to someone who is unconscious or convulsing. Administer a gastric lavage followed by saline catharsis. Monitor blood and electrolytic balance. Other sources recommend giving the victim several glasses of water to drink.

GET MEDICAL HELP (IN PLANT, PARAMEDIC, COMMUNITY) FOR ALL EXPOSURES. Seek prompt medical assistance for further treatment, observation, and support after first aid.

SECTION 7. SPILL, LEAK, AND DISPOSAL PROCEDURES

Spill/Leak: Notify safety personnel, provide ventilation, and eliminate all ignition sources immediately. Cleanup personnel need protection against contact and inhalation of vapor (see sect. 8). Contain large spills and collect waste. Use nonsparking tools to place naphthalene into closable containers for disposal. Keep waste out of sewers, watersheds, and waterways.
Waste Disposal: Consider reclamation, recycling, or destruction rather than disposal in a landfill. Contact your supplier or a licensed contractor for detailed recommendations. Follow Federal, state, and local regulations.

OSHA Designations
Air Contaminant (29 CFR 1910.1000, Subpart Z)
EPA Designations (40 CFR 302.4)
RCRA Hazardous Waste, No. U165
CERCLA Hazardous Substance, Reportable Quantity: 100 lbs (45.4 kg)

SECTION 8. SPECIAL PROTECTION INFORMATION

Goggles: Always wear protective eyeglasses or chemical safety goggles. Follow the eye- and face-protection guidelines of 29 CFR 1910.133. **Respirator:** Use a NIOSH-approved respirator per the *NIOSH Pocket Guide to Chemical Hazards* (Genium ref. 88) for the maximum-use concentrations and/or the exposure limits cited in section 2. Respirator usage must be in accordance with the OSHA regulations of 29 CFR 1910.134. IDLH or unknown concentrations require an SCBA with a full facepiece operated in the pressure-demand or positive-pressure mode. **Warning:** Air-purifying respirators will *not* protect workers in oxygen-deficient atmospheres.
Other Equipment: Wear impervious gloves, boots, aprons, gauntlets, etc., as required by the specific work environment to prevent skin contact. **Ventilation:** Install and operate general and local maximum explosion-proof ventilation systems of sufficient power to maintain airborne levels of naphthalene below the OSHA PEL standard cited in section 2. **Safety Stations:** Make eyewash stations, washing facilities, and safety showers available in areas of use and handling. **Contaminated Equipment:** Contact lenses pose a special hazard; soft lenses may absorb irritants, and all lenses concentrate them. Do *not* wear contact lenses in any work area. Remove and launder contaminated clothing before wearing it again; clean this material from shoes and equipment.
Comments: Practice good personal hygiene; always wash thoroughly after using this material. Keep this material off of your clothing and equipment. Avoid transferring this material from hands to mouth while eating, drinking, or smoking. Do *not* smoke, eat, or drink in any immediate work area. Avoid inhalation of vapor!

SECTION 9. SPECIAL PRECAUTIONS AND COMMENTS

Storage Segregation: Store naphthalene in a cool, dry, well-ventilated area away from chemical incompatibles (see sect. 5).
Special Handling/Storage: Protect containers from physical damage. All bulk storage facilities must be built with an explosion-proof design. All containers used in shipping/transferring operations must be electrically grounded to prevent static sparks. Use monitoring equipment to measure the extent of vapor present in any storage facility containing naphthalene because of potential fire and explosion hazards.
Comments: All operations with naphthalene must be done carefully to prevent accidental ignition of its flammable/explosive vapor. If the weather is warm, more naphthalene vapor forms and the potential for explosion increases. Do *not* smoke in any use or storage area!
Transportation Data (49 CFR 172.101-2)

DOT Shipping Name: Naphthalene
DOT Hazard Class: ORM-A
IMO Class: 4.1

DOT ID No. UN1334
IMO Label: Flammable Solid
DOT Label: None

References: 1, 2, 12, 73, 84-94, 103 PH

Approvals
Indust. Hygiene/Safety
Medical Review

Occupational Health Guideline for Cyanide

INTRODUCTION

This guideline is intended as a source of information for employees, employers, physicians, industrial hygienists, and other occupational health professionals who may have a need for such information. It does not attempt to present all data; rather, it presents pertinent information and data in summary form.

APPLICABILITY

The general guidelines contained in this document apply to all cyanides. Physical and chemical properties of two specific compounds are provided for illustrative purposes.

SUBSTANCE IDENTIFICATION

Potassium cyanide

- Formula: KCN
- Synonyms: None
- Appearance and odor: White solid with a faint almond odor.

Sodium cyanide

- Formula: NaCN
- Synonyms: None
- Appearance and odor: White solid with a faint almond odor.

PERMISSIBLE EXPOSURE LIMIT (PEL)

The current OSHA standard for cyanide is 5 milligrams of cyanide per cubic meter of air (mg/m^3) averaged over an eight-hour work shift. NIOSH has recommended that the permissible exposure limit be changed to a ceiling of 5 milligrams cyanide per cubic meter of air averaged over a 10-minute period. The NIOSH Criteria Document for Hydrogen Cyanide and Cyanide Salts should be consulted for more detailed information.

HEALTH HAZARD INFORMATION

- **Routes of exposure**

Cyanide can affect the body if it is inhaled, if it comes in contact with the eyes or skin, or if it is swallowed. Sufficient cyanide may be absorbed through the skin, especially if there are cuts to cause fatal poisoning.

- **Effects of overexposure**

1. Short-term Exposure: Inhalation or ingestion of cyanide salts may be rapidly fatal. Larger doses by inhalation or swallowing may cause the person to rapidly lose consciousness, stop breathing, and die. In some cases, there are convulsions. At lower levels of exposure, the earlier symptoms include weakness, headache, confusion, nausea, and vomiting. These symptoms may be followed by unconsciousness and death. Occasionally, convulsions occur. Milder forms of intoxication may result only in weakness, dizziness, headache, and nausea. The dust of cyanide salts is irritating to the eyes. In the presence of tears, it may cause the symptoms of poisoning described above. The dust of cyanide salts may produce irritation of the nose and skin. Strong solutions of cyanide salts are corrosive and may produce ulcers.

2. Long-term Exposure: Effects from chronic exposure to cyanide are non-specific and rare.

3. Reporting Signs and Symptoms: A physician should be contacted if anyone develops any signs or symptoms and suspects that they are caused by exposure to cyanide.

- **Recommended medical surveillance**

The following medical procedures should be made available to each employee who is exposed to cyanide at potentially hazardous levels:

1. Initial Medical Examination:

—A complete history and physical examination: The purpose is to detect pre-existing conditions that might place the exposed employee at increased risk, and to establish a baseline for future health monitoring. Persons with a history of fainting spells, such as occur in various types of cardiovascular and nervous disorders,

---

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service Centers for Disease Control
National Institute for Occupational Safety and Health

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

and those unusually susceptible to effects of anoxia or with anemia would be expected to be at increased risk from exposure. Examination of the cardiovascular, nervous, and upper respiratory systems, and thyroid should be stressed. The skin should be examined for evidence of chronic disorders.

—Skin disease: Cyanide is a defatting agent and can cause dermatitis on prolonged exposure. Persons with pre-existing skin disorders may be more susceptible to the effects of this agent.

—14" x 17" chest roentgenogram: Cyanide causes human lung damage. Surveillance of the lungs is indicated.

—FVC and FEV (1 sec): Cyanide is a respiratory irritant. Persons with impaired pulmonary function may be at increased risk from exposure. Periodic surveillance is indicated.

2. *Periodic Medical Examination:* The aforementioned medical examinations should be repeated on an annual basis.

3. *First Aid Kits:* First aid kits should be readily available in workplaces where there is a potential for the release of cyanide. These kits should contain a minimum of 48 ampules, each of 0.3 ml amyl nitrate, and complete instructions for use. In addition, 2 physician's kits should be immediately available to trained medical personnel. These kits should contain the above quantity of amyl nitrate as well as sterile sodium nitrite solution (3%) and sterile sodium thiosulfate solution (25%). All of the above drugs should be replaced at least biannually to ensure their potency.

- **Summary of toxicology**

The dust of cyanide salts, a source of cyanide ion, is an asphyxiant due to an inhibitory action on metabolic enzyme systems and can be rapidly fatal. Cyanide exerts this effect because it inactivates certain enzymes by forming very stable complexes with the metal in them. Cytochrome oxidase is probably the most important of these, since it occupies a fundamental position in the respiratory process and is involved in the ultimate electron transfer to molecular oxygen. Since cytochrome oxidase is present in practically all cells that function under aerobic conditions, and since the cyanide ion diffuses easily to all parts of the body, it is capable of suddenly bringing to a halt practically all cellular respiration. In the presence of even weak acids, hydrocyanic acid (HCN) gas is liberated from cyanide salts; a few inhalations of higher concentrations of HCN may be followed by almost instantaneous collapse and cessation of respiration; 270 ppm HCN is immediately fatal to humans, 181 ppm is fatal after 10 minutes, 135 ppm after 30 minutes, and 110 ppm may be fatal in 1 hour. The ingestion by humans of 50 to 100 mg of sodium or potassium cyanide may also be fatal. At lower levels of exposure to HCN, the earliest symptoms of intoxication may include weakness, headache, confusion, and occasionally nausea and vomiting; respiratory rate and depth is usually increased initially and at later stages becomes slow and gasping; if cyanosis is present, it usually indicates that respiration has either ceased or has been very inadequate for a few minutes. Humans tolerate 45 to 54 ppm for ½ to 1 hour without immediate or delayed effects, while 18 to 36 ppm may result in some symptoms after an exposure of several hours. Sodium cyanide dust is irritating to the eyes; in the presence of tears it may liberate HCN, which can be absorbed and cause systemic intoxication. Skin contact with dust may be irritating; strong solutions on the skin produce ulcers which are slow in healing. Cyanide is one of the few toxic materials for which an antidote exists; it functions as follows: First, amyl nitrite (inhalation) and sodium nitrite (intravenously) are administered to form methemoglobin, which binds firmly with free cyanide ions. This traps any circulating cyanide ions. The formation of 10 to 20% methemoglobin usually does not involve appreciable risk, yet provides a large amount of cyanide-binding substance. Second, sodium thiosulfate is administered intravenously to increase the rate of conversion of cyanide to the less toxic thiocyanate. Methylene blue should not be administered, because it is a poor methemoglobin former and, moreover, promotes the conversion of methemoglobin back to hemoglobin.

CHEMICAL AND PHYSICAL PROPERTIES

- **Physical data—Potassium cyanide**

1. Molecular weight: 65.1
2. Boiling point (760 mm Hg): Data not available
3. Specific gravity (water = 1): 1.55
4. Vapor density (air = 1 at boiling point of potassium cyanide): Not applicable
5. Melting point: 635 C (1175 F)
6. Vapor pressure at 20 C (68 F): Essentially zero
7. Solubility in water, g/100 g water at 20 C (68 F): 71.6
8. Evaporation rate (butyl acetate = 1): Not applicable

- **Physical data—Sodium cyanide**

1. Molecular weight: 49
2. Boiling point (760 mm Hg): 1500 C (2732 F) (extrapolated)
3. Specific gravity (water = 1): 1.6
4. Vapor density (air = 1 at boiling point of sodium cyanide): Not applicable
5. Melting point: 560 C (1040 F)
6. Vapor pressure at 20 C (68 F): Essentially zero
7. Solubility in water, g/100 g water at 20 C (68 F): 58
8. Evaporation rate (butyl acetate = 1): Not applicable

- **Reactivity**

1. Conditions contributing to instability: None. Hazardous if kept in closed containers. It may form toxic concentrations of hydrogen cyanide gas when in prolonged contact with air in a closed area.
2. Incompatibilities: Contact with strong oxidizers such as nitrates and chlorates may cause fires and

explosions. Contact with acids and acid salts causes immediate formation of toxic and flammable hydrogen cyanide gas.

3. Hazardous decomposition products: Toxic gases and vapors (such as hydrogen cyanide and carbon monoxide) may be released when cyanide decomposes.

4. Special precautions: Cyanide may react with carbon dioxide in ordinary air to form toxic hydrogen cyanide gas.

- **Flammability**

1. Not combustible

- **Warning properties**

1. Odor Threshold: No quantitative information is available concerning the odor threshold of sodium or potassium cyanide. HCN, however, is evolved from these substances in the presence of moisture. The Manufacturing Chemists Association states that "although HCN has a characteristic odor, its toxic action at hazardous concentrations is so rapid that it is of no value as a warning property."

2. Eye Irritation Level: Cyanide (as CN) is not known to be an eye irritant. However, according to Grant, HCN can produce eye irritation after chronic exposures.

3. Evaluation of Warning Properties: Although cyanide (as CN) has a negligible vapor pressure, in the presence of moisture HCN can be given off. HCN does not have adequate warning properties.

MONITORING AND MEASUREMENT PROCEDURES

- **Eight-Hour Exposure Evaluation**

Measurements to determine employee exposure are best taken so that the average eight-hour exposure is based on a single eight-hour sample or on two four-hour samples. Several short-time interval samples (up to 30 minutes) may also be used to determine the average exposure level. Air samples should be taken in the employee's breathing zone (air that would most nearly represent that inhaled by the employee).

- **Ceiling Evaluation**

Measurements to determine employee ceiling exposure are best taken during periods of maximum expected airborne concentrations of cyanide. Each measurement should consist of a ten (10) minute sample or series of consecutive samples totalling ten (10) minutes in the employee's breathing zone (air that would most nearly represent that inhaled by the employee). A minimum of three (3) measurements should be taken on one work shift and the highest of all measurements taken is an estimate of the employee's exposure.

- **Method**

Sampling and analyses may be performed by collection of cyanide with a cellulose membrane filter and an impinger containing sodium hydroxide, followed by analysis by direct potentiometry. An analytical method for cyanide is in the *NIOSH Manual of Analytical Methods*, 2nd Ed., Vol. 3, 1977, available from the Government Printing Office, Washington, D.C. 20402 (GPO No. 017-033-00261-4).

RESPIRATORS

- Good industrial hygiene practices recommend that engineering controls be used to reduce environmental concentrations to the permissible exposure level. However, there are some exceptions where respirators may be used to control exposure. Respirators may be used when engineering and work practice controls are not technically feasible, when such controls are in the process of being installed, or when they fail and need to be supplemented. Respirators may also be used for operations which require entry into tanks or closed vessels, and in emergency situations. If the use of respirators is necessary, the only respirators permitted are those that have been approved by the Mine Safety and Health Administration (formerly Mining Enforcement and Safety Administration) or by the National Institute for Occupational Safety and Health.
- In addition to respirator selection, a complete respiratory protection program should be instituted which includes regular training, maintenance, inspection, cleaning, and evaluation.

PERSONAL PROTECTIVE EQUIPMENT

- Employees should be provided with and required to use impervious clothing, gloves, face shields (eight-inch minimum), and other appropriate protective clothing necessary to prevent any possibility of skin contact with cyanide or liquids containing cyanide.
- If employees' clothing has had any possibility of being contaminated with cyanide, employees should change into uncontaminated clothing before leaving the work premises.
- Clothing which has had any possibility of being contaminated with cyanide should be placed in closed containers for storage until it can be discarded or until provision is made for the removal of cyanide from the clothing. If the clothing is to be laundered or otherwise cleaned to remove the cyanide, the person performing the operation should be informed of cyanide's hazardous properties.
- Where there is any possibility of exposure of an employee's body to cyanide or liquids containing cyanide, facilities for quick drenching of the body should be provided within the immediate work area for emergency use.
- Non-impervious clothing which becomes contaminated with cyanide should be removed immediately and not reworn until the cyanide is removed from the clothing.
- Employees should be provided with and required to use dust- and splash-proof safety goggles where there is any possibility of cyanide or liquids containing cyanide contacting the eyes.

- Where there is any possibility that employees' eyes may be exposed to cyanide or liquids containing cyanide, an eye-wash fountain should be provided within the immediate work area for emergency use.

SANITATION

- Skin that becomes contaminated with cyanide should be immediately washed or showered with soap or mild detergent and water to remove any cyanide.
- Workers subject to skin contact with cyanide should wash with soap or mild detergent and water any areas of the body which may have contacted cyanide at the end of each work day.
- Eating and smoking should not be permitted in areas where cyanide or liquids containing cyanide are handled, processed, or stored.
- Employees who handle cyanide or liquids containing cyanide should wash their hands thoroughly with soap or mild detergent and water before eating, smoking, or using toilet facilities.

COMMON OPERATIONS AND CONTROLS

The following list includes some common operations in which exposure to cyanide may occur and control methods which may be effective in each case:

Operation	Controls
Use as fumigants and pesticides in greenhouses, ships, mills, and warehouses; use of cyanogen chloride as a warning agent in fumigant gases	Local exhaust ventilation; general dilution ventilation; personal protective equipment
Use in metal treatment in nitriding, tempering, and case hardening steel; coloring of metals by chemical or electrolytic process; cleaning and coating metals; welding and cutting of heat-resistant metals; liberation during ore extraction and metal purification	Process enclosure; local exhaust ventilation; general dilution ventilation; personal protective equipment
Use of calcium cyanamid in fertilizer on soil; during chemical synthesis for manufacture of intermediates in pharmaceuticals, dyes, vitamins, plastics, and sequestering agents; preparation of nitriles, carbylamines, cyano fatty acids, and inorganic cyanides	Process enclosure; local exhaust ventilation; general dilution ventilation; personal protective equipment
Use in cellulose technology; paper manufacture; in dyeing; as cement stabilizers; use in photography as fixatives, and in blueprinting and process engraving; liberation in blast furance gases or in handling of illuminating gas	Process enclosure; local exhaust ventilation; general dilution ventilation; personal protective equipment

EMERGENCY FIRST AID PROCEDURES

In the event of an emergency, institute first aid procedures and send for first aid or medical assistance.

- **Eye Exposure**

If cyanide gets into the eyes, wash eyes immediately with large amounts of water, lifting the lower and upper lids occasionally. Get medical attention immediately. Contact lenses should not be worn when working with cyanides.

- **Skin Exposure**

If cyanide gets on the skin, immediately wash the contaminated skin using soap or mild detergent and water. If cyanide penetrates through the clothing, remove the clothing immediately and wash the skin using soap or mild detergent and water. Get medical attention immediately.

- **Breathing**

If a person breathes in large amounts of cyanide, move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. Get medical attention as soon as possible.

- **Swallowing**

When cyanide has been swallowed and the person is conscious, give the person large quantities of water immediately. After the water has been swallowed, try to get the person to vomit by having him touch the back of his throat with his finger. Do not make an unconscious person vomit. Get medical attention immediately.

- **Rescue**

Move the affected person from the hazardous exposure. If the exposed person has been overcome, notify someone else and put into effect the established emergency rescue procedures. Do not become a casualty. Understand the facility's emergency rescue procedures and know the locations of rescue equipment before the need arises.

SPILL AND DISPOSAL PROCEDURES

- Persons not wearing protective equipment and clothing should be restricted from areas of spills until cleanup has been completed.
- If cyanide is spilled, the following steps should be taken:

1. Ventilate area of spill.
2. Collect spilled material in the most convenient and safe manner for reclamation, or for treatment in a cyanide disposal system.

- Waste disposal method:

After treatment as in above, cyanide may be disposed of in a secured sanitary landfill.

REFERENCES

- American Conference of Governmental Industrial Hygienists: "Cyanide (as CN)," *Documentation of the Threshold Limit Values for Substances in Workroom Air* (3rd ed., 2nd printing), Cincinnati, 1974.
- American Industrial Hygiene Association: "Hydrogen Cyanide," *Hygienic Guide Series*, Detroit, Michigan, 1970.
- Baskin, A. D. (ed.): *Handling Guide for Potentially Hazardous Commodities*, Railway Systems and Management Association, Chicago, 1972.
- Chen, K. K., and Rose, C. L.: "Nitrite and Thiosulfate Therapy in Cyanide Poisoning," *Journal of the American Medical Association*, 149:113-119, 1952.
- Deichmann, W. B., and Gerarde, H. W.: *Toxicology of Drugs and Chemicals*, Academic Press, New York, 1969.
- Gleason, M. N., Gosselin, R. E., Hodge, H. C., and Smith, R. P.: *Clinical Toxicology of Commercial Products* (3rd ed.), Williams and Wilkins, Baltimore, 1969.
- Grant, W. M.: *Toxicology of the Eye* (2nd ed.), C. C. Thomas, Springfield, Illinois, 1974.
- Hamilton, A., and Hardy, H.: *Industrial Toxicology* (3rd ed.), Publishing Sciences Group, Acton, Massachusetts, 1974.
- Hunter, D.: *Diseases of Occupations* (4th ed.), Little, Brown, Boston, 1969.
- Kirk, R., and Othmer, D.: *Encyclopedia of Chemical Technology* (2nd ed.), Interscience, New York, 1968.
- Manufacturing Chemists Association, Inc.: *Chemical Safety Data Sheet SD-30, Cyanide*, Washington, D.C., 1967.
- National Institute for Occupational Safety and Health, U.S. Department of Health, Education, and Welfare: *Criteria for a Recommended Standard . . . . Occupational Exposure to Hydrogen Cyanide and Cyanide Salts*, HEW Publication No. (NIOSH) 77-108, GPO No. 017-033-00163-4, U.S. Government Printing Office, Washington, D.C., 1976.
- Patty, F. A. (ed.): *Toxicology*, Vol. II of *Industrial Hygiene and Toxicology* (2nd ed. rev.), Interscience, New York, 1963.
- Sax, N. I.: *Dangerous Properties of Industrial Materials* (3rd ed.), Van Nostrand Reinhold, New York, 1968.
- Stauden, A. (exec. ed.): *Kirk-Othmer Encyclopedia of Chemical Technology* (2nd ed.), Interscience, New York, 1972.
- Stecher, P. G. (ed.): *The Merck Index* (8th ed.), Merck Co., Inc., Rahway, New Jersey, 1968.
- Thienes, C. H., and Haley, T. J.: *Clinical Toxicology* (5th ed.), Lea and Febiger, Philadelphia, 1972.
- von Oettingen, W. F.: *Poisoning: A Guide to Clinical Diagnosis and Treatment* (2nd ed.), Saunders, Philadelphia, 1958.
- Wolfsie, J. H.: "Treatment of Cyanide Poisoning in Industry," *A.M.A. Archives of Industrial Hygiene and Occupational Medicine*, 4:417-425, 1951.

RESPIRATORY PROTECTION FOR CYANIDE

Condition	Minimum Respiratory Protection* Required Above 5 mg/m³
Particulate Concentration	
50 mg/m³ or less	Any supplied-air respirator. Any self-contained breathing apparatus.
Greater than 50 mg/m³ or entry and escape from unknown concentrations	Self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive pressure mode. A combination respirator which includes a Type C supplied-air respirator with a full facepiece operated in pressure-demand or other positive pressure or continuous-flow mode and an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive pressure mode.
Fire Fighting	Self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive pressure mode.
Escape	Any gas mask providing protection against hydrogen cyanide and particulates. Any escape self-contained breathing apparatus.

*Only NIOSH-approved or MSHA-approved equipment should be used.

EXHIBIT E-3

SAMPLE MEDICAL DATA SHEET

CONFIDENTIAL

THE FOLLOWING INFORMATION IS REQUESTED TO DETERMINE YOUR CURRENT MEDICAL STATUS

Date

1. Name (Last. First. Middle Initial)

3. Social Security Number

2. Employee Address (Number & Street) City - State Zip Code

4. Telephone Number

5. Sex* ☐ M ☐ F

6. Birth Date*

7. Name and Address of Person to Notify in an Emergency

8. Telephone Number

9. Personal Physician Address Telephone Number

11. Type of Examination
☐ Pre-Placement
☐ Periodic
☐ Other (Specify)

10. Which Division or Facility

Position

12. I.D. or Clock No.

13. Work Location

14. Please Check if You Have Been Immunized For:

☐ Tetanus ☐ Don't Know LAST DATE

☐ Smallpox ☐ Don't Know LAST DATE

☐ Polio ☐ Don't Know LAST DATE

☐ Others ☐ Don't Know LAST DATE

15. Are You:
☐ Right Handed
☐ Left Handed
☐ Ambidextrous

16. Family History*

CHECK EACH BOX (If answer is yes, state blood relationship).

RELATION	AGE	STATE OF HEALTH	IF DEAD, CAUSE AND AGE		YES	NO	RELATION
Father				Cancer			
Mother				Diabetes			
Spouse				Stomach Trouble			
Grandparents				Kidney Trouble			
				Heart Trouble			
				Tuberculosis			
				Mental Disorder			
Brothers nd Sisters				Convulsions			
				Arthritis			
				Allergies			
				Other			
Children							

17. Personal History*

DO YOU HAVE, OR HAVE YOU EVER HAD ANY OF THE FOLLOWING. (Check Each Box)

	YES	NO		YES	NO		YES	NO
nemia			Female Disorders			Malaria		
ithma			Foot Trouble			Nervous Breakdown		
Cancer, Cyst, Tumor or Growth			Frequent Indigestion or Heartburn			Nervous Trouble of Any Sort		
Chest Pain or Shortness of Breath			Frequent or Painful Urination			Numbness, Weakness		
hills, Fever, Night Sweats			Frequent Trouble Sleeping			Palpitation or Pounding Heart		
Chronic Cough or Colds			Gall Bladder Trouble			Prostate Trouble		
Convulsions, Fits,			Goiter or Thyroid Problem			Reaction from Medicines		
or Falling Sickness			Hayfever or Allergies			Recent Gain or Loss of Weight		
oughing Up, Spitting, or			Headaches, Frequent or Severe			Rheumatism or Arthritis		
Vomiting Blood			Heart Trouble			Scarlet Fever or Rheumatic Fever		
epression or Excessive Worry			Hemorrhoids or Rectal Trouble			Skin Rash or Hives		
iabetes, or Sugar in Urine			Hernia or Rupture			Stomach Trouble, Ulcers		
Dizziness			High Blood Pressure			Swelling of Ankles or Feet		
Ear, Nose, or Throat Trouble			Jaundice or Hepatitis			Swollen or Painful Joints		
Epilepsy			Kidney Trouble or Blood in Urine			Tuberculosis or Pleurisy		
Eye Trouble			Liver Trouble			Varicose Veins		
Fainting			"Locked" Knee or "Trick Joint"			Veneral Disease		
atigue, Chronic or Frequent			Loss of Appetite, Chronic			Other		

18. Injuries: Please Check Any Injuries You Have Had

☐ Fractures/Broken Bones
☐ Severe Burns
☐ Other Injury
☐ Severe Cuts
☐ Dislocations
☐ None
☐ Loss of Consciousness
☐ Low Back Pain
☐ Back Injury
☐ Loss of Arm, Leg, Finger, Toe

19. Check Yes or No. If Yes, Give Details in Blank Area.

	YES	NO	
a. Any Time Loss From Work Past Two Years Due to Illness.			
b. Any Brace or Support Worn			
c. Discharged or Disqualified From Armed Services for Any Reason.			
d. Military Service - Dates and Locations.			
e. Applied for, or Received Workmen's Compensation.			
f. Been Exposed to Work With Dusts, Radiation, Excessive Noise, Chemicals.			
g. Have You Been Unable to Hold a Job Because of:			
1. Sensitivity to Chemicals, Dust, Sunlight, etc.			
2. Inability to Perform Certain Motions.			
3. Inability to Assume Certain Positions.			
4. Other Medical Reasons.			
h. Been a Patient in a Hospital or Sanitarium.			
i. Had Surgery Recommended or Performed Date and Type.			
j. Are You Taking Medicines Now.			
k. Have You Been Turned Down on a Physical Examination or Been Informed of Any Abnormal Findings From a Physical Examination.			
l. Do You Smoke - If Yes, Quantity Per Day.			
m. Do You Use Alcoholic Beverages - If Yes, Quantity Per Day.			
n. Have You Lived or Travelled Outside the Continental U.S.A.			
o. Allergies.			

EXHIBIT E-4

ACCIDENT REPORT FORM

ACCIDENT REPORT

Report No. ________

SITE: ________________________________ PROJECT NO.: ________________

Location: ____

Date of Report: ____________ Preparers Name: ____________________

Name and Address of Injured: ________ SSN: __________ Age: ______

_____________________________________ Sex: ______

Years of Service: ___ Time on Present Job: ___ Title/Classification: __

Division/Department: _______ Date of Accident: ________ Time: _______

Accident Category: ___ Motor Vehicle ____ Property Damage ____ Fire

___ Chemical Exposure ____ Near Miss ____ Other

Severity of Injury or Illness: ____ Non-disabling ____ Disabling

____ Medical Treatment ____ Fatality

Amount of Damage: $________________ Property Damaged: ____________

Estimated Number of Days Away from Job: ______________________________

Nature of Injury or Illness: ___________________________________

CLASSIFICATION OF INJURY:

____ Fractures
____ Dislocations
____ Sprains
____ Abrasions
____ Lacerations
____ Punctures
____ Bites

_____ Heat Burns
_____ Chemical Burns
_____ Radiation Burns
_____ Bruises
_____ Blisters
_____ Toxic Respiratory Exposure
_____ Toxic Ingestion

______ Cold Exposure
______ Frostbite
______ Heat Stroke
______ Heat Exhaustion
______ Concussion
______ Faint/Dizziness
______ Toxic Respiratory Allergy
______ Dermal Allergy

Part of Body Affected: ____

Degree of Disability: ____

Date Medial Care was Received: ______________________________

Where Medical Care was Received: ______________________________

Address (if off-site): ______________________________

ACCIDENT LOCATION: ______________________________

Was weather a factor: ______________________________

Unsafe act by injured and/or others contributing to the accident (Be specific, must be answered):

____

____

____

Personal factors (Improper attitude, lack of knowledge of skill, slow reaction, fatigue):

____

____

____

Level of personal protection equipment required in Site Safety Plan: _____

____

Modifications: ______________________________

Was injured using required equipment: ______________________________

If not, how did actual equipment use differ from plan: ______________

____

Detailed narrative description (How did accident occur, why; objects, equipment, tools used, circumstance assigned duties) (Be specific):

____

____

____

(Use back of sheet, as required)

Witnesses to accident: ______________________________

____

Signature of Preparer ______________________

Signature of Site Leader ______________________

EXHIBIT E-5

OSHA FORM 200

Bureau of Labor Statistics
Log and Summary of Occupational
Injuries and Illnesses

U.S. Department of Labor

For Calendar Year 19 ______ Page ___ of ___

NOTE: **This form is required by Public Law 91-596 and must be kept in the establishment for 5 years. Failure to maintain and post can result in the issuance of citations and assessment of penalties.** ***(See posting requirements on the other side of form.)***

RECORDABLE CASES: You are required to record information about every occupational death, every nonfatal occupational illness, and those nonfatal occupational injuries which involve one or more of the following: loss of consciousness, restriction of work or motion, transfer to another job, or medical treatment (other than first aid). ***(See definitions on the other side of form.)***

Company Name

Establishment Name

Establishment Address

Form Approved
O.M.B. No. 1220-0029
See OMB Disclosure
Statement on reverse

Case or File Number	**Date of Injury or Onset of Illness**	**Employee's Name**	**Occupation**	**Department**	**Description of Injury or Illness**
Enter a nonduplicating number which will facilitate comparisons with supplementary records.	Enter Mo./day.	Enter first name or initial, middle initial, last name.	Enter regular job title, not activity employee was performing when injured or at onset of illness. In the absence of a formal title, enter a brief description of the employee's duties.	Enter department in which the employee is regularly employed or a description of normal workplace to which employee is assigned, even though temporarily working in another department at the time of injury or illness.	Enter a brief description of the injury or illness and indicate the part or parts of body affected. Typical entries for this column might be: Amputation of 1st joint right forefinger; Strain of lower back; Contact dermatitis on both hands; Electrocution - body.
(A)	(B)	(C)	(D)	(E)	(F)
					PREVIOUS PAGE TOTALS →
					TOTALS (Instructions on other side of form.) →

Extent of and Outcome of INJURY					
Fatalities	**Nonfatal Injuries**				
Injury Related	Injuries With Lost Workdays				Injuries Without Lost Workdays
Enter DATE of death. Mo./day/yr.	Enter a CHECK if injury involves days away from work, or days of restricted work activity, or both.	Enter a CHECK if injury involves days away from work.	Enter number of DAYS away from work.	Enter number of DAYS of restricted work activity.	Enter a CHECK if no entry was made in columns 1 or 2 but the injury is recordable as defined above.
(1)	(2)	(3)	(4)	(5)	(6)

Type, Extent of, and Outcome of ILLNESS												
Type of Illness							**Fatalities**	**Nonfatal Illnesses**				
CHECK Only One Column for Each Illness *(See other side of form for terminations or permanent transfers.)*							Illness Related	Illnesses With Lost Workdays				Illnesses Without Lost Workdays
Occupational skin diseases or disorders	Dust diseases of the lungs	Respiratory conditions due to toxic agents	Poisoning (systemic effects of toxic materials)	Disorders due to physical agents	Disorders associated with repeated trauma	All other occupational illnesses	Enter DATE of death. Mo./day/yr.	Enter a CHECK if illness involves days away from work, or days of restricted work activity, or both.	Enter a CHECK if illness involves days away from work.	Enter number of DAYS away from work.	Enter number of DAYS of restricted work activity.	Enter a CHECK if no entry was made in columns 8 or 9.
(7)							(8)	(9)	(10)	(11)	(12)	(13)
(a)	(b)	(c)	(d)	(e)	(f)	(g)						

H&S 3/14/85

OSHA No. 200

Certification of Annual Summary Totals By ______________ Title ______________ Date ______________

FOLD

OSHA No. 200

POST ONLY THIS PORTION OF THE LAST PAGE NO LATER THAN FEBRUARY 1.

OMB DISCLOSURE STATEMENT

We estimate that it will take from 4 minutes to 30 minutes to complete a line entry on this form, including time for reviewing instructions; searching, gathering and maintaining the data needed; and completing and reviewing the entry. If you have any comments regarding this estimate or any other aspect of this recordkeeping system, send them to the Bureau of Labor Statistics, Division of Management Systems (1220-0029), Washington, D C. 20212 and to the Office of Management and Budget, Paperwork Reduction Project (1220-0029), Washington, D C 20503.

Instructions for OSHA No. 200

I. Log and Summary of Occupational Injuries and Illnesses

Each employer who is subject to the recordkeeping requirements of the Occupational Safety and Health Act of 1970 must maintain for each establishment a log of all recordable occupational injuries and illnesses This form (OSHA No 200) may be used for that purpose. A substitute for the OSHA No 200 is acceptable if it is as detailed, easily readable, and understandable as the OSHA No 200

Enter each recordable case on the log within six (6) workdays after learning of its occurrence Although other records must be maintained at the establishment to which they refer, it is possible to prepare and maintain the log at another location, using data processing equipment if desired If the log is prepared elsewhere, a copy updated to within 45 calendar days must be present at all times in the establishment

Logs must be maintained and retained for five (5) years following the end of the calendar year to which they relate Logs must be available (normally at the establishment) for inspection and copying by representatives of the Department of Labor or the Department of Health and Human Services, or States accorded jurisdiction under the Act Access to the log is also provided to employees former employees and their representatives

II. Changes in Extent of or Outcome of Injury or Illness

If, during the 5 year period the log must be retained, there is a change in an extent and outcome of an injury or illness which affects entries in columns 1 2 6, 8, 9, or 13, the first entry should be lined out and a new entry made For example, if an injured employee at first required only medical treatment but later lost workdays away from work, the check in column 6 should be lined out, and checks entered in columns 2 and 3 and the number of lost workdays entered in column 4.

In another example, if an employee with an occupational illness lost workdays, returned to work, and then died of the illness, any entries in columns 9 through 12 should be lined out and the date of death entered in column 8

The entire entry for an injury or illness should be lined out if later found to be nonrecordable For example an injury which is later determined not to be work related, or which was initially thought to involve medical treatment but later was determined to have involved only first aid.

III. Posting Requirements

A copy of the totals and information following the fold line of the last page for the year must be posted at each establishment in the place or places where notices to employees are customarily posted This copy must be posted no later than ***February 1 and must remain in place until March 1.***

Even though there were no injuries or illnesses during the year, zeros must be entered on the totals line, and the form posted

The person responsible for the ***annual summary totals*** shall certify that the totals are true and complete by signing at the bottom of the form.

IV. Instructions for Completing Log and Summary of Occupational Injuries and Illnesses

Column A – CASE OR FILE NUMBER Self-explanatory.

Column B – DATE OF INJURY OR ONSET OF ILLNESS.
For occupational injuries, enter the date of the work accident which resulted in injury For occupational illnesses, enter the date of initial diagnosis of illness, or, if absence from work occurred before diagnosis, enter the first day of the absence attributable to the illness which was later diagnosed or recognized

Columns C through F – Self explanatory

Columns 1 and 8 – INJURY OR ILLNESS-RELATED DEATHS.
Self-explanatory.

Columns 2 and 9 – INJURIES OR ILLNESSES WITH LOST WORKDAYS.
Self explanatory

Any injury which involves days away from work, or days of restricted work activity, or both must be recorded since it always involves one or more of the criteria for recordability.

Columns 3 and 10 – INJURIES OR ILLNESSES INVOLVING DAYS AWAY FROM WORK. Self-explanatory.

Columns 4 and 11 LOST WORKDAYS DAYS AWAY FROM WORK.
Enter the number of workdays (consecutive or not) on which the employee would have worked but could not because of occupational injury or illness The number of lost workdays should not include the day of injury or onset of illness or any days on which the employee would not have worked even though able to work
NOTE: For employees not having a regularly scheduled shift, such as certain truck drivers, construction workers, farm labor, casual labor, part time employees, etc., it may be necessary to estimate the number of lost workdays. Estimates of lost workdays shall be based on prior work history of the employee AND days worked by employees, not ill or injured, working in the department and/or occupation of the ill or injured employee

Columns 5 and 12 – LOST WORKDAYS DAYS OF RESTRICTED WORK ACTIVITY.
Enter the number of workdays (consecutive or not) on which because of injury or illness

(1) the employee was assigned to another job on a temporary basis, or
(2) the employee worked at a permanent job less than full time, or
(3) the employee worked at a permanently assigned job but could not perform all duties normally connected with it

The number of lost workdays should not include the day of injury or onset of illness or any days on which the employee would not have worked even though able to work.

Columns 6 and 13 – INJURIES OR ILLNESSES WITHOUT LOST WORKDAYS Self explanatory.

Columns 7a through 7g – TYPE OF ILLNESS
Enter a check in only ***one*** column for each illness

TERMINATION OR PERMANENT TRANSFER–Place an asterisk to the right of the entry in columns 7a through 7g (type of illness) which represented a termination of employment or permanent transfer

V. Totals

Add number of entries in columns 1 and 8
Add number of checks in columns 2, 3, 6, 7, 9, 10, and 13.
Add number of days in columns 4, 5, 11, and 12
Yearly totals for each column (1-13) are required for posting Running or page totals may be generated at the discretion of the employer

If an employee's loss of workdays is continuing at the time the totals are summarized, estimate the number of future workdays the employee will lose and add that estimate to the workdays already lost and include this figure in the annual totals No further entries are to be made with respect to such cases in the next year's log

VI. Definitions

OCCUPATIONAL INJURY is any injury such as a cut, fracture, sprain, amputation, etc , which results from a work accident or from an exposure involving a single incident in the work environment
NOTE: Conditions resulting from animal bites, such as insect or snake bites or from one time exposure to chemicals, are considered to be injuries

OCCUPATIONAL ILLNESS of an employee is any abnormal condition or disorder, other than one resulting from an occupational injury, caused by exposure to environmental factors associated with employment It includes acute and chronic illnesses or diseases which may be caused by inhalation, absorption, ingestion, or direct contact

The following listing gives the categories of occupational illnesses and disorders that will be utilized for the purpose of classifying recordable illnesses For purposes of information, examples of each category are given These are typical examples, however, and are not to be considered the complete listing of the types of illnesses and disorders that are to be counted under each category

7a **Occupational Skin Diseases or Disorders**
Examples Contact dermatitis, eczema, or rash caused by primary irritants and sensitizers or poisonous plants, oil acne, chrome ulcers, chemical burns or inflammations, etc

7b **Dust Diseases of the Lungs (Pneumoconioses)**
Examples Silicosis, asbestosis and other asbestos related diseases, coal worker's pneumoconiosis, byssinosis, siderosis, and other pneumoconioses

7c **Respiratory Conditions Due to Toxic Agents**
Examples Pneumonitis pharyngitis, rhinitis or acute congestion due to chemicals, dusts, gases, or fumes, farmer's lung, etc

7d **Poisoning (Systemic Effect of Toxic Materials)**
Examples Poisoning by lead, mercury, cadmium arsenic, or other metals poisoning by carbon monoxide, hydrogen sulfide, or other gases, poisoning by benzol, carbon tetrachloride, or other organic solvents, poisoning by insecticide sprays such as parathion, lead arsenate, poisoning by other chemicals such as formaldehyde, plastics, and resins etc

7e **Disorders Due to Physical Agents (Other than Toxic Materials)**
Examples Heatstroke, sunstroke, heat exhaustion, and other effects of environmental heat, freezing, frostbite, and effects of exposure to low temperatures, caisson disease, effects of ionizing radiation (isotopes, X-rays, radium), effects of nonionizing radiation (welding flash, ultraviolet rays, microwaves, sunburn), etc

7f **Disorders Associated With Repeated Trauma**
Examples Noise induced hearing loss, synovitis, tenosynovitis and bursitis Raynaud's phenomena, and other conditions due to repeated motion, vibration, or pressure

7g **All Other Occupational Illnesses**
Examples Anthrax brucellosis infectious hepatitis malignant and benign tumors food poisoning histoplasmosis, coccidioidomycosis, etc

MEDICAL TREATMENT includes treatment (other than first aid) administered by a physician or by registered professional personnel under the standing orders of a physician Medical treatment does NOT include first aid treatment (one time treatment and subsequent observation of minor scratches, cuts burns splinters and so forth, which do not ordinarily require medical care) even though provided by a physician or registered professional personnel

ESTABLISHMENT A single physical location where business is conducted or where services or industrial operations are performed (for example a factory mill store, hotel, restaurant, movie theater farm ranch, bank, sales office, warehouse or central administrative office) Where distinctly separate activities are performed at a single physical location, such as construction activities operated from the same physical location as a lumber yard each activity shall be treated as a separate establishment

For firms engaged in activities which may be physically dispersed such as agriculture construction transportation communications and electric, gas, and sanitary services records may be maintained at a place to which employees report each day

Records for personnel who do not primarily report or work at a single establishment such as traveling salesmen technicians engineers etc , shall be maintained at the location from which they are paid or the base from which personnel operate to carry out their activities

WORK ENVIRONMENT is comprised of the physical location equipment, materials processed or used and the kinds of operations performed in the course of an employee's work whether on or off the employer's premises

EXHIBIT E-6

FIRST REPORT OF INJURY FORM

1. INSURER FILE NUMBER/LARS Loc. Code

2. EMPLOYER FILE NUMBER:

3. EMPLOYER'S CONNECTICUT REGISTRATION NUMBER (CRN):

WORKERS' COMPENSATION COMMISSION OF CONNECTICUT

EMPLOYER'S FIRST REPORT OF OCCUPATIONAL INJURY OR DISEASE

(Please type or print in ink)

4. WCC FILE NUMBER

5. REASON FOR REPORT CHECK ALL THAT APPLY
- LOST TIME — ONE OR MORE DAYS ☐
- MEDICAL/HEALTH CARE ☐
- OCCUPATIONAL DISEASE (Note item 41 below) ☐
- CORRECT PRIOR REPORT ☐

EMPLOYER INFORMATION

6. EMPLOYER NAME:

7. EMPLOYER MAILING ADDRESS AND PHONE. Including Town

8. LOCATION IF DIFFERENT FROM MAILING ADDRESS:

9. NATURE OF BUSINESS:

10. NAME OF WC INSURER:

11. POLICY NUMBER: POLICY PERIOD

EMPLOYEE INFORMATION

12. LAST NAME: FIRST NAME: M. I.

13. SOCIAL SECURITY NUMBER:

14. ADDRESS — NUMBER AND STREET:

15. CITY: STATE: ZIP:

16. HOME PHONE:

17. DATE OF BIRTH:

18. AGE:

19. SEX: MALE ☐ FEMALE ☐

20. OCCUPATION:

21. DEPARTMENT:

22. DATE OF HIRE:

23. DATE CURRENT DUTIES BEGAN:

24. WEEKLY WAGE AT TIME OF INJURY:

INJURY OR EXPOSURE INFORMATION

25. DATE AND TIME OF INJURY: : AM ☐ PM ☐

26. DID INJURY OR EXPOSURE OCCUR ON EMPLOYER'S PREMISES SHOWN ABOVE? YES ☐ NO ☐

27. IF NO, PLACE WHERE INJURY OR EXPOSURE OCCURRED, INCLUDING TOWN

28. DESCRIBE THE EVENTS WHICH RESULTED IN THE INJURY OR DISEASE. (GIVE FULL DETAILS ON ALL FACTORS THAT LED OR CONTRIBUTED TO THE INJURY OR THE ONSET OF DISEASE.)

N	
P	
S	
T	
A	

29. NAME THE OBJECT, SUBSTANCE, OR EXPOSURE WHICH DIRECTLY BROUGHT ABOUT THE INJURY OR DISEASE.

30. DESCRIBE THE INJURY OR DISEASE AND INDICATE PART OF BODY AFFECTED.

31. PHYSICIAN (NAME AND ADDRESS):

32. ☐ FIRST AID ☐ HOSPITAL ☐ EMERGENCY ROOM ☐ OUT-PATIENT

33. HOSPITAL (NAME AND ADDRESS):

34. DATE EMPLOYER NOTIFIED:

35. TIME EMPLOYEE'S WORKDAY BEGAN: AM ☐ PM ☐

36. DID EMPLOYEE LOSE ONE OR MORE DAYS WORK? YES ☐ NO ☐ IF NO, SKIP BOXES 38, 39, 40, AND 41.

37. EXTENT OF ACCIDENT/HEALTH AND LIFE INSURANCE COVERAGE FOR EMPLOYEE:

38. DATE INCAPACITY BEGAN:

39. HAS EMPLOYEE RETURNED TO WORK? YES ☐ NO ☐ IF YES, GIVE DATE:

40. DID EMPLOYEE DIE? YES ☐ NO ☐ IF YES, GIVE DATE:

41. FOR OCCUPATIONAL DISEASE DATE OF LAST EXPOSURE: DATE OF DIAGNOSIS AS OCCUPATIONALLY RELATED:

PREPARER INFORMATION

42. PREPARER'S NAME AND TITLE (TYPE OR PRINT): SIGNATURE (FORM MUST BE SIGNED) DATE:

Form WCC-15 (10-85) SEE REVERSE SIDE FOR WAGE STATEMENT Form LC-4706-2 Printed in U.S.A.

EXHIBIT E-7

RECORD OF SAFETY MEETINGS

SAFETY MEETING RECORD

Safety Meeting Date/Time: 11/1/90 10:00 a.m.

Given By: Dennis Unites

Topics Discussed: Routes to hospitals for each site, sampling protocol, decontamination measures, and level of protection.

Present at Safety Meeting (signature):

1.
2. Anna Sullivan
3.
4.
5.
6.
7.
8.
9.
10.
11.
12.
13.
14.
15.
16.
17.
18.
19.
20.

APPENDIX F

QUALITY ASSURANCE/QUALITY CONTROL DOCUMENT

QUALITY ASSURANCE PROJECT PLAN

This section presents those elements of project control which are necessary to ensure quality of the overall preliminary investigation at the NYSEG MGP Sites and outlines the procedures and guidelines Atlantic will follow to ensure the reliable collection and handling of sampling and analysis data. This basic elements normally included in an EPA Quality Assurance Plan and/or Quality Assurance Project Management Plan are addressed in this section.

Brief Description of Field Activities

The field investigation program will consist of the following subtasks:

- Topographic and Property Survey
- Surface Soil Sampling
- Surface Water Sampling
- Sediment Sampling
- Air Sampling

Each of these subtasks is discussed in detail in Section 2.0 of this Work Plan.

Field Procedures

Atlantic Environmental Services has developed a number of technical procedures which have been applied to site investigations including work performed at CERCLA sites. A list of relevant Atlantic procedures for the NYSEG MGP Sites field investigation are as follows.

Procedure Number	Procedure Title
1020	Field Procedures for Collection of Surface Soil Samples
1022	Field Procedures for Collection of Surface Water and Sediment Samples for Hazardous Waste Determination

1040NY	Sample Preservation for Solid and Liquid Matrices for Work Conducted in New York State
1041	Sample Chain-of-Custody Procedure
1042	Shipping Procedures for Environmental Field Samples
1051	Operation and Calibration of the HNu Systems Photoionizer Model PI-101
1060	Cleaning Procedure for Sampling Devices Used in Environmental Site Investigations

Each of these listed Atlantic Technical Procedures are presented in Appendix F.

Project Organization and Responsibility

Atlantic will perform the quality assurance elements described in this section in accordance with EPA guidance to assure consistency throughout the program. Specific personnel have been identified who are responsible for implementing the quality control aspects of the project. Primary responsibility rests with the Project Manager.

The following is a list of personnel responsible for various aspects of the project.

Function	Person Responsible
Sample Collection	Anna Sullivan (Atlantic)
QA/QC Coordinator	Robert Breeding (Atlantic)
Data Quality Review	Robert Breeding (Atlantic)
Data Processing QA	James Gould (Atlantic)
Sample QA	Anna Sullivan (Atlantic)
Lab Analysis	John Flaherty (Wadsworth)
Lab QA	Renee Gigliotti (Wadsworth)
Overall Project Coordination	Dennis Unites (Atlantic)

The Project Manager, Dennis Unites, P.G., will assume prime responsibility for technical, financial and scheduling matters. He will be Atlantic's principal point of contact with NYSEG and the DEC. James Gould, P.E., will be the Senior Technical Review for the project, responsible for overall technical content of

Atlantic's work. Robert Breeding will coordinate the overall project QA/QC program. Anna Sullivan will oversee all aspects of the field investigation.

Quality Assurance and Quality Control

This section describes the QA/QC requirements for the field activities.

Field Instrument Calibration and Preventative Maintenance

Atlantic procedure 1051 (HNu P1-101/Organic Vapor Meter) describes calibration and maintenance procedures for HNu P1-101.

A master calibration/maintenance file will be maintained which will include the following information:

- device/instrument serial and/or I.D. number;
- frequency of calibration;
- date of calibration;
- results of calibration;
- name of person performing the calibration; and
- identification of calibration gas.

QA/QC Sample Collection and Frequency

Trip Blanks

A trip blank is an aliquot of deionized organic-free water that is sealed in a sample bottle prior to initiation of field work. Glass vials (40 ml) will be used for VOA Trip Blanks. These sealed bottles are subsequently placed within a cooler and accompany field personnel during the sampling activities. For each day of aqueous sampling, a trip blank will also be sent for analysis. In this manner, any possible cross-contamination occurring among samples during shipment can be assessed. A trip blank will be taken for each day of aqueous volatile organics sampling.

Field Blanks

A field blank is an aliquot of deionized, organic free water which has been used to rinse the field sampling equipment after decontamination. A field blank will be taken for each media sampled (i.e., for each type of equipment used) at a frequency of one field blank per day per media. In this manner, any possible cross-contamination occurring among samples due to the repeated use of the same sampling equipment can be assessed.

Replicate Samples

Replicate samples will be analyzed to check laboratory reproducibility of analytical data from two aliquots of a sample taken at one location. Approximately ten percent of the total number of aqueous samples will be replicated in order to evaluate the precision of the methods used.

Sample Identification System

Each sample will be designated by alphanumeric code which will identify the project site, sample type, sampling location, sample depth, and addition designation if needed. Replicates will <u>not</u> be specifically identified as such in the sample number, but will have a different (sequential) number which will be noted in the sample logbook.

The sample code will use the following format: Lockport-CGLS

- Date of Sampling
- Sample Type: SS (surface soil), SW (surface water), SE (sediment), A (air)
- Sample Number

Where: CGLS-111290-SS3

Indicates:
CGLS - Lockport State Road Site
111290 - November 12, 1990
SS - Surface Soil
3 - Sample Number 3

Sample Holding Times

Sample holding times are specified in Atlantic Procedure No. 1040NY.

Sampling Packaging and Shipping

Samples should be packaged and shipped according to Atlantic Procedure No. 1042. When sample shipments are to be sent, the receiving laboratory will be telephoned on that day or the following morning, and notified of the shipment date, airbill number, and number and type of samples being shipped. All samples will be shipped in the afternoon (the end) of each day to ensure that samples will be shipped within twenty-four (24) hours of sampling. Samples will be labeled as per 40 CFR 261.4, "Research Samples" or "Environmental Samples".

Sample and Field Activity Documentation

Custody of samples must be maintained and documented at all times. Chain-of-custody begins with the collection of the samples in the field. Procedures are detailed in Atlantic Procedure No. 1041.

A bound/weatherproof master sample log shall be maintained by the field team. The Field Operations Leader, or designee, shall record information related to sampling or field activities. The information will include sample number, sample time, shipping information, sample location, sample description, sample method used, weather conditions, field measurements, sampler's name, unusual events, etc.

A site logbook will be maintained by the Field Operations Leader or designee. The book will contain a summary of the day's activities, including site visitors, daily telephone contacts, and decision points.

QA Objectives for Precision, Accuracy and Completeness

Environmental measurements have inherent limitations arising from equipment problems, procedural deviations, and changes in ambient conditions. Most environmental measurements are analyses made for extremely low concentrations of constituents and are subject to chemical interferences, instrument limitation and uncertainties that affect the accuracy of the determination. It is essential to minimize these factors so that the measurements accurately reflect the character of the sample collected.

All data gathered during the course of the NYSEG MGP Site study by Atlantic or processed by the laboratory will meet objectives of accuracy, precision, completeness, representativeness, and comparability, as referenced in Stanley and Verner (1983). These characteristics are defined below:

- Accuracy - the degree of agreement of a measurement, X, with an accepted reference or true value, T, usually expressed as the difference between the two values, X-T, or the difference as a percentage of the reference or true value, 100 (X-T)/T. Accuracy is a measure of the bias in a system.

- Precision - a measure of mutual agreement among individual measurements of the same property, usually under prescribed similar conditions. Precision is best expressed in terms of the standard deviation. Various measures of precision exist depending upon the "prescribed similar conditions".

- Completeness - a measure of the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under correct normal conditions.

- Representativeness - expresses the degree to which data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition.

- Comparability - expresses the confidence with which one data set can be compared to another.

APPENDIX G

ATLANTIC ENVIRONMENTAL SERVICES, INC.
TECHNICAL PROCEDURES

ATLANTIC PROCEDURE NO. 1020

FIELD PROCEDURES FOR COLLECTION OF SURFACE SOIL SAMPLES

Prepared By: John A. Ripp — Principal
JOHN A. RIPP — TITLE

Reviewed By: Edmund J. Burke — Q.A. Manager
EDMUND J. BURKE, P.E. — TITLE

Approved By: Paul Burgess — Chief Engineer
PAUL BURGESS, P.E. — TITLE

REVISIONS

NO.	DATE	PREPARED BY	REVIEWED BY	APPROVED BY
1.				
2.				
3.				
4.				

ATLANTIC ENVIRONMENTAL SERVICES, INC.
COLCHESTER, CONNECTICUT

Procedure No. 1020
Revision No. 1
Date April 21, 1989
Page 1 of 7

TABLE OF CONTENTS

SECTION PAGE

SECTION 1.0: PURPOSE

To insure a standard procedure for collection of surface soil samples for the identification of chemical parameters.

SECTION 2.0: SCOPE

The following procedure describes the logistics, chain-of-events, collection techniques and documentation requirements for collecting surface soil samples designated for chemical analysis.

SECTION 3.0: RESPONSIBILITY

Project Manager - First

Field Chemist, Geologist or Engineer - Second

SECTION 4.0: SUPPORTING PROCEDURES

Atlantic Procedure No. 1041 Sample Chain-of-Custody Procedure

SECTION 5.0: REQUIRED FORMS

Field Notebook No. 351, published by J.L. Darling Corp., Tacoma, Washington

SECTION 6.0: PROCEDURE

6.1 Selection of Sampling Locations

The selection of sampling locations in and around a project site will be based on a review of existing site data, the site topography and surface features, results of preliminary site surveys using portable geophysical and air monitoring equipment and the initial estimates as to the extent of and migration pathways of the waste present. At the start of the investigation, a number of surface soil samples are usually allocated. Only after initial field reconnaissance are the final locations selected. At a minimum, the following should be included as sampling points:

- Upgradient soil surfaces to determine background levels.
- Soil surfaces within the immediate area of contamination.
- Downgradient soil surfaces to determine any spread of contamination resulting from storm water runoff.

Sampling locations may be selected in the following areas at the site:

- Areas where chemicals may have been stored, handled or disposed.
- Areas where motor vehicles hauling chemicals may have traveled on the site.
- Areas where water may have ponded during storm events.

6.2 Equipment List

The following is to be considered a minimum listing of required field equipment for collecting soil samples. Other tools required for accessing soils beneath paved area, etc. should be included when necessary.

- Boots, latex gloves, chemical resistant gloves, appropriate level of protection.
- Sample container - 1 each 1 liter glass jar with a teflon lined cap.
- Teflon coated or stainless steel sample spoons.
- Wooden stakes and spray paint (highly visible)
- Field notebook
- Sample bottle labels
- Chain-of-custody forms

6.3 Order of Samples

Surface soil samples should be taken in all locations prior to all other site sampling events. This is to prevent the possibility of cross-contamination between sampling points by site personnel or equipment (backhoe, drill rigs, equipment vehicles, etc. . .). For consistency with other sampling programs, the upgradient samples should be collected first.

6.4 Location and Collection of Samples

Surface soils, depending upon the contaminants of interest, can be either individual or composite samples. Composites represent samples taken from a number of individual locations which are equally blended to form a sample representing a larger area. Certain state agencies are discouraging the use of composite samples when looking for aromatic volatile and halogenated volatile organic compounds because of dilution and the difficulty of forming a "true" composite. Therefore prior to sampling, the use of composites should be checked with the agency which will have final approval of actions regarding a site in which surface soil samples are used in developing certain actions regarding clean up.

If statistical techniques are to be employed in collecting surface soil samples using a random grid, the procedure provided in Chapter 5 of Methods of Soil Analysis, Part I by C.A. Black et al, American Society of Agronomy, Academic Press, N.Y. 1965 and Section I of EPA-SW 846 Test Methods for Evaluating Solid Waste. Physical Chemical/Methods are suggested protocols.

Once the general locations have been chosen, sampling can begin. Normally a sample representing the top 3 to 6 inches of soil is taken. Samples are collected using a dedicated, precleaned stainless steel or Teflon spoon and immediately stored in the glass jar. Organic debris (ie.

leaves, twigs, bark) along with large pieces of gravel should be avoided. The sample should be representative of the area soil; it is best represented by the finer grains of the topsoil. The jars must be filled completely so as to avoid creating a head space where volatiles may escape. After each jar is filled the threads should be wiped clean so that the cap can be threaded on without creating an air gap.

Latex or rubber gloves should be worn to protect the sampling person and to avoid cross contamination through handling.

All filled jars must be labelled with the following as a minimum:

- project number
- sampling time and date
- sample number
- analysis
- collector's initials

The sample chain-of-custody form is then immediately filled out and kept with the sample. The sample is then stored in a refrigerated container until delivery to the analytical lab.

The location, depth of sample, sample type, time of sample, and other associated data (ie. organic vapor readings, color of the ground, odors, texture, etc.) will be documented in the field notebook when the sample is taken. If sampling is performed under a paved area or in fill, a description of these unique areas will also be included.

6.5 Sample Verification

After each sample of soil is taken, an indicator should be used to mark the location in the event it will be surveyed at a later time. Once all the surface soil samples are collected, the sample numbers and locations should be reviewed before leaving the site or progressing to other tasks in a program. All used sampling devices will be kept together, separate from clean tools, so that they can be cleaned according to appropriate decontamination and cleaning procedure. In no event will a used sampling device be used for two or more samples without full cleaning between samples.

ATLANTIC PROCEDURE NO. 1022

FIELD PROCEDURES FOR COLLECTION OF SURFACE WATER AND SEDIMENT SAMPLES FOR HAZARDOUS WASTE DETERMINATION

Prepared By: John A. Ripp — Principal
JOHN A. RIPP — TITLE

Reviewed By: Edmund J. Burke — Q.A. Manager
EDMUND J. BURKE, P.E. — TITLE

Approved By: Paul Burgess — Chief Engineer
PAUL BURGESS, P.E. — TITLE

REVISIONS

NO.	DATE	PREPARED BY	REVIEWED BY	APPROVED BY
1.				
2.				
3.				
4.				

ATLANTIC ENVIRONMENTAL SERVICES, INC.
COLCHESTER, CONNECTICUT

Procedure No. 1022
Revision No.
Date July 1, 1986
Page 1 of 11

TABLE OF CONTENTS

SECTION PAGE

1.0 PURPOSE

To insure a standard procedure for collection of surface water (streams, ponds, lakes, impoundments) and sediments for the identification of chemical composition.

2.0 SCOPE

The following procedure describes the logistics, chain-of-events, collection techniques and documentation requirements for collecting surface water and sediment samples designated for chemical analysis.

3.0 RESPONSIBILITY

Project Manager - First

Field Supervisor - Second

Field Sampling Technicians - Third

4.0 SUPPORTING PROCEDURES

Atlantic Procedure No. 1060 Decontamination Procedure for Sampling Devices

Atlantic Procedure No. 1041 Sample Chain-of-Custody Procedure.

5.0 REQUIRED FORMS

Field Notebook No. 351, published by J.L. Darling Corp.,
Tacoma, Washington

6.0 PROCEDURE

6.1 Selection of Sampling Locations

The selection of sampling locations in and around an project site will be based on a review of existing site data, the site topography and surface features, results of preliminary site surveys using portable geophysical and air monitoring equipment and the initial estimates as to the extent of the waste. At the start of the investigation, a number of surface water and sediment samples are usually allocated. Only after initial field reconnaissance are the final locations selected. At a minimum the following should be included as sampling points.

- Upstream and upgradient of the waste site to determine background levels of pollutants.
- In leachate, runoff or intermittent flow paths passing through or from the site.
- In downgradient streams, swales, runoff channels or sewers draining the site to determine limits of surficial deposition.

6.2 Equipment List

The following lists are examples of equipment to be used for sampling. Site specific checklists of equipment should be designed based on the characteristics of each sample and location.

6.2.1 Surface Water Sampling

- o Boots, latex gloves, chemical resistant gloves, appropriate level of protection.
- o Sample containers (depending on sample requirements of the analytical laboratory) may include for each location:
    - 4 each 1 liter glass jars with teflon lined caps.
    - 8 each 40 ml. glass vials with teflon lined septas.
    - 1 each 500 ml. plastic containers for metals analysis.
    - 1 each 500 ml. plastic containers for mercury analysis.
- o Wooden stakes and spray paint.
- o Stainless steel Kemmerer bottle, Van Dorn bottle or sterile glass samplers (if required)
- o Remote samplers
- o Field Notebook
- o Sample bottle labels
- o Chain-of-custody forms

6.2.2 Sediment Sampling

- o Boots, latex gloves, chemical resistant gloves, appropriate level of protection.
- o Dedicated stainless steel spoons (tablespoon size)
- o Dedicated teflon spoons (if required)
- o Sample containers for each sample
    - 1 each 1 liter glass jars with teflon lined caps
- o Wooden stakes and spray paint.

- o Field Notebook
- o Sample bottle labels
- o Chain-of-custody forms

6.3 Order of Samples

If both stream sediment and water samples are to be collected concurrently, the water samples should be taken first in order to avoid introducing pollutants in the water column from sediment collection activities.

In flowing streams or runoff channels samples should be collected from the furthest downstream point first. The remaining samples will be taken progressing upstream.

6.4 Sample Collection

6.4.1 Surface Water Samples

Surface water samples are collected in a manner to be representative of the water column from which the samples are taken. A two man team is required for the collection as a safety precaution. The person collecting the samples in most cases will have entered the water body. For flowing streams this will necessitate the donning of boots or waders and wearing latex inner gloves and chemical resistant outer gloves. All samples in flowing water bodies will be taken facing upstream. Samples taken from small lakes or ponds should be taken from a small boat using a Kemmerer or teflon lined Van Dorn bottle. Samples taken from standing puddles, pools, drainage ditches should be taken without disturbing the sediments. This may be accomplished by the use of a remote sampler, e.g. a sample bottle held on along pole with a gimballed yoke.

For pre-preserved sample containers the following procedure will be followed:

- Prior to collecting any water samples place a waterproof sample label on each container which specifies the following:

  Sample number
  Date
  Time
  Analysis
  Preservative
  Project number
  Initials of the collector

  Fill in the information with a waterproof ink pen. This will prevent difficulty in filling out the labels on a wet jar after it is filled.
- Face upstream, wearing gloves, take a 1 liter glass container with no preservative and submerge it closed to mid-depth.
- Open the jar with the mouth facing upstream; fill it and; close it while submerged.
- Take the filled jar and use it to fill the 40 ml. vials making sure no air is trapped in the vials.

- o Repeat steps 1 and 2 with the same container and fill those containers having preservative avoiding any overflow since this will dilute the preservative.
- o Repeat steps 1 and 2 with the same container and fill the remaining sample containers. The last container filled, will be the original container used to fill the other jars.
- o If dissolved metals analysis are required, an extra bottle (no preservative) will be filled and the metals container (pre-preserved with nitric acid) will remain empty. Only after the water sample is field filtered will it be poured into the pre-preserved metals container.
- o Place all sample containers into a sample shipping container, cool with ice packs and fill in the chain-of-custody form.
- o Detail in the field notebook the following:
  - sample identification number
  - location of the sample (sketch of the sample point)
  - time and date sample was taken
  - personnel performing the task
  - visual or sensory description of the sample (color, odor, turbidity, etc.)
  - weather conditions during sampling
  - runoff conditions
  - other pertinent observations

- o Place a wooden stake at the edge of the stream or near the sample point with sample number on it. The stake may be located by survey for inclusion on a site map.

Note:

- o It is understood that all sample containers and collection devices will be cleaned prior to field use following the appropriate cleaning procedures depending on the type of analysis to be performed.
- o If sampling devices are to be dedicated to a particular sample location, they will be placed in a plastic bag after its use and marked or tagged "DEDICATED TO PROJECT NO. ______ SAMPLE LOCATION NO. _________".

6.4.2 Sediment Samples

Stream sediment samples are collected in a manner to be representative of deposits of sediment carried off of a site. Again the use of protective boots, and gloves will be necessary. All priority pollutant and organic analysis of sediments can be performed on a 1 liter sample. The following procedure will be followed:

- o Select a sample location that is representative of sediment depositional areas. This might mean a sandbar in the middle of a stream, the inside corner of a stream bed in a meander, or a deep pool where water velocities are reduced.

- Place a waterproof sample label on the glass container which specifies the following:

  Sample number
  Date
  Time
  Preservative
  Project number
  Initials of the collector

  Fill in the information with a waterproof ink pen prior to collecting the sample.
- Use either a pre-cleaned dedicated stainless steel spoon or teflon coated spoon, that will fit inside the sample jar, to collect a sample.
- All samples should be taken within the top 3 inches of the stream bed. Remove any vegetation debris (leaves, roots, bark) along with any large stones from the sample so that only the finer soil material is collected.
- Fill out the chain-of-custody form and place the sediment sample into the shipping container. Cool as required.
- Detail in the field notebook the following:
  - sample identification number
  - location of the sample (sketch of the sample point)
  - time and date sample was taken
  - personnel performing the task

- visual or sensory description of the sample
- brief sediment descriptions (color, texture, appearance)
- weather conditions during sampling
- runoff or flow conditions
- other pertinent observations

o Place a wooden stake at the edge of the stream or near the sample point with the sample number on it. This stake will be located by survey for inclusing on a site map.

6.4.3 General Site Rules

Surface water and sediment samples, depending on the particular site, can be collected from a variety of locations. Instead of having a procedure for each type of location, the following general rules should be used for any site.

o The sample must be representative of the water body or sediments deposited in an area.

o Avoidance of cross contamination between sampling points can be accomplished by the use of dedicated sampling devices.

o Care must be taken to not disturb the sample location conditions or chemistry, e.g. facing upstream in a river, collecting sediments from areas not stepped on by the collectors.

- In lakes or ponds, samples of the water column, at a minimum, will be a composite of surface, mid-depth and bottom (1 foot above floor) samples. Sediments need only be sampled by grab method.
- Only pre-cleaned sampling devices and sample containers are to be used.
- Proper field documentation and chain-of-custody procedures must be followed.

ATLANTIC PROCEDURE NO. 1040-NY

SAMPLE PRESERVATION FOR SOLID AND LIQUID MATRICES FOR PROGRAMS CONDUCTED IN NEW YORK STATE

Prepared By: John A. Ripp Principal
JOHN A. RIPP TITLE

Reviewed By: James E. Gould Engineer
JAMES E. GOULD TITLE

Approved By: Paul Burgess Principal
PAUL BURGESS, P.E. TITLE

REVISIONS

NO.	DATE	PREPARED BY	REVIEWED BY	APPROVED BY
1.				
2.				
3.				
4.				

ATLANTIC ENVIRONMENTAL SERVICES, INC.
COLCHESTER, CONNECTICUT

TABLE OF CONTENTS

SECTION PAGE

TABLE

SECTION 1.0: PURPOSE

To insure a standard procedure for preservation of solid and liquid samples collected at a site for hazardous waste determination.

SECTION 2.0: SCOPE

The following procedure is established to provide a set of standards which follow recommended NYSDEC preservation techniques and holding times for various analytical groups as per the NYSDEC Analytical Services Protocol (ASP) published in 1989.

SECTION 3.0: RESPONSIBILITY

Project Manager - First

Field Operations Manager - Second

Field Staff - Third

SECTION 4.0: SUPPORTING PROCEDURES

Atlantic Procedure No. 1020 Field Procedures for Collection of Surface Soil Samples

Atlantic Procedure No. 1021 Field Procedures for Collection of Subsurface Soils

Atlantic Procedure No. 1022 Field Procedures for Collection of Surface Water and Sediment Samples for Hazardous Waste Determination

Atlantic Procedure No. 1023 Field Procedures for Collection of Groundwater Samples for Hazardous Waste Determination

Atlantic Procedure No. 1042 Shipping Procedure for Environmental Field Samples

SECTION 5.0: REQUIRED FORMS

1. Field Notebook No. 351. Published by the J.L. Darling Corp., Tacoma, Washington
2. Master Sample Log

SECTION 6.0: PROCEDURE

6.1 General Procedure

All sample preservations will be performed in the field as soon after sample collection as possible. In many instances sample containers supplied by the analytical laboratory will be pre-preserved so that no additional preservations will be required. In the event preservations are required, Atlantic personnel will use the following format:

1. For those water samples requiring target compound list (TCL), the procedures in Table 6-1 will be followed.

2. All glass or plastic containers must be cleaned prior to sampling according to appropriate cleaning procedures. In no case will sample containers be rinsed with a sample before the actual sample is containerized.

3. In no case shall methylene chloride or acetone be used as a cleaning agent in any glassware or field equipment used on a site investigation. Methylene chloride and acetone are listed wastes and if used, cleaning may cause errors in evaluating field data.

4. All soils samples collected for TCL analysis be placed in a one liter glass jar with teflon lined cap. This jar also must be cleaned prior to sampling according to appropriate cleaning procedure. To avoid losing volatile organics to the head space within a jar, all soil jars will be filled completely. Care must be taken to avoid getting soil on the threads of a sample jar. This can cause a faulty seal.

5. All samples will be held in insulated shipping containers and kept cool to a temperature of 4°C until they are delivered to the analytical laboratory.

6. When samples are preserved in the field, the type of preservation will be listed on the label along with all other appropriate label information. Also the details of each sample will be logged in the Master Sample Log, maintained at the field office.

7. If Atlantic personnel plan to perform field preservations the analytical laboratory must be consulted to verify those particular procedures to be followed. In some instances different laboratories may require more sample volume than those listed or wish no preservative be used.

8. Table 6-1 is taken directly from the NYSDEC ASP. Soils rarely require preservation and the laboratory should always be consulted before collecting soil samples. Occasionally the NYSDEC may update the holding times and this can be found by calling the NYSDEC headquarters in Albany, New York.

9. All field preservations should be performed using proper safety precautions especially when handling acids and caustics. A reference for proper chemical handling techniques is found in Basic Laboratory Skills for Water and Wastewater Analysis by

Douglas W. Clark, New Mexico Water Resources Research Institute, Report No. 125, 1980. Also latex or chemical resistant gloves should be worn during all field preservations. Proper ventilation is necessary when performing preservations in enclosed areas.

6.2 Sample Preservation and Holding Time Requirements

Table 6-1 provides a schedule for sampling, preservation, and holding times for samples being analyzed for convention parameters and target compound list (TCL) parameters.

The laboratory shall adhere to the preservation procedures and holding times listed in Table 6-1 below unless specifically directed otherwise by the Bureau of Technical Services and Research. All holding times are from Verified Time of Sample Receipt (VTSR) at the laboratory.

The laboratory shall provide all necessary preservatives to properly stabilize the samples. The laboratory must adhere to all analytical holding times. Failure to do so will result in the imposition of any contract specified penalties.

TABLE 6-1

REQUIRED CONTAINERS, PRESERVATIVES, AND HOLDING TIMES

PARAMETER NAME	CONTAINER(1)	PRESERVATIVE(2),(3)	MAXIMUM HOLDING TIME(4)
AQUEOUS SAMPLES			
Bacteriological Tests:			
Total Coliform	Sterilized P,G	Cool, 4°C, 0.008% $Na_2S_2O_3$ (5)	6 hours
Fecal Coliform	Sterilized P,G	Cool, 4°C, 0.008% $Na_2S_2O_3$ (5)	6 hours
Fecal Streptococci	Sterilized P,G	Cool, 4°C, 0.008% $Na_2S_2O_3$ (5)	6 hours
Inorganic and Conventionals Tests:			
Acidity	P,G	Cool, 4°C	12 days
Alkalinity	P,G	Cool, 4°C	12 days
Ammonia	P,G	Cool, 4°C H_2SO_4 to pH<2	26 days
BOD_5	P,G	Cool, 4°C	24 hours
BOD_{20}	P,G	Cool, 4°C	24 hours
Bromide	P,G	Cool, 4°C	26 days
$CBOD_5$	P,G	Cool, 4°C	24 hours
COD	P,G	Cool, 4°C H_2SO_4 to pH<2	26 days
Chloride	P,G	Cool, 4°C	26 days
Color	P,G	Cool, 4°C	24 hours
Cyanide, Total	P,G	Cool, 4°C NaOH to pH>12	12 days

TABLE 6-1 (CONTINUED)

REQUIRED CONTAINERS, PRESERVATIVES, AND HOLDING TIMES

PARAMETER NAME	CONTAINER(1)	PRESERVATIVE(2),(3)	MAXIMUM HOLDING TIME(4)
AQUEOUS SAMPLES (continued)			
Cyanide, Amenable to Chlorination	P,G	Cool, 4°C NaOH to pH>12, 0.6 g ascorbic acid(5)	12 days(6)
Fluoride	P only	Cool, 4°C	26 days
Hardness	P,G	NNO_3 to pH<2	6 months
Kjeldahl Nitrogen	P,G	Cool, 4°C H_2SO_4 to pH<2	26 days
Organic Nitrogen	P,G	Cool, 4°C H_2SO_4 to pH<2	26 days
Metals(7), except Chromium+6 and Mercury	P,G	HNO_3 to pH<2	6 months
Chromium+6	P,G	Cool, 4°C	24 hours
Mercury	P,G	HNO_3 to pH<2	26 days
Nitrate + Nitrite	P,G	Cool, 4°C H_2SO_4 to pH<2	26 days
Nitrate	P,G	Cool, 4°C	24 hours
Nitrite	P,G	Cool, 4°C	24 hours
Oil and Grease	G only	Cool, 4°C H_2SO_4 to pH<2	26 days
Total Organic Carbon	P,G	Cool, 4°C H_2SO_4 to pH<2	26 days
Orthophosphate	P,G	Cool, 4°C	24 hours
Total Phenols	G only	Cool, 4°C H_2SO_4 to pH<2	26 days

TABLE 6-1 (CONTINUED)

REQUIRED CONTAINERS, PRESERVATIVES, AND HOLDING TIMES

PARAMETER NAME	CONTAINER(1)	PRESERVATIVE(2),(3)	MAXIMUM HOLDING TIME(4)
AQUEOUS SAMPLES (continued)			
Phosphorous, Total	P,G	Cool, 4°C H_2SO_4 to pH<2	26 days
Residue, Total	P,G	Cool, 4°C	5 days
Residue, Filterable	P,G	Cool, 4°C	24 hours
Residue, Non-Filterable	P,G	Cool, 4°C	5 days
Residue, Settleable	P,G	Cool, 4°C	24 hours
Residue, Volatile	P,G	Cool, 4°C	5 days
Silca	P only	Cool, 4°C	26 days
Specific Conductance	P,G	Cool, 4°C	26 days
Sulfate	P,G	Cool, 4°C	26 days
Sulfide	P,G	Cool, 4°C, add zinc acetate plus NaOH to pH>9	5 days
Surfactants (MBAS)	P,G	Cool, 4°C	24 hours
Turbidity	P,G	Cool, 4°C	24 hours
Organic Tests(8):			
Purgeable Halocarbons	G, teflon lined septa	Cool, 4°C	7 days
Purgeable Aromatics	G, teflon lined septa	Cool, 4°C	7 days
Acrolein and Acrylonitrile	G, teflon lined septa	Cool, 4°C, 0.008% $Na_2S_2O_3$(5) adjust to pH 4-5(9)	7 days

TABLE 6-1 (CONTINUED)

REQUIRED CONTAINERS, PRESERVATIVES, AND HOLDING TIMES

PARAMETER NAME	CONTAINER(1)	PRESERVATIVE(2),(3)	MAXIMUM HOLDING TIME(4)
AQUEOUS SAMPLES (continued)			
Phenolics(10)	G, teflon lined septa	Cool, 4°C, 0.008% $Na_2S_2O_3$ (5)	5 days after VTSR until extraction; 40 days for analysis(12)
Benzidines(10,11)	G, teflon lined septa	Cool, 4°C 0.008% $Na_2S_2O_3$ (5)	5 days after VTSR until extraction(12)
Phthalate esters(10)	G, teflon lined septa	Cool, 4°C	5 days after VTSR until extraction; 40 days for analysis(12)
Nitrosamines(10,14)	G, teflon lined septa	Cool, 4°C 0.008% $Na_2S_2O_3$ (5) Store in dark	5 days after VTSR until extraction; 40 days for analysis(12)
PCBs(10)	G, teflon lined septa	Cool, 4°C	5 days after VTSR until extraction; 40 days for analysis(12)
Nitroaromatics and Isophorone(10)	G, teflon lined septa	Cool, 4°C 0.008% $Na_2S_2O_3$ (5) Store in dark	5 days after VTSR until extraction; 40 days for analysis(12)

TABLE 6-1 (CONTINUED)

REQUIRED CONTAINERS, PRESERVATIVES, AND HOLDING TIMES

PARAMETER NAME	CONTAINER(1)	PRESERVATIVE(2),(3)	MAXIMUM HOLDING TIME(4)
AQUEOUS SAMPLES (continued)			
Polynuclear Aromatic Hydrocarbons(10)	G, teflon lined septa	Cool, 4°C 0.008% $Na_2S_2O_3$ (5) Store in dark	5 days after VTSR until extraction; 40 days for analysis(12)
Haloethers(10)	G, teflon lined septa	Cool, 4°C 0.008% $Na_2S_2O_3$ (5)	5 days after VTSR until extraction; 40 days for analysis(12)
Chlorinated Hydrocarbons(10)	G, teflon lined septa	Cool, 4°C 0.008% $Na_2S_2O_3$ (5)	5 days after VTSR until extraction; 40 days for analysis(12)
Chlorinated Dioxins and Furans(10)	G, teflon lined septa	Cool, 4°C 0.008% $Na_2S_2O_3$ (5)	5 days after VTSR until extraction; 40 days for analysis(12)
Pesticides(10)	G, teflon lined septa	Cool, 4°C Adjust pH to 5-9(14)	5 days after VTSR until extraction; 40 days for analysis(12)
Radiological Tests:			
Alpha, beta and Radium	P,G	HNO_3 to pH<2	6 months

SOIL/SEDIMENT/SOLID SAMPLES

The same containers and holding times as listed for aqueous samples are to be used for soil/sediment/solid samples. Preservation for all analyses is limited to cooling to 4 C.

Footnotes for Table 6-1

1. Polyethylene (P) or Glass (G).

2. Sample preservation should be performed immediately upon collection. For composite chemical samples each aliquot should be preserved at the time of collection. When use of an automated sampler makes it impossible to preserve each aliquot, then chemical samples may be preserved by maintaining at 4°C until compositing and sample splitting is completed.

3. When any samples is to be shipped by common carrier or sent through the United States Mails, it must comply with the Department of Transportation Hazardous Materials Regulations (49 CFR Part 172). The person offering such material for transportation is responsible for ensuring such compliance. For preservation requirements of Table 6-1, the Office of Hazardous Materials, Materials Transportation Bureau, Department of Transportation has determined that the Hazardous Materials Regulations do not apply to the following materials: Hydrochloric Acid (HCL) in water solutions at concentrations of 0.04% by weight or less (pH about 1.96 or greater); Nitric Acid (HNO_3) in water solutions at concentrations

of 0.15% by weight or less (pH about 1.62 or greater); Sulfuric Acid (H_2SO_4) in water solutions at concentrations of 0.35% by weight or less (pH about 1.15 or greater); and Sodium Hydroxide (NaOH) in water solutions at concentrations of 0.080% by weight or less (pH about 12.30 or less).

4. Samples should be analyzed as soon as possible after collection. The times listed are the maximum times that samples may be held before analysis and still be considered valid. Samples may be held for longer periods only if the monitoring laboratory has data on file to show that specific types of samples under study are stable for the longer time, and has received written permission prior to analysis form the Regional Administrator under 40 CFR Part 136.3(e) AND from the Bureau of Technical Services and Research. Some samples may not be stable for the maximum time period given in the table. A monitoring laboratory is obligated to hold the sample for a shorter time if knowledge exists to show that this is necessary to maintain sample stability.

5. Should only be used in the presence of residual chlorine.

6. Maximum holding time is 24 hours when sulfide is present. Optionally all samples may be tested with lead acetate paper before pH adjustments in order to determine if sulfide is present. If sulfide is present, it can be removed by addition of cadmium nitrate powder until a negative spot test is obtained. The sample is filtered and then NaOH is added to pH 12.

7. Samples should be filtered immediately onsite before adding preservative for dissolved metals.

8. Guidance applies to samples to be analyzed by GC, LC or GC/MS for specific compounds.

9. The pH adjustment is not required if acrolein will not be measured. Samples for acrolein receiving no pH adjustment must be analyzed within 3 days of sampling.

10. When the extractable analytes of concern fall within a single chemical category, the specified preservative and maximum holding times should be observed for optimum safeguard of sample integrity. When the analytes of concern fall within two or more chemical categories, the sample may be preserved by cooling to

4°C, reducing residual chlorine with 0.008% sodium thiosulfate, storing in the dark, and adjusting the pH to 6-9; samples preserved in this manner may be held for five days before extraction and for 40 days after extraction. Exceptions to this optional preservation and holding time procedure are noted in footnote 5 (re the requirement for thiosulfate reduction of residual chlorine), and footnotes 12, 13 (re the analysis of benzidine).

11. If 1,2-diphenylhydrazine is likely to be present, adjust the pH of the sample to 4.0±0.2 to prevent rearrangement of benzidine.

12. This does not supercede the contract requirement of a 30 day reporting time.

13. Extracts may be stored up to 7 days before analysis if storage is conducted under an inert (oxidant-free) atmosphere.

14. For the analysis of diphenylnitrosamine, add 0.008% sodium thiosulfate and adjust the pH to 7-10 with NaOH within 24 hours of sampling.

15. The pH adjustment may be preformed upon receipt in the laboratory and may be omitted if the samples are extracted with 72 hours of collection. For the analysis of aldrin, add 0.008% sodium thiosulfate.

ATLANTIC PROCEDURE NO. 1041

SAMPLE CHAIN-OF-CUSTODY PROCEDURE

Prepared By: John A. Ripp — Principal
JOHN A. RIPP — TITLE

Reviewed By: Edmund J. Burke — Q.A. Manager
EDMUND J. BURKE, P.E. — TITLE

Approved By: Paul Burgess — Chief Engineer
PAUL BURGESS, P.E. — TITLE

REVISIONS

NO.	DATE	PREPARED BY	REVIEWED BY	APPROVED BY
1.				
2.				
3.				
4.				

ATLANTIC ENVIRONMENTAL SERVICES, INC.
COLCHESTER, CONNECTICUT

Procedure No. 1041
Revision No.
Date July 1, 1986
Page 1 of 5

TABLE OF CONTENTS

SECTION PAGE

FIGURE

Procedure No. 1041
Revision No.
Date July 1, 1986

SECTION 1.0: PURPOSE

To provide the project manager with a record of the custody of any environmental field sample from time of collection to final analysis. Once a sample has been submitted to the laboratory, internal laboratory chain-of-custody will take over in the form of "Request for Analysis" forms, analytical notebooks, and "Reports of Analysis" forms.

SECTION 2.0: SCOPE

This procedure details how a sample is traced through the Chain-of-Custody-Form.

SECTION 3.0: RESPONSIBILITY

Project Manager - First

Field Supervisor - Second

Field Technician - Third

SECTION 4.0: SUPPORTING PROCEDURES

None

SECTION 5.0: REQUIRED FORMS

Atlantic Chain-of-Custody Form No. 1041

SECTION 6.0: PROCEDURE

This procedure describes the use of a Chain-of-Custody Form to accompany all sample containers from the time of collection to submission to the analytical laboratory.

For sampling programs where a large number of samples are to collected or where various laboratories will be receiving the samples, a Chain-of-Custody Form is to accompany each group of samples (see attached form). This form presents general sample information in tabular form listing sample number, date and time of sampling, whether the sample was a composite or grab and information regarding the number of containers, size of container and preservative used for each. If for instance a sample consisted of two 40 ml. vials with no preservation and one 500 ml vial preserved with nitric acid, the number of containers box would designate three while the first diagonal box would list 40 ml vial/PRSV.-NONE and the box beneath listing two and the second diagonal box listing 500 ml glass jar/PRSV.-HNO_3 and the box beneath listing one.

The bottom of the form is the chain-of-custody with dates and times of transfer indicated with the appropriate signatures. The sample collector is always the first signature while the analytical laboratory is the final. Theoretically all individuals handling the samples between collection and laboratory should sign the form. However if a common carrier (ie. Federal Express, Purolator) are used for shipping only one signature is required.

This form can be used as a legal document to guarantee samples were not mishandled and that they were delivered to the laboratory within the time frame necessary to start analysis.

On occasion, the analytical laboratory will provide their own Chain-of-Custody form. Usually the same information is included but in a different format from the Atlantic form. Chain-of-Custody forms from the analytical laboratories are acceptable documentation.

Since these forms are basically sample transmittal documents a copy of the form should remain with the sampling personnel. Upon completion of the analysis the laboratory will provide a complete set of all Chain-of-Custody forms for inclusion with analytical reports.

ATLANTIC
ENVIRONMENTAL SERVICES, INC.

FORM NO. 1041

CHAIN OF CUSTODY FORM

PROJECT NO.:

PROJECT NAME:

SAMPLERS (SIGNATURE):

SAMPLE NO.*	DATE	TIME	COMP	GRAB	NO. OF CONTAINERS	PRSV.	PRSV.	PRSV.	PRSV.	PRSV.	PRSV.	REMARKS

*SOURCE CODES:	Test Pit Soil...(TP)	Boring Hole Soil...(BH)	Surface Soil...(SS)	Waste...(W)
	Ground Water...(GW)	Surface Water...(SW)	Sediment...(SD)	Waste Water...(WW)

RELINQUISHED BY (SIGNATURE):	DATE/TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME:	RECEIVED BY (SIGNATURE):
RELINQUISHED BY (SIGNATURE):	DATE/TIME:	RECEIVED BY (SIGNATURE):	RELINQUISHED BY (SIGNATURE):	DATE/TIME:	RECEIVED BY (SIGNATURE):
RELINQUISHED BY (SIGNATURE):	DATE/TIME:	RECEIVED FOR LABORATORY BY (SIGNATURE):	DATE/TIME:	REMARKS:	

Distribution: Original accompanies shipment; copy to coordinator field files.

ATLANTIC PROCEDURE NO. 1042

SHIPPING PROCEDURES FOR ENVIRONMENTAL FIELD SAMPLES

Prepared By: John A. Ripp JOHN A. RIPP Principal TITLE

Reviewed By: Edmund J. Burke EDMUND J. BURKE, P.E. Q.A. Manager TITLE

Approved By: Paul Burgess PAUL BURGESS, P.E. Chief Engineer TITLE

REVISIONS

NO.	DATE	PREPARED BY	REVIEWED BY	APPROVED BY
1.				
2.				
3.				
4.				

ATLANTIC ENVIRONMENTAL SERVICES, INC.
COLCHESTER, CONNECTICUT

Procedure No. 1042
Revision No.
Date July 1, 1986
Page 1 of 5

TABLE OF CONTENTS

SECTION 1.0: PURPOSE

To insure a standard procedure for shipment of water, soil and other environmental samples that are controlled by chain-of-custody and strict analytical starting times.

SECTION 2.0: SCOPE

The following procedure is established to avoid mishandling, delays and mislabeling of samples normally collected and shipped from a field site to a designated analytical laboratory.

SECTION 3.0: RESPONSIBILITY

Project Manager - First

Field Supervisor - Second

Field Technicians - Third

SECTION 4.0: SUPPORTING PROCEDURES

Atlantic Procedure No. 1040 Sample Preservation for Solid and Liquid Matrices

Atlantic Procedure No. 1041 Sample Chain-Of-Custody Procedure

SECTION 5.0: REQUIRED FORMS

Receipt of Airweigh Bill or Weighbill Forms

Chain-of-Custody Form Standard Form No. 1041

SECTION 6.0: PROCEDURE

6.1 Prior to mobilization to a field site, the field operations manager or his designee will select a shipper based on proximity to the site and ability to ship overnight.

6.2 Upon selection of a shipper the following information will be gathered before any samples are shipped. This can be done over the phone or by correspondence.

1. Location of the shipping depot or local pickup office in case samples are to be delivered directly to the depot by the field team.
2. Name and phone number of a contact at the shipper.
3. Rates of shipping per package size and weight
4. Special instructions as to container sizes and weights.
5. A set of weighbills for the field team.
6. A copy of the shipper's brochure which will provide information on the format for the various types of weigh bills.
7. Times for calling in a pickup from the job site and normal pickup times.

6.3 The Atlantic field manager will give the shipper a street address where samples can be picked up by the courier near the job site.

6.4 Once all samples have been collected, preserved and containerized for shipment, the field supervisor will call the shipper to arrange for pick up.

Procedure No. 1042
Revision No.
Date July 1, 1986
Page 4 of 5

6.5 All samples, unless so designated for ground transportation, will be shipped by air express for overnight delivery. This is the standard method since samples collected for Method 625 organics have only a 72-hour holding time between collection and the start of analysis.

6.6 The following steps will be followed in the field to prepare the sample shipping containers for pick up.

1. A standard chain-of-custody form will be filled-out, signed by the courier as a custodian, and placed inside each shipping container before final sealing.
2. The Atlantic field supervisor or his designee will insure that all weighbills have been filled-in properly for air express. If the contract laboratory is within ground transportation distance for overnight delivery, then the weighbills should reflect guaranteed overnight delivery.
3. A copy of all weighbills must be kept by the field supervisor and the weighbill number associated with each group of samples logged into the Master Sample Log. The name of courier must be written in this log also in case there is a problem in tracing samples.
4. If possible, to save shipping fees, the sample shipping containers can be strapped together.

5. An estimated time of delivery for the samples will be logged in the Master Sample Log, (e.g., ETA 12 noon 3/14/83).

6.7 Once the samples have been shipped, the field supervisor will call the analytical laboratory and provide a listing of samples to be delivered, the shipping company's name, and the weighbill numbers. As soon as the samples are delivered, the contract laboratory will inform Atlantic of their arrival and report, any damage associated with the samples or whether any sample containers are missing.

ATLANTIC PROCEDURE NO. 1051

OPERATION AND CALIBRATION OF THE HNu SYSTEMS PHOTOIONIZER
MODEL PI-101

Prepared By: John A. Ripp
JOHN A. RIPP
Principal
TITLE

Reviewed By: Edmund J. Burke
EDMUND J. BURKE, P.E.
Q.A. Manager
TITLE

Approved By: Paul Burgess
PAUL BURGESS, P.E.
Chief Engineer
TITLE

REVISIONS

NO.	DATE	PREPARED BY	REVIEWED BY	APPROVED BY
1.				
2.				
3.				
4.				

ATLANTIC ENVIRONMENTAL SERVICES, INC.
COLCHESTER, CONNECTICUT

Procedure No. 1051
Revision No. 1
Date April 21, 1989
Page 1 of 6

TABLE OF CONTENTS

SECTION 1.0: PURPOSE

To insure a standard procedure for the calibration and operation of the HNu Systems Photoionizer Model PI-101.

SECTION 2.0: SCOPE

The following procedure details those steps necessary for the collection and operation in the survey mode of the HNu Photoionizer. A listing of calibration data needed for proper documentation is supplied at the end of this procedure.

SECTION 3.0: RESPONSIBILITY

Project Manager - First

Field Operations Manager - Second

Field Staff - Third

SECTION 4.0: SUPPORTING PROCEDURES

None

SECTION 5.0: REQUIRED FORMS

Field Notebook No. 351, published by J.L. Darling Corp., Tacoma, Washington (or equivalent), or a conventional paper, bound laboratory notebook (Nalge 6301 or equivalent).

SECTION 6.0: PROCEDURE

6.1 General Description

The HNu Photoionizer is a survey tool for determining general levels of organic vapors in air. The instrument is comprised of a readout module which contains all controls and the battery power supply and a photoionizer probe which contains the photo-cell. The readout module also contains terminals for connection to a recorder. This module is carried by a strap held across the shoulder while the probe is held by hand.

6.2 Instrument Startup

First connect the probe unit to the readout module by attaching and turning the connector terminal. Note this fitting is "keyed" and must be attached in only one orientation.

Second turn the main switch to battery. The needle should deflect to the upper end of the green scale. If it doesn't deflect into the green area or is at the low end of the scale, the instrument needs to be charged. A battery charger is located in the instrument cover and it plugs into the side of the readout module. For a full day's operation the battery should be charged overnight.

Third turn on the main switch to any range (ie. 0-2,000 ppm, 0-200 ppm or 0-20 ppm). Look into the probe through the sample tube and observe the violet light of the photo cell. If the light is not on, check the following:

1. Make sure the probe is attached properly to the readout module.
2. An etch mark should be scribed on the probe where it can be unscrewed to replace the photo cell. This mark shows the exact position that the top of the probe takes so that the air inlet ports are lined up. If not lined up,unscrew the probe and assemble it properly.
3. Check the photo cell lamp and replace it if necessary.

Once the battery and photo cell are operating, perform a calibration.

6.3 Calibration

The PI 101 Analyzer is designed for trace gas analysis in ambient air and is calibrated at HNu with certified standards of benzene, vinyl chloride and isobutylene.

Some general points to consider when calibrating the PI 101 are that the analyzer is designed for operation at ambient conditions and therefore the gas standards used for calibration should be delivered to the analyzer at ambient temperatures and pressure and at the proper flow rates. The PI 101 is a non-destructive analyzer; calibrations using toxic or hazardous gases must be done in a well ventilated area.

The frequency of calibration should be twice daily as a minimum. The instrument should be calibrated at the beginning of the day (or when the instrument is first turned on) and at the end of the day (or when use of the instrument is completed). If the instrument is turned off during the day for any significant length of time, it should be calibrated when turned on. An accurate and reliable method of calibration check is to use analyzed gas cylinders of "hydrocarbon-free" air and isobutylene (prepared by HNu).

Step 1. Zero set - Turn the function switch to STANDBY. In this position the lamp is OFF and no signal is generated. Set the zero point with the ZERO set control. The zero can also be set with the function switch on the X1 position and using a "Hydrocarbon-free" air. In this case "negative" readings are possible if the analyzer measures a cleaner sample when in service.

Step 2. 0-20 or 0-200 range - For calibrating on the 0-20 or 0-200 range only one gas standard is required. Turn the function switch to the range position and note the meter reading. Adjust the SPAN control setting as required to read the ppm concentration of the standard. Recheck the zero setting (Step 1). If readjustment is needed, repeat Step 2. This gives a two-point calibration; zero and the gas standard point.

6.4 Documentation

In the field notebook, or in the bound laboratory notebook, at the start of the project (or if there is a change in instruments), record the following:

1. Site name
2. Instrument model and serial number S/N
3. Types of calibration gases
4. Note the size of the photo cell lamp used in the particular probe. This is useful to know which organic compounds the HNu is sensitive toward.

In the field notebook, or in the bound laboratory notebook, at the start of each calibration, record the following:

1. Date
2. Time
3. Name of person performing the calibration
4. Span setting before beginning calibration
5. That the instrument was zeroed, and whether the instrument was on standby or if "hydrocarbon-free" air was used.
6. The new span setting, if necessary, to calibrate instrument reading
7. Repeat Step 5 if span was adjusted during Step 6
8. Note that the second calibration reading was correct

APPENDIX H

LABORATORY ANALYSES

PERFORMED BY:

Wadsworth/Alert Laboratories, Inc.
450 William Pitt Way
Pittsburgh, PA 15238

Thomas Tomayko
Project Manager

John M. Flaherty
Laboratory Manager - Pittsburgh

NEW YORK STATE DEPARTMENT OF HEALTH

DAVID AXELROD, M.D. *COMMISSIONER*

Expires 12:01 AM April 1, 1991
ISSUED September 26, 1990

INTERIM CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

(Issued in accordance with the Laws of New York State)

pursuant to Section 502 of the Public Health Law

Laboratory ID. Number 11182

Director: Mr. John H Flaherty

Laboratory Name: Wadsworth Alert Lab - PA
Number & Street: 450 William Pitt Way
City,State,Zip : Pittsburgh PA 15238

VALID AT THIS ADDRESS ONLY

is hereby APPROVED as an Environmental Laboratory for the category

NON-POTABLE WATER

All approved subcategories and analytes are listed on the attached addendum

Herbert W. Dicke

Herbert W. Dickerman, M.D., Ph.D.
Director
Wadsworth Center for Laboratories and Research

FORM LR 23.F

7445

PROPERTY OF
NEW YORK STATE DEPARTMENT OF HEALTH

DAVID AXELROD, M.D. ***COMMISSIONER***

Expires 12:01 AM April 1, 1991
ISSUED September 28, 1990

INTERIM

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

(Issued in accordance with the Laws of New York State)

pursuant to Section 502 of the Public Health Law

Laboratory ID. Number 11182

Director: Mr. John Flaherty

Laboratory Name: Wadsworth Alert Lab - PA
Number & Street: 450 William Pitt Way
City,State,Zip : Pittsburgh PA 15238
VALID AT THIS ADDRESS ONLY

is hereby APPROVED as an Environmental Laboratory for the category

ENVIRONMENTAL ANALYSES/SOLID AND HAZARDOUS WASTE

All approved subcategories and/or analytes are listed below:

Characteristic Testing :
    Corrosivity
    Ignitability
    Toxicity
Haloethers (ALL)
Nitroaromatics Isophorone (ALL)
Phthalate Esters (ALL)
Purgeable Aromatics (ALL)

Miscellaneous :
    Cyanide, Total
    Hydrogen Ion (pH)
    Sulfide (as S)
Metals I (ALL)
Polynuclear Aromatic Hydrocarbons (ALL)
Priority Pollutant Phenols (ALL)
Purgeable Halocarbons (ALL)

Acrolein and Acrylonitrile (ALL)
Chlorophenoxy Acid Pesticides (ALL)
Chlorinated Hydrocarbon Pesticides (ALL)
Chlorinated Hydrocarbons (ALL)
Metals II (ALL)
Polychlorinated Biphenyls (ALL)

Herbert W. Dicke

Herbert W. Dickerman, M.D., Ph.D.
Director
Wadsworth Center for Laboratories and Research

FORM LR 23.F

7446

The following list correlates Atlantic Environmental Services, Inc. sample identification number with NYSEG's Manufactured Gas Plant Sampling Identification Protocol.

SAMPLE IDENTIFICATION

Atlantic Codes	NYSEG Codes
CGWW-SS1	WWEISF9001L
CGWW-SS2	WWEISF9002L
CGWW-SS3	WWEISF9003L
CGWW-SS4	WWEISF9004L

ANALYTICAL RESULTS – GENEVA
NOVEMBER 21, 1990

	SURFACE SOIL			
	CGWW–SS1	CGWW–SS2	CGWW–SS3	CGWW–SS4
VOLATILE ORGANICS (CAS NO.) (ppb)				
Acetone (67–64–1)	<75	<74	<74	<79
Benzene (71–43–2)	<7.5	<7.4	<7.4	<7.9
Bromodichloromethane (75–27–4)	<7.5	<7.4	<7.4	<7.9
Bromoform (75–25–2)	<7.5	<7.4	<7.4	<7.9
Bromomethane (74–95–3)	<15	<15	<15	<16
2–Butanone (78–93–3)	<75	<74	<74	<79
Carbon disulfide (75–15–0)	<7.5	<7.4	<7.4	<7.9
Carbon tetrachloride (56–23–5)	<7.5	<7.4	<7.4	<7.9
Chlorobenzene (108–90–7)	<7.5	<7.4	<7.4	<7.9
Chloroethane (75–00–3)	<15	<15	<15	<16
Chloroform (67–66–3)	<7.5	<7.4	<7.4	<7.9
Chloromethane (74–87–3)	<15	<15	<15	<16
Dibromochloromethane (124–48–1)	<7.5	<7.4	<7.4	<7.9
1,1–Dichloroethane (75–34–3)	<7.5	<7.4	<7.4	<7.9
1,2–Dichloroethane (107–06–2)	<7.5	<7.4	<7.4	<7.9
1,1–Dichloroethene (75–34–3)	<7.5	<7.4	<7.4	<7.9
1,2–Dichloroethene (Total)	<7.5	<7.4	<7.4	<7.9
1,2–Dichloropropane (78–87–5)	<7.5	<7.4	<7.4	<7.9
cis–1,3–Dichloropropene	<7.5	<7.4	<7.4	<7.9
trans–1,3–Dichloropropene	<7.5	<7.4	<7.4	<7.9
Ethylbenzene (100–41–4)	<7.5	<7.4	<7.4	<7.9
2–Hexanone (591–78–6)	<75	<74	<74	<79
Methylene chloride (75–09–2)	<15	<15	<15	<16
4–Methyl–2–pentanone (108–10–1)	<75	<74	<74	<79
Styrene (100–42–5)	<7.5	<7.4	<7.4	<7.9
1,1,2,2–Tetrachloroethane (79–34–5)	<7.5	<7.4	<7.4	<7.9
Tetrachloroethene (127–18–4)	<7.5	<7.4	<7.4	<7.9
Toluene (108–88–3)	<7.5	590J	<7.4	<7.9
1,1,1–Trichloroethane (71–55–6)	<7.5	<7.4	<7.4	<7.9
1,1,2–Trichloroethane (79–00–5)	<7.5	<7.4	<7.4	<7.9
Trichloroethene (79–01–6)	<7.5	<7.4	<7.4	<7.9
Vinyl acetate (108–05–4)	<75	<74	<74	<79
Vinyl chloride (75–01–4)	<15	<15	<15	<16
Total xylenes (1330–20–7)	<7.5	<7.4	<7.4	<7.9
SEMI–VOLATILE ORGANICS (ppb)				
Acenaphthene (83–32–9)	96J	<780	190J	<880
Acenaphthylene (83–32–9)	180J	<780	350J	240J
Anthracene (120–12–7)	580J	160J	1200J	620J
Benzo(a)anthracene	2500	<780	4400	3300
Benzo(b)fluoranthene (205–99–2)	3500	1300	6300	5400
Benzo(k)fluoranthene (207–08–9)	1700	590J	1500	2200
Benzo(ghi)perylene	<800	<780	1500	<880
Benzo(a)pyrene (50–32–8)	<800	<780	4500	1900
Benzyl alcohol (100–51–6)	<800	<780	<1500	<880
Bis(2–chloroethoxy)methane	<800	<780	<1500	<880
Bis(2–chloroethyl)ether (111–44–4)	<800	<780	<1500	<880
Bis(2–chloroisopropyl)ether	<800	<780	<1500	<880
Bis(2–ethylhexyl)phthalate (117–81–7)	350J	240J	<1500	420J
4–Bromophenyl phenyl ether	<800	<780	<1500	<880
Butyl benzyl phthalate (85–68–7)	280J	<780	220J	<880
4–Chloroaniline (106–47–8)	<800	<780	<1500	<880
2–Chloronaphthalene (91–58–7)	<800	<780	<1500	<880
4–Chlorophenyl phenyl ether	<800	<780	<1500	<880
Chrysene (218–01–9)	2700	1300	4900	3400
Dibenzo(a,h)anthracene (53–70–3)	<800	<780	430J	420J
Dibenzofuran	110J	<780	180J	220J
Di–n–butyl phthalate (84–74–2)	<800	<780	<1500	<880
1,2–Dichlorobenzene (95–50–1)	<800	<780	<1500	<880

ANALYTICAL RESULTS – GENEVA
NOVEMBER 21, 1990

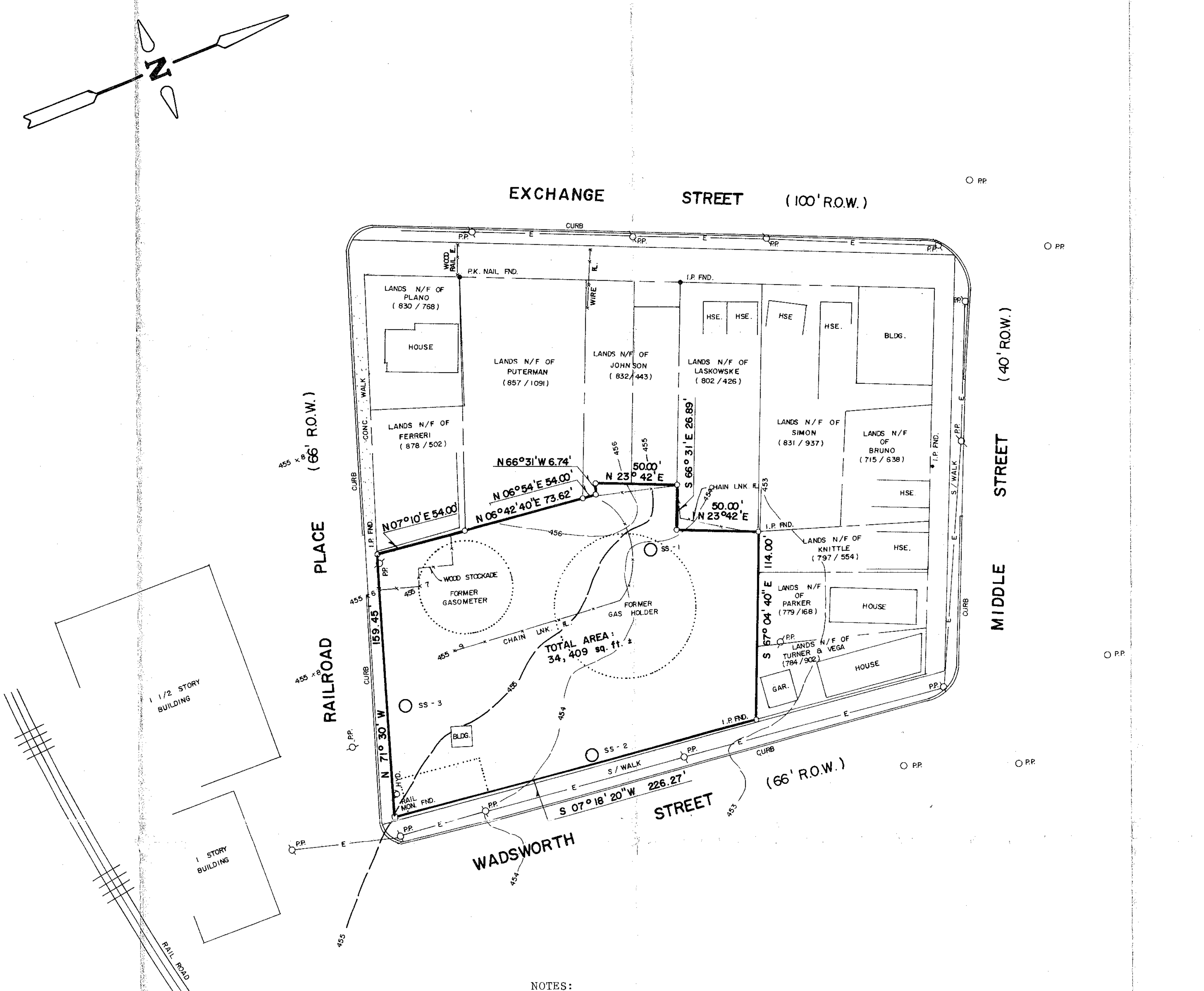
	SURFACE SOIL			
	CGWW–SS1	CGWW–SS2	CGWW–SS3	CGWW–SS4
1,3–Dichlorobenzene (541–73–1)	<800	<780	<1500	<880
1,4–Dichlorobenzene (106–46–7)	<800	<780	<1500	<880
3,3'–Dichlorobenzidine (91–94–1)	<4000	<3900	<7700	<4200
Diethyl phthalate (84–66–2)	<800	<780	<1500	<880
Dimethyl phthalate (131–11–3)	<800	<780	<1500	<880
2,4–Dinitrotoluene	<800	<780	<1500	<880
2,6–Dinitrotoluene (606–20–2)	<800	<780	<1500	<880
Di–n–octyl phthalate (117–84–0)	<800	<780	<1500	<880
Fluoranthene (206–44–0)	5200	1300	8300	5400
Fluorene (86–73–7)	170J	<780	<1500	<880
Hexachlorobenzene (118–74–1)	<800	<780	<1500	<880
Hexachlorobutadiene (87–68–3)	<800	<780	<1500	<880
Hexachlorocyclopentadiene (77–47–4)	<800	<780	<1500	<880
Hexachloroethane (67–72–1)	<800	<780	<1500	<880
Indeno(1,2,3–cd)pyrene (193–39–5)	1200	<780	1400J	<880
Isophorone (78–59–1)	<800	<780	<1500	<880
2–Methylnaphthalene	<800	<780	150J	200J
Naphthalene (91–20–3)	200J	<780	380J	<880
Nitrobenzene (98–95–3)	<800	<780	<1500	<880
2–Nitroaniline (88–74–4)	<4000	<3900	<7700	<4200
3–Nitroaniline (99–09–2)	<4000	<3900	<7700	<4200
4–Nitroaniline (100–01–6)	<4000	<3900	<7700	<4200
N–Nitrosodiphenylamine (86–30–6)	<800	<780	<1500	<880
N–Nitrosodi–n–propylamine	<800	<780	<1500	<880
Phenanthrene (85–01–8)	2300	590J	5600	3000
Pyrene (129–00–0)	6000	1500	8900	7500
1,2,4–Trichlorobenzene (120–82–1)	<800	<780	<1500	<880
Benzoic Acid (65–85–0)	<4000	<3900	<7700	<4200
4–Chloro–3–methylphenol (59–50–7)	<800	<780	<1500	<880
2–Chlorophenol (95–57–8)	<800	<780	<1500	<880
2,4–Dichlorophenol (120–83–2)	<800	<780	<1500	<880
2,4–Dimethylphenol	<800	<780	<1500	<880
2,4–Dinitrophenol (51–28–5	<4000	<3900	<7700	<4200
2–Methyl–4,6–dinitrophenol (534–52–1)	<4000	<3900	<7700	<4200
2–Methylphenol (95–48–7)	<800	<780	<1500	<880
4–Methylphenol (106–44–5)	<800	<780	<1500	<880
2–Nitrophenol (88–75–5)	<800	<780	<1500	<880
4–Nitrophenol (100–02–7)	<4000	<3900	<7700	<4200
Pentachlorophenol (87–86–5)	<4000	<3900	<7700	<4200
Phenol (108–95–2)	<800	<780	<1500	<880
2,4,5–Trichlorophenol (95–95–4)	<800	<780	<1500	<880
2,4,6–Trichlorophenol (88–06–2)	<800	<780	<1500	<880
METALS (ppm)				
Silver (7440–22–4)	<1.2	<1.2	<1.2	<1.3
Aluminum (7429–90–5)	6100	4400	4000	7000
Arsenic (7440–38–2)	18	8.8	62	11
Barium (7440–39–3)	200	150	100	150
Beryllium (7440–41–7)	1	0.75	1	1.2
Calcium (7440–70–2)	74000	54000	55000	20000
Cadmium (7440–43–9)	1	<0.59	<0.59	<0.63
Cobalt (7440–48–4)	<6	<5.9	<5.9	6.4
Chromium (7440–47–3)	12	8.9	11	14
Copper (7440–50–8)	37	56	30	53
Iron (7439–89–6)	23000	13000	22000	22000
Mercury (7439–97–6)	2	0.39	1.7	1.3
Potassium (7440–09–7)	1200	890	830	1300
Magnesium (7439–95–4)	20000	18000	17000	7600
Manganese (7439–96–5)	610	310	290	340
Sodium	<600	<590	<590	<630
Nickel (7440–02–0)	12	9.8	10	15

ANALYTICAL RESULTS – GENEVA
NOVEMBER 21, 1990

	SURFACE SOIL			
	CGWW–SS1	CGWW–SS2	CGWW–SS3	CGWW–SS4
Lead (7439–92–1)	410	430	150	500
Antimony (7440–36–0)	<7.2	<7.1	<7.1	<7.6
Selenium (7782–49–2)	<2.9	<3	<2.9	<3.2
Thallium (7440–28–0)	<1.2	<1.2	<1.2	<1.3
Vanadium (7440–62–2)	14	12	12	18
Zinc (7440–66–6)	410	21	110	320
CYANIDE (ppm)	57	2	<0.59	6.5

All concentrations in ppb. Metals and cyanide concentrations in ppm, except surface water metals in ppb.
< None detected, lower detectable limit.
–– Not analyzed
J – Detected, but below quantification limit; estimated value.
Shaded regions indicated detected concentrations.
Laboratory: Wadsworth/Alert Laboratoties, Inc.
Sample locations shown on Figure 5.

PLATE 1



MAP REFERENCES:

1) A map of a survey of land owned by Joseph F. and Peter P. Gillotte, prepared by Donald M. Phillips, L.S., dated September 22, 1982, filed September 24, 1982 as Map No. 10280.

2) A map of a survey of land owned by Donald & Rachel D. Plano, prepared by Ronald M. Phillips, L.S., dated December 4, 1986 and filed December 16, 1986 as Map No. 14175.

3) A map of a survey of land to be conveyed by Caroline Kite, prepared by Ronald M. Phillips, dated July 20, 1984, revised August 27, 1984 and filed August 31, 1984 as Map No. 11760.

NOTES:

1) ⋯⋯ Depicts approximate location of former structures as scaled from various maps.

2) Boundary line information as shown is based upon adjoining deed and maps of record and is subject to any state of facts an up to date abstract of title will show.

UNAUTHORIZED ADDITIONS OR ALTERATIONS TO THIS MAP IS A VIOLATION OF ARTICLE 145, SECTION 7209, SUB-PARAGRAPH 2 OF NEW YORK STATE EDUCATION LAW.

BOUNDARY & TOPOGRAPHIC SURVEY
OF GENAVA N.Y. WADSWORTH
MGP SITE

CITY OF GENEVA	ONTARIO CO. N.Y.
SCALE: 1" = 50'	JANUARY 26, 1991

S.Y. KIM LAND SURVEYOR P.C. JOB NO. SY-213-90

49071

ARCADIS
Infrastructure, environment, buildings

Imagine the result

New York State Electric & Gas Corporation

Feasibility Study Report

Former Manufactured Gas Plant Site
Wadsworth Street, Geneva, New York

February 2010

ARCADIS

Feasibility Study Report

Former Manufactured Gas Plant Site – Wadsworth Street, Geneva, New York

Prepared for:
New York State Electric & Gas Corp.

Prepared by:
ARCADIS
6723 Towpath Road
P.O. Box 66
Syracuse
New York 13214-0066
Tel 315.446.9120
Fax 315.449.4111

Our Ref.:
0130.13057.0001.0001

Date:
February 2010

Tables

Figures

1. Introduction

1.1 General

This *Feasibility Study Report* (FS Report) identifies and evaluates remedial alternatives to address environmental risks resulting from the former operation of a manufactured gas plant (MGP) at Wadsworth Street in Geneva, New York (the site; Figure 1). These environmental risks, generally related to byproducts associated with the former MGP operations such as coal tar and spent purifier wastes, are present within subsurface portions of the site.

This FS Report was prepared on behalf of NYSEG (New York State Electric & Gas Corporation) by ARCADIS, in accordance with an Order on Consent (Index No. D0-0002-9309, effective March 30, 1994) between NYSEG and the New York State Department of Environmental Conservation (NYSDEC). This FS Report represents the continuation of site characterization (SC) and remedial investigation (RI) efforts completed by NYSEG to assess the presence and extent of MGP-related impacts and to evaluate whether identified MGP-related impacts posed a significant threat to human health and the environment. Results of the SC and RI work were presented in the Remedial Investigation Report (RI Report) that was sent to the NYSDEC and New York State Department of Health (NYSDOH) in February 2008 (ARCADIS, 2008). As summarized in the RI Report (ARCADIS, 2008), 24 soil borings were advanced, nine monitoring wells were installed, five test pits were excavated and approximately 60 environmental samples were collected and chemically analyzed during the SC and RI. RI investigation locations are summarized on Figure 2.

The overall objective of this FS Report is to use the information learned during the RI to identify, evaluate and recommend remedial alternatives that are protective of human health and the environment; and to comply with state and federal requirements that are legally applicable or relevant and appropriate to the remedial actions to the extent practicable, and are cost effective. Specific remedial action objectives (RAOs) have been developed for the site. The RAOs (presented in Section 3) consider the nature and extent of environmental affects, current and foreseeable future site uses, potential exposure pathways and related risks, and applicable regulations and guidance. In preparing this FS Report, the following documents, regulations and guidance were considered and incorporated as warranted:

- Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, 42 U.S.C. Sections 9601 et seq., as amended

- Applicable provisions of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) regulations contained in Part 300 of Title 40 of the Code of Federal Regulations (40 CFR 300)

- The United States Environmental Protection Agency (USEPA) guidance document titled, *Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA* (CERCLA Interim Final; USEPA, 1988)

- The NYSDEC Technical and Administrative Guidance Memorandum (TAGM) 4025 titled, *Guidelines for Remedial Investigations/Feasibility Studies*, dated March 31, 1989

- The NYSDEC TAGM 4030 titled, *Selection of Remedial Actions at Inactive Hazardous Waste Sites*, revised May 15, 1990 (TAGM 4030) (NYSDEC, 1990)

- 6 New York State Codes, Rules, and Regulations (NYCRR) Part 375 titled, *Environmental Remediation Programs,* dated December 14, 2006

- The NYSDEC Division of Environmental Remediation's (DER) *Draft DER-10 Technical Guidance for Site Investigation and Remediation*, dated December 2002 (NYSDEC, 2002)

1.2 Report Organization

This FS Report is organized as indicated in the table below.

Section	Purpose
Section 1 — Introduction	Introduces the FS Report and summarizes the physical site characteristics, history and the nature and extent of environmental affects.
Section 2 — Identification of Potential Standards, Criteria and Guidelines (SCGs)	Identifies the potential SCGs to be considered in the identification of remedial RAOs and remedial alternatives.

Section	Purpose
Section 3 — Development of Remedial Action Objectives	Presents the RAOs that have been identified for the site based on results of the RI (including the assessment of potential current and future site-related risks) and applicable SCGs.
Section 4 — Assembly of Remedial Alternatives	Identifies and presents screening results for remedial technologies selected for the site.
Section 5 — Detailed Evaluation of Remedial Alternatives	Describes and analyzes each remedial alternative using the criteria contained in 6NYCRR Part 375.
Section 6 — Comparative Analysis of Remedial Alternatives	Presents a comparative analysis of each of the site-wide remedial alternatives.
Section 7 — Selection of Preferred Alternatives	Identifies the recommended comprehensive remedial approach for the site.
Section 8 — References	Lists the references cited in the FS Report.

1.3 Project Area Description and Background

This section provides a brief overview of the physical setting of the site, including a summary of current property ownership and uses (Section 1.3.1) and historical site/property uses (Section 1.3.2). The information presented below is general; more detailed information can be found in the RI Report (ARCADIS, 2008).

1.3.1 Description of Site and Adjacent Properties

The site is located in the city of Geneva, near the northwestern shore of Seneca Lake in eastern Ontario County, New York (Figure 1). The former MGP site comprised a rectangular piece of land that is now located in a mixed commercial and residential area in the east-central part of Geneva, New York. Seneca Lake is located about 900 feet to the southeast. The site is bordered by Wadsworth Street to the east, a railroad to the south, a restaurant to the west and residential properties to the north. A dry cleaner is located northeast of the site, on the east side of Wadsworth Street. Railroad Place intersects Wadsworth Street and bisects the site. A gas holder and coal shed formerly stood where Railroad Place now runs. The city of Geneva's Public Safety Building (PSB) is located south of Railroad Place where several MGP structures previously existed. Figure 2 shows current tax map property boundaries and the locations of the former MGP structures as they relate to present-day features.

The area of the former MGP site north of Railroad Place is currently owned by NYSEG, while the area south of Railroad Place is owned by the city of Geneva. The area owned by NYSEG includes a grass-covered area in the eastern portion of the property and an asphalt parking lot comprises the western portion of the property. The restaurant leases the parking area from NYSEG. A gravel parking area located in the extreme northeast of NYSEG's property is apparently used by residential property owners. A gas regulator shed maintained by NYSEG sits near the intersection of Railroad Place and Wadsworth Street. The city of Geneva's PSB is located south of Railroad Place. The PSB comprises office space in the western portion and an attached pole barn structure in the eastern portion. The large parking lot that services PSB employees is located west of the PSB. A railroad is located immediately south of the PSB.

Based on utility drawings obtained from the city of Geneva, several utilities are located within the Railroad Place right-of-way, and transect former Gas Holder 1. Utilities present within Railroad Place include, but are not limited to:

- 24-inch active sanitary sewer
- 8-inch potable water mains
- 8-inch active natural gas lines

Figure 2 shows the location of the subsurface utilities at the site.

1.3.2 Site History

The gas plant was constructed in 1853 and included a retort and condenser house, purification building (including lime room, ammonia tank and cistern) coal shed and one gas holder. A second gas holder was constructed around 1900 in the northwest corner of the site. Between 1903 and 1909, the gas plant was demolished; the only remaining structures were the second gas holder, tool house and meter house. The remaining holder was demolished between 1915 and 1925. Between 1925 and 1943, a 500,000-cubic-foot gas holder and a regulator house were constructed at the site to serve as a storage/distribution facility. This newer holder could have served as a remote distribution holder for the Border City MGP, which was built as the Wadsworth MGP was decommissioned. The 500,000-cubic-foot gas holder was demolished sometime after 1946. Railroad Place was constructed through the center of the former MGP site, covering the location of the southernmost former gas holder. The locations of the historical MGP structures and present-day features are shown on Figure 2.

1.4 Nature and Extent of Environmental Impacts

As previously noted, the RI Report (ARCADIS, 2008) summarized the results of numerous environmental investigations and related remedial efforts (e.g., trenching activities to facilitate the city of Geneva's water line installation) that have been conducted within the site to address certain MGP-related impacts. This section describes the hydrogeologic and environmental conditions in the site, and summarizes the potential risks to human health and the environment. This information is summarized from the RI Report (ARCADIS, 2008); additional information can be found in that report. The information is presented in the following order:

- Geology/Hydrogeology
- Surface Soil Quality
- Subsurface Soil Quality
- Soil Vapor
- Groundwater Quality
- Soil Vapor Intrusion
- Assessment of Site Risks

1.4.1 Geology/Hydrogeology

Three geologic units were observed/investigated beneath the site during the RI. In descending order these are fill, silt and clay, and fine sand. These units comprise at least the upper approximately 40 feet of materials that underlie the site. Because the deepest investigation location terminated approximately 40 feet below grade, the geologic materials below 40 feet are unknown. Regional geologic information from a nearby location (the NYSEG Border City site located approximately ½ mile east of the site) indicates that a clay confining unit may be located at a depth of 85 feet below grade.

In terms of hydrogeology, the fill is the least significant unit because it is typically unsaturated. However, the fill is saturated in the southern portion of the site, in the area of the PSB. The saturated portion of the fill is only a few feet in thickness. The bottom of the fill is typically encountered at approximately 4 to 8 feet below grade. The silt and clay is continuous across the site and is generally 12 to16 feet thick; however, the silt and clay is artificially thin (approximately 1 foot thick) in the area of former Gas Holder 1. The water table resides in the silt and clay in the northern portion of the site. The silt and clay grades into a fine sand unit at approximately 18 to 20 feet below grade. The fine sand is at least 22 feet thick.

The horizontal hydraulic conductivity (ability of the units to transmit groundwater horizontally) of the silt and clay and fine sand appears to be similar. The average linear velocity for these units is low, approximately 0.09 feet/day. The vertical hydraulic conductivity of the silt and clay is expected to be much less because of the bedding and horizontal laminations observed in this unit. Groundwater in this unit likely moves more rapidly laterally along bedding than vertically across the bedding. Because of this anisotropy, the silt and clay unit is significant hydrogeologically because it may limit recharge to the fine sand unit by restricting downward infiltration of precipitation.

Groundwater beneath the site moves north-northeast. Although groundwater appears to flow away from Seneca Lake, a regional groundwater discharge boundary, it is likely that site groundwater eventually finds its way to Seneca Lake. Local variability in groundwater flow direction is common in glacial/glacio-lacustrine depositional settings (such as the site area) due to the heterogeneous nature of glacially derived overburden materials.

1.4.2 Surface Soil Quality

Laboratory analytical results for the soil samples collected as part of the RI are summarized in Table 1-1. Six surface (0 to 0.2 feet) soil samples were collected and analyzed for semi-volatile organic compounds (SVOCs), volatile organic compounds (VOCs) and total cyanide. Surface soil samples consisted of SS-1 through SS-6 and were all collected within the confines of the site. Surface soil sampling locations are shown on Figure 2. All surface soil data were compared to 6 NYCRR Part 375 soil cleanup objectives (SCOs) for unrestricted use (NYSDEC, 2006a).

A limited number of VOCs (acetone, benzene, toluene) were detected in the surface soil samples. Acetone was the only VOC to exceed the SCOs for unrestricted use. As acetone is not attributed to MGP-related impacts, it would not be evaluated further in this FS Report.

Fifteen SVOCs including acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, dibenzofuran, fluoranthene, fluorine, indeno(1,2,3-cd)pyrene phenanthrene and pyrene were detected in one surface soil sample (SS-1) at concentrations that exceeded their SCOs. For the remainder of the surface soil samples, the only other soil exceedances were benzo(k)fluoranthene at SS-2 and benzo(a)pyrene at SS-5 and SS-6.

Total cyanide was not detected above the SCOs for unrestricted use of 27 milligrams per kilogram (mg/kg). Total cyanide was detected in samples SS-1 and SS-5 with concentrations of 1.4 and 2.9 mg/kg, respectively.

1.4.3 Subsurface Soil Quality

The quality of soils beneath the site was evaluated by observing visually impacted soils and comparing soil analytical results to the commercial SCOs for the protection of public health as presented in the NYSDEC Part 375 regulations. That comparison found that benzene, toluene, ethylbenzene and xylene (BTEX) and polycyclic aromatic hydrocarbon (PAH) concentrations exceeded the SCOs in only a few relatively isolated areas. Visual impacts and soil analytical results are summarized in Section 1.4.3.1.

1.4.3.1 Visual NAPL Impacts in Subsurface Soil

Soil collected from subsurface investigation locations was visually characterized and the presence of potential impacts (nonaqueous-phase liquid [NAPL], sheen, odor, staining) was noted. Observed odor/sheens, NAPL blebs and samples saturated with NAPL were observed at 10 of the 30 subsurface investigation locations. Indications of only odor were observed at five of these 10 locations.

The remaining five locations mostly contained trace-to-little amounts of tar and/or sheen and odor. Indications of NAPL and/or sheen were observed in three areas of the site: former Gas Holder 1, an unknown buried structure at the SB-14 borings and at MW-3 (near the former purifier house). Additional details regarding the observations in these three areas are provided below.

Former Gas Holder 1

A trace-to-little viscous, tarlike NAPL was observed at three soil borings (SB-5, SB-7 and SB-13) drilled inside the footprint of former Gas Holder 1. The soil boring logs indicate that the NAPL was present in the form of droplets and blebs, pooled potentially mobile NAPL was not observed within the soil borings installed in this holder. The interval that the viscous tar was observed at each location corresponds to immediately above and below the floor of the holder at a depth interval of approximately 16 to 23 feet below grade (the holder floor was encountered at approximately 18 feet below grade). The deepest impact observed in the area of former Gas Holder 1 is a trace sheen observed at approximately 28 to 29 feet below grade at SB-13. No impacts were observed in soils encountered below this interval.

Buried Structure at SB-14

A potential buried structure, as evidenced by void space encountered during drilling, was observed at the first boring (SB-14A) completed at the SB-14 location. The void was encountered at approximately 4 to 6.5 feet below grade, and contained water (likely perched) and a black oil-like fluid. Drilling at boring SB-14A was not advanced beyond the floor of the buried structure and was discontinued at approximately 6.5 feet below grade. A second boring (SB-14B) was drilled approximately 5 feet west in an attempt to miss the apparent structure. Strong odors and relatively minor photo ionization detector (PID) readings were observed at SB-14B to approximately 14 feet below grade; however, analytical results from SB-14B (10 to 12 feet) indicate that BTEX was not detected and PAHs were not detected at concentrations above the unrestricted use SCO.

Former Lime House or Purifier House

MGP-related impacts were observed at MW-3, where a moderate to faint odor, trace sheen and/or slightly elevated PID readings (up to 42 parts per million [ppm]) were noted intermittently between 10 and 22 feet below grade. The soil boring for MW-3 was drilled through a brick foundation. The impacts were observed below the foundation. As shown on Figure 2, the foundation could be part of the former MGP, possibly associated with the former lime house or purifier house.

1.4.3.2 Subsurface Soil Analytical Results

Laboratory analytical results for the soil samples collected as part of the RI are summarized in Table 1-1. To evaluate the potential significance of the results, soil analytical results were compared to the unrestricted and restricted use SCOs for the protection of public health as presented in the NYSDEC's Part 375 Regulations. The commercial SCOs are the focus of the discussion below because the current and intended use of the site is commercial. Soil analytical results that exceed the commercial SCOs are shown on Figure 7. The discussion below focuses on BTEX, PAHs and cyanide because these are the constituents of concern (COCs) associated with MGP sites.

BTEX

A total of 31 subsurface soil samples were collected and analyzed for VOCs. All but four of the 31 samples contained detectable concentrations of BTEX compounds. Concentrations of total BTEX ranged from 0.002 ppm (SB-2 [8 to 10 feet]) to 980 ppm (SB-13 [16 to 18 feet]). The highest concentrations of total BTEX were in samples collected from the visually impacted material (discussed above) at SB-5, SB-7, SB-13 and SB-14A. Only two samples contained concentrations of benzene above the commercial SCO: SB-13 (16 to 18 feet) at 240 ppm and SB-14A (4 to 6.5 feet) at 64 ppm. No samples contained concentrations of toluene, ethylbenzene or xylenes above commercial SCOs.

PAHs

A total of 31 subsurface soil samples were collected and analyzed for SVOCs. All but two of the 31 samples contained detectable concentrations of PAH compounds. Concentrations of total PAHs ranged from 0.011 ppm (TP-1 [7 feet]) to 11,000 ppm (SB-5 [23 to 23.3 feet]). Similar to the concentration trend observed for BTEX, the highest concentrations of total PAHs were in samples collected from the visually impacted material (discussed above) at MW-3, SB-5, SB-7, SB-13 and SB-14A. Samples collected from visually non-impacted intervals contained concentrations of total PAHs less than 50 ppm. Ten samples contained concentrations of one or more PAHs above the commercial SCO. Eight of these samples correspond to the areas where visually impacted material was observed. The remaining two samples were collected from SB-9 (6 to 6.8 feet) and SB-12 (16 to 18 feet). These two samples contained concentrations of benzo(a)pyrene and/or dibenz(a,h)anthracene at levels slightly above the commercial SCO.

Cyanide

A total of 31 subsurface soil samples were collected and analyzed for total cyanide. Ten of the 31 samples contained detectable concentrations of total cyanide. Concentrations of total cyanide ranged from 0.87 ppm (SB-8 [14 to 16 feet]) to 2,170 ppm (SB-14A [4 to 6.5 feet]). The sample containing the second highest concentration of total cyanide (26.7 ppm) was collected from SB-13 (16 to 18 feet). The sample from SB-14A was the only sample containing a concentration greater than the commercial SCO for total cyanide. The distribution of cyanide detected in soil is a reflection of the presence of fill material across the site that contains apparent MGP wastes (e.g., clinkers, ash, cinders, purifier wastes). Because MGP wastes sometimes contain cyanide, and MGP-related wastes (mostly in the former of cinders and ash) were observed in nearly every subsurface investigation location, it is not surprising that cyanide was detected in subsurface soils in many areas of the site. Although cyanide was detected at several locations, the concentrations were relatively low (generally detected at less than 20 ppm), with the exception of the sample from SB-14A that was saturated with NAPL.

1.4.4 Groundwater Quality

Laboratory analytical results for the soil samples collected as part of the RI is summarized in Table 1-2. Groundwater quality was evaluated by comparing the analytical results of groundwater samples to appropriate NYSDEC Division of Water, Technical and Operational Guidance Series (TOGS 1.1.1) criteria. The interval of groundwater that was evaluated is the groundwater in the silt and clay and upper few feet of fine sand. The quality in these units was found to be unaffected by BTEX and PAHs, except at well MW-3. The sample from this well contained BTEX and several PAHs above TOGS criteria.

The source of these constituents could be associated with the former lime house, purifier house or other former MGP structures located beneath the PSB which are hydraulically upgradient of Gas Holder 1.. Although no monitoring wells were installed inside/immediately near former Gas Holder 1 or the buried structure at SB-14A, it is reasonable to assume that groundwater in immediate contact with soils at these locations may exceed the TOGS criteria for BTEX and PAHs, but MGP-related COCs have not been detected hydraulically downgradient from these structures at offsite well MW-7, indicating that they are not a source of dissolved-phase hydrocarbons to groundwater. In addition, MGP-related NAPL has not been observed in any monitoring wells and does not appear to be mobile.

Groundwater in the silt and clay and fine sand was found to contain low-level concentrations of total cyanide over a broader area than the region of groundwater affected by BTEX and PAHs. Low levels of cyanide were detected in all monitoring wells located near and downgradient of the former lime house/purifier house and former Gas Holder 1. Monitoring wells MW-2 and MW-3 are the only wells containing groundwater with total cyanide concentrations above the TOGS criteria. MW-2 is located inside the footprint of former Gas Holder 2 (a formerly at-grade holder) and MW-3 is located at/near the former lime house/ purifier house.

1.4.5 Soil Vapor

A soil vapor intrusion investigation was conducted at the city of Geneva’s PSB located in the southern half of the site (Figure 2). The investigation involved collecting soil vapor samples from below the floor slab of the building, and samples of air inside and outside of the building. The investigation found that several VOCs were present in vapor samples collected beneath the building foundation slab and in the air inside the building; however, it was not possible to attribute the VOCs to a particular source. Several of the VOCs (most notably BTEX and naphthalene) are potentially related to the former MGP, but these same compounds have other possible non-MGP sources such as gasoline. Other detected VOCs, such as trichloroethene, are clearly not related to the former MGP. The levels of VOCs detected in indoor air were below appropriate criteria. Based on the investigation results, subsurface byproducts of the former MGP do not appear to be contributing VOCs to the indoor air at the PSB via soil vapor intrusion.

The presence of alkanes in the sub-slab vapor samples suggests that the presence of BTEX and naphthalene may be related to a gasoline source. However, the groundwater data from one of the five monitoring wells proximate to the PSB (i.e., MW-3, located just north of the PSB), exhibited characteristics likely related to MGP waste (i.e., polycyclic aromatic hydrocarbons, total cyanide and BTEX). In light of this, it is possible that some fraction of the BTEX and naphthalene measured in the sub-slab vapor samples may be attributed to MGP byproducts and that there could be sub-slab vapor-phase commingling of these compounds from both a gasoline and an MGP source.

The NYSDEC and the NYSDOH concluded that the levels of BTEX and naphthalene detected below the slab present a potential for future soil vapor intrusion into the PSB. As such, the NYSDEC and the NYSDOH requested that NYSEG either install a sub-slab depressurization system or conduct additional vapor sampling during the 2007/2008 winter season.

Based on the findings of the sub-slab pressure field testing conducted during January 2008 and the heating, ventilation and air conditioning (HVAC) air balance evaluation conducted during April 2008, ARCADIS determined that the installation of a sub-slab depressurization by itself to address vapor intrusion concerns at the PSB is not feasible due to the inability to induce an effective sub-slab negative pressure throughout a majority of the building. NYSEG conducted an interim remedial measure (IRM) during 2008 and 2009, consisting of a combination of a sub-slab depressurization vapor intrusion mitigation system and adjustments to the HVAC operational set points to minimize or eliminate the positive pressure conditions in the PSB relative to conditions beneath the slab. Routine maintenance and operational checks of the depressurization and HVAC systems would be recommended annually to verify proper system operation. The potential for soil vapor issues on the NYSEG-owned property north of the PSB remains a concern should the property use ever change.

1.4.6 Assessment of Site Risks

Based on the investigation activities and results described in the RI Report (ARCADIS, 2008) (summarized above), as well as information concerning current and potential future site uses, a risk evaluation was included in the RI Report (ARCADIS, 2008). The risk evaluation included performing a Fish and Wildlife Resource Impact Analysis (FWRIA) (through Part 1: Resource Characterization) and a qualitative Human Health Exposure Evaluation (HHEE). The summary and conclusions of the FWRIA and HHEE are presented below.

Fish and Wildlife Resource Impact Analysis

The FWRIA for the site was conducted in accordance with NYSDEC (1994 and 2002a) guidance. No threatened or endangered plant or animal species were found to inhabit the site or the immediate surrounding areas. The site is predominately characterized by paved (asphalt) and unpaved (gravel) surfaces and a commercial building, which provide no value to wildlife. The areas of mowed lawn and seasonal grasses and shrubs on site provide limited wildlife habitat conducive to foraging, nesting and/or cover. Due to the general lack of natural resources and the surrounding industrial/commercial/residential land use, fauna that may use site resources are most likely restricted to those typical of an urban setting. Exposure to onsite surface soils is identified as a potentially complete exposure pathway.

The criteria-specific analysis found that three PAHs (acenaphthene, benzo(a)pyrene and fluorene) exceeded their associated SCOs in surface soil samples collected from the mowed lawn area. The site contains only a small area of natural habitat, which, coupled with surrounding land use, most likely limits wildlife use of the site. Therefore, ecological exposures to surface soil are not considered to be significant.

Human Health Exposure Evaluation

Analytical data indicate that benzene and PAHs are present in subsurface soil at concentrations exceeding NYSDEC-recommended values. The majority of the site is covered by asphalt road and parking lots, and a commercial building. As such, the potential for exposure to constituents of potential concern (COPCs) in subsurface soils is limited to hypothetical future construction and maintenance workers that might be engaged in intrusive activities, although potential exposures could be mitigated through the use of personal protective equipment (PPE). Potential exposures of residents, commercial visitors and trespassers to constituents in subsurface soils are unlikely because these receptors would not be involved in intrusive activities.

Surface soils represent a potentially complete exposure pathway for trespassers, residents, commercial visitors, maintenance workers and construction workers. However, potential exposures to COPCs in surface soil (i.e., PAHs) are limited to the sparse areas of exposed soil within the gravel parking lot. PAH concentrations exceeding the NYSDEC screening criteria in the surface soil were generally limited to the area of the former Gas Holder 1 (as shown by SS-1 analytical results). Benzo(a)pyrene was the only PAH that exceeded criteria outside of this area, with slight exceedances occurring near the northern boundary of the site (SS-5 and SS-6).

Groundwater beneath the site is not used as a potable source; therefore, exposure via ingestion of groundwater is unlikely. Likewise, exposure of trespassers, commercial visitors and residents to groundwater is unlikely based on the depth to groundwater and the lack of surface expressions (i.e., seeps). Hypothetical future construction and maintenance workers may be exposed to shallow groundwater during intrusive activities, but exposures would likely be mitigated with the use of PPE.

Although subsurface byproducts of the MGP do not appear to be currently affecting indoor air quality at the PSB, sub-slab soil vapor concentrations for several VOCs, which may not be entirely MGP related, are believed by the NYSDEC and the NYSDOH to have the potential for future intrusion into the PSB.

The information presented in the RI Report (ARCADIS, 2008) and summarized in this section provides an assessment regarding the type, nature and extent of MGP-related impacts for the site. This information serves as the basis for the development and evaluation of remedial alternatives presented in the following sections.

2. Identification of Potential Standards, Criteria and Guidelines

This FS Report was prepared in general conformance with the applicable SCGs set forth in TAGM 4025 (NYSDEC, 1989) and TAGM 4030 (NYSDEC, 1990), Draft DER-10 and the NCP. Part of the process of identifying, evaluating and selecting a remedial approach for a site is to review SCGs that may be potentially applicable to the site and/or contemplated remedial actions. Understanding potential federal, state and local SCGs assists in identifying remedial objectives for the site, the type of remedial alternatives that may be appropriate and the scope and extent to which each retained alternative would be implemented. Although this section discusses the potential SCGs associated with these documents, these potential SCGs do not dictate required remedial actions or remediation cleanup levels.

The potential SCGs that have been identified for the project are presented in the following sections.

2.1 Definition of SCGs

“Standards and criteria” are cleanup standards, standards of control and other substantive environmental requirements, criteria or limitations promulgated under federal or state law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location or other circumstance.

“Guidelines” are nonpromulgated criteria, advisories and/or guidance that are not legal requirements and do not have the same status as “standards and criteria;” however, remedial alternatives should consider guidance documents that, based on professional judgment, may be applicable to the project.

Within the context of this FS Report, it is important to consider SCGs and the manner in which they may influence or shape the conceptual design and implementation of the remedial alternatives under consideration. Doing so allows for the development of each alternative to a reasonably accurate level of detail and provides for a common basis for comparison among alternatives.

2.2 Types of SCGs

The NYSDEC has provided guidance on the application of SCGs during the FS process. SCGs would be progressively identified on a site-specific basis as the FS proceeds. The potential SCGs considered in this FS Report were categorized into the following NYSDEC-recommended classifications:

- *Chemical-Specific SCGs*. These SCGs are usually health- or risk-based numerical values or methodologies, which, when applied to site-specific conditions, result in the establishment of numerical values for each COC. These values establish the acceptable amount or concentration of constituents that may be found in, or discharged to, the ambient environment.

- *Action-Specific SCGs*. These SCGs are usually technology- or activity-based requirements or limitations on actions taken with respect to hazardous waste management and site cleanup.

- *Location-Specific SCGs*. These SCGs are restrictions placed on the concentration of hazardous substances or the conduct of activities solely because they occur in specific locations.

Potential SCGs applicable to this site are discussed in Section 2.3.

2.3 Standards, Criteria and Guidelines

The SCGs identified for the evaluation of remedial alternatives are presented in Sections 2.3.1, 2.3.2, and 2.3.3.

2.3.1 Chemical-Specific Standards, Criteria and Guidelines

The potential chemical-specific SCGs for the site are summarized in Table 2-1.

The SCOs presented in 6 NYCRR Part 375-6 are chemical-specific SCGs that are relevant and appropriate to the site. Chemical-specific SCGs that potentially apply to the waste materials generated during remedial activities are the Resource Conservation and Recovery Act (RCRA) and New York State regulations regarding the identification and listing of hazardous wastes outlined in 40 CFR 261 and 6 NYCRR Part 371, respectively. Included in these regulations are the regulated levels for the Toxicity Characteristic Leaching Procedure (TCLP) constituents. The TCLP constituent levels are a set of numerical criteria at which solid waste is considered a hazardous waste by the characteristic of toxicity. In addition, the hazardous characteristics of ignitability, reactivity and corrosivity may also apply, depending upon the results of waste characterization activities.

Another set of chemical-specific SCGs that may apply to waste materials generated at the site (e.g., soils that are excavated and determined to be a hazardous waste) are the USEPA Universal Treatment Standards/Land Disposal Restrictions (UTSs/LDRs), as listed in 40 CFR Part 268. These standards and restrictions identify those hazardous wastes for which land disposal is restricted and define acceptable treatment technologies or concentration limits for those hazardous wastes on the basis of their waste code characteristics. The UTSs/LDRs also provide a set of numerical criteria at which a hazardous waste is restricted from land disposal, based on the concentration of select constituents present. In addition, the UTSs/LDRs define hazardous waste soil and hazardous waste debris, and specify alternative treatment standards and methods required to treat or destroy hazardous constituents on or in hazardous waste debris. Based on the current site knowledge, and analysis performed to date, wastes encountered at the site are not listed hazardous wastes.

Pursuant to the USEPA's “Contained-in Policy,” environmental media (soil, groundwater and sediment) and debris impacted by a hazardous waste are subject to RCRA hazardous waste management requirements until they no longer contain the hazardous waste. Specifically, environmental media/debris that has been impacted by a release of characteristic hazardous waste must be managed as hazardous waste until the media/ debris no longer exhibits that characteristic (based on laboratory testing). UTS/LDR requirements would continue to apply for the waste in accordance with 40 CFR Part 268. In addition, environmental media/debris containing a listed hazardous waste must be managed as hazardous waste until the media/debris no longer contains the listed hazardous waste at concentrations exceeding health-based levels. Under certain circumstances, the UTS/LDR requirements might continue to apply. Although the USEPA has not established generic health-based “contained-in” levels for listed hazardous wastes, they authorized individual states to establish their own levels. The NYSDEC has established “contained-in” criteria for environmental media and debris, which are presented in TAGM 3028 titled, “Contained-In Criteria” for Environmental Media; Soil Action Levels (NYSDEC, 1997).

Groundwater beneath the site is classified as Class GA and, as such, the New York State Groundwater Quality Standards (6 NYCRR Parts 700-705) and ambient water quality standards presented in the NYSDEC's Division of Water, TOGS 1.1.1 Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations (NYSDEC, reissued June 1998 and addended April 2000) are potentially applicable chemical-specific standards even though groundwater at the site is not currently, and would not likely in the future, be used as a potable water supply. These standards identify acceptable levels of constituents in groundwater based on potable use.

The NYSDOH has released guidance entitled, Guidance for Evaluating Soil Vapor Intrusion in the State of New York (NYSDOH, 2006). This document provides guidance on identifying and addressing current and potential human exposures to contaminated subsurface vapors associated with known or suspected volatile chemical contamination. While vapor intrusion may also occur with "naturally occurring" subsurface gases (e.g., radon, methane and hydrogen sulfide), the document discusses soil vapor intrusion in terms of environmental contamination only. The guidance is applicable anywhere a soil vapor intrusion investigation is warranted in the state of New York. As previously discussed, an IRM to address potential vapor intrusion concerns is scheduled to be implemented in 2008.

2.3.2 Action-Specific Standards, Criteria and Guidelines

The potential action-specific SCGs for this site are summarized in Table 2-2. Action-specific SCGs include general health and safety requirements, and general requirements regarding handling and disposing of waste materials (including transportation and disposal, permitting, manifesting, disposal and treatment facilities), discharge of water generated during implementation of remedial alternatives, and air monitoring requirements for site activities (including permitting requirements for onsite treatment systems).

The NYSDEC Division of Air Resources (DAR) policy document DAR-1: Guidelines for the Control of Toxic Ambient Air Contaminants (formerly issued as Air Guide 1), incorporates applicable federal and New York State regulations and requirements pertaining to air emissions, and may be applicable for soil or groundwater alternatives that result in certain air emissions. Community air monitoring may be required in accordance with the NYSDOH Generic Community Air Monitoring Plan (2000). New York Air Quality Standards provides requirements for air emissions (6 NYCRR Parts 257). Emissions from remedial activities shall meet the air quality standards based on the air quality class set forth in the New York State Air Quality Classification System (6 NYCRR Part 256) and the permit requirements in New York Permits and Certificates (6 NYCRR Part 201).

One set of potential action-specific SCGs for the site consists of the LDRs, which regulate land disposal of hazardous wastes. The LDRs are applicable to alternatives involving the disposal of hazardous waste (if any). Because MGP wastes resulted from historical operations that ended before the passage of RCRA, MGP-impacted material is only considered a hazardous waste in New York if it is removed (generated) and it exhibits a characteristic of a hazardous waste. However, if the MGP-impacted material only exhibits the hazardous characteristic of toxicity for benzene (D018), it is conditionally exempt from the hazardous waste management requirements (6 NYCRR Parts 370-374 and 376) when destined for thermal treatment in accordance with the requirements set forth in the NYSDEC's TAGM HWR-4061, Management of Coal Tar Waste and Coal Tar Contaminated Soils and Sediment from Former Manufactured Gas Plants (NYSDEC, 2002a). If MGP-related hazardous wastes are destined for land disposal in New York, the state hazardous waste regulations apply, including LDRs and alternative LDR treatment standards for hazardous waste soil.

The LDR for hazardous waste soils is a 90% reduction in constituent concentration capped at 10 times the Universal Treatment Standards (10xUTSs). This means that if concentrations of constituents in excavated soil exceed 10xUTSs, the soil would have to be treated to reduce constituent concentrations to below 10xUTSs prior to land disposal. Under the Phase IV, Part 2 regulations, characteristically hazardous MGP-impacted soil may be rendered nonhazardous after generation at the remediation site by mixing the soil with clean materials to render the impacted soil amenable to treatment and to reduce concentrations of the chemical constituents in soil to less than the hazardous characteristic(s). Following mixing, the soil would no longer be considered a hazardous waste, but would still have to meet the LDR requirements.

The NYSDEC would no longer allow amendment of soil at MGP sites with lime kiln dust/quick lime due to vapor issues associated with its use. Guidance issued in the form of a letter from the NYSDEC to the NYS utility companies, dated May 20, 2008, indicated that lime kiln dust/quick lime would not be permitted for use during future remedial activities.

The United States Department of Transportation (USDOT) and New York State rules for the transport of hazardous materials are provided in 49 CFR Parts 107 and 171.1 through 172.558 and 6 NYCRR 372.3. These rules include procedures for packaging, labeling, manifesting and transporting hazardous materials and would be potentially applicable to the transport of hazardous materials under any remedial alternative. New York State requirements for waste transporter permits are included in 6 NYCRR Part 364 along with standards for the collection, transport and delivery of regulated wastes within New York. Contractors transporting waste materials off site during the selected remedial alternative must be permitted.

The National Pollutant Discharge Elimination System (NPDES) program is also administered in New York by the NYSDEC as a State Pollutant Discharge Elimination System (SPDES). If the selected remedial alternative for the site results in discharges to a publicly owned treatment works (POTW) (due to dewatering or other activities), discharge limits must be established with the receiving facility.

Remedial alternatives conducted within the site must comply with applicable requirements outlined under the Occupational Safety and Health Act (OSHA). General industry standards are outlined under OSHA (29 CFR 1910) that specify time-weighted average concentrations for worker exposure to various compounds and training requirements for workers involved with hazardous waste operations. The types of safety equipment and procedures to be followed during site remediation are specified under 29 CFR 1926, and record keeping and reporting-related regulations are outlined under 29 CFR 1904.

In addition to the requirements outlined under OSHA, the preparedness and prevention procedures, contingency plan and emergency procedures outlined under RCRA (40 CFR 264) are potentially relevant and appropriate to those remedial alternatives that include generation, treatment or storing hazardous wastes.

2.3.3 Location-Specific Standards, Criteria and Guidelines

The potential location-specific SCGs for the site are summarized in Table 2-3. Examples of potential location-specific SCGs include regulations and federal acts concerning activities conducted in floodplains, wetlands, historical areas, and activities affecting navigable waters and endangered/threatened or rare species.

Location-specific SCGs also include local requirements, such as local building permit conditions for permanent or semi-permanent facilities constructed during the remedial activities (if any), and local pollution requirements (air and noise).

3. Development of Remedial Action Objectives

This section presents the RAOs that have been developed for environmental media (soil and groundwater) at the site. Based on considerations specific to the site, RAOs are identified to maintain and/or achieve conditions that are protective of human health and the environment. The RAOs that have been developed for the site are consistent with the remedy selection process described in 6 NYCRR Part 375. They are based on the results of completed site investigations, the SCGs presented in Section 2 of this FS Report and conclusions drawn from the HHEE and FWRIA. Once defined, the RAOs will be used to identify the scope of potential remedial alternatives presented in Section 5 of this FS Report.

The RAOs developed for the site are presented in the following table, and further discussed in the text that follows the table.

Media/Operable Unit	Constituents/ Materials of Concern	Remedial Action Objectives
Surface Soil	COCs: PAHs	1. Reduce human exposure to soil containing COCs.
Subsurface Soil	COCs: BTEX, PAHs, cyanide, Materials of concern: MGP NAPL/Tar Purifier Waste	2. Reduce, to the extent practicable, human exposure to subsurface soil containing COCs. 3. Reduce, to the extent practicable, the potential for offsite migration of MGP-related source material.
Groundwater	COCs: BTEX, PAHs, cyanide Material of concern: MGP NAPL/Tar	4. Reduce, to the extent practicable, human exposure to COC-impacted groundwater. 5. Reduce, to the extent practicable, the presence of MGP-related source material that causes or contributes to exceedances of current NYS groundwater quality standards. 6. Restore, to the extent practicable, COC-impacted groundwater to current NYS groundwater quality standards.

For this FS Report and as previously defined, COCs include chemical constituents of interest that are attributable to former MGP operations. MGP-related source materials include visually observed MGP-related byproducts (coal tar).

Additional discussion concerning the development of each RAO is presented in Sections 3.1 and 3.2.

3.1 Surface and Subsurface Soil

The RAOs for soil were developed to be protective of human health and the environment, in consideration of the nature and location of soil impacts, applicable SCGs, potential current and future exposure pathways, and potential receptor populations. In addition, the RAOs for soil also consider the potential dissolution of MGP-related impacts in soil to groundwater.

RAOs 1, 2 and 3 are discussed below:

- RAO No. 1 and RAO No. 2 were identified to address potential exposure pathways to MGP-related impacts in soils. These pathways (i.e., inhalation, ingestion, direct contact) can be present for both surface soil and subsurface soil, and the remedial alternatives discussed in Section 5 consider the type, extent and relative frequency/intensity of the exposure pathways. For example, PAHs present in surface soils represent a potential exposure pathway for trespassers, residents, commercial visitors, maintenance workers and construction workers. However, potential exposures to PAHs in surface soil are limited to a relatively small area of exposed soil within the gravel parking lot and a mowed lawn area. For subsurface soil, COCs and materials of concern represent only a potential exposure pathway for hypothetical future construction and maintenance workers, and would likely be mitigated by using PPE. Therefore, the remedial alternatives presented in Section 5 consider, to varying degrees, removal/treatment, maintenance/restoration of existing surface covers and institutional controls.

- RAO No. 3 focuses on the potential for MGP-related impacts in soil to adversely affect groundwater. This RAO considers the potential interaction of soil and groundwater, and the potential for MGP-related impacts to serve as a potential “source” of impacts to groundwater. The development of remedial alternatives to address this RAO (Section 5) considers the current groundwater data, and current/future potential exposure pathways to these media. Note, the results of the RI did not indicate that the MGP-related impacts were currently mobile. The impacted materials within the former structure encountered in soil boring SB-14 have the highest likelihood of being mobile in the future, based on the physical characteristics of the structure and materials within the structure. The NAPL-impacted soils observed within Gas Holder 1 have limited potential for future mobility due to the limited volume of NAPL observed within the holder (primarily staining/sheens and NAPL droplets and blebs).

3.2 Groundwater

The RAOs for groundwater were developed to be protective of human health and the environment, in consideration of information obtained during the RI and related investigations, which include visual observations, chemical data from groundwater samples, applicable SCGs, potential current and future exposure pathways, and potential receptor populations. RAOs No. 4, 5 and 6 are discussed below:

- RAO No. 4 considers potential exposure pathways to MGP-related COCs in groundwater. These pathways (i.e., inhalation, ingestion, direct contact) are already limited based on several site considerations. Specifically, groundwater is not currently used for potable purposes at or in the vicinity of the site. In addition, MGP-related COCs have been detected above groundwater quality standards in only two monitoring wells (MW-2 and MW-3), concentrations at these locations have decreased through time and NAPL has not accumulated in any of the overburden monitoring wells. Therefore, the remedial alternatives evaluated in Section 5 of this FS Report primarily address this RAO via the establishment of institutional controls.

- RAO No. 5 seeks to decrease (to the extent practicable) the extent and/or magnitude of the dissolution of MGP-related impacts in soil to groundwater. In doing so, it is expected that overall groundwater conditions at MW-3 would improve, and that the concentrations of COCs in groundwater would be reduced, possibly to levels below applicable groundwater quality standards.

- RAO No. 6 focuses on achieving the applicable New York State groundwater standards. Groundwater in the site is classified as Class GA, and the New York State Groundwater Quality Standards and ambient water quality standards presented in NYSDEC’s TOGS 1.1.1 are applicable. Unlike RAO No. 4 (which focuses on groundwater exposure pathways) and RAO No. 5 (which seeks to decrease the presence of MGP-related impacts that cause or contribute to water quality exceedances), RAO No. 6 has the objective of achieving, to the extent practicable, a set of constituent-specific numerical standards.

4. Assembly of Remedial Alternatives

4.1 General

This section discusses potential remedial alternatives for each impacted medium at the site. As a first step, general response actions (GRAs) were identified to address surface soil, subsurface soil and groundwater impacted by MGP-related COCs. GRAs are medium-specific and describe those actions that would satisfy the RAOs. They may include various actions, such as treatment, containment, institutional controls, excavation or a combination of such actions. From the GRAs, potential technology types and process options were identified and screened to identify those that were the most viable for the site. Process options that survived the screening were used to develop potential remedial alternatives. These potential remedial alternatives are evaluated in Section 5.

According to the USEPA's Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (USEPA, 1988), the term "technology types" refers to general categories of technologies. The term "technology process options" refers to specific processes within each technology type. For each GRA identified, a series of technology types and associated process options has been assembled. Each identified technology type and process option is briefly described, and is evaluated against preliminary and secondary screening criteria. This approach was used to determine if a particular technology type or process option is applicable, given the site-specific conditions for remediation of the impacted media. Based on this screening, remedial technology types and process options were eliminated or retained and subsequently combined into potential remedial alternatives for further evaluation.

This approach is consistent with the screening and selection process provided in the NYSDEC's TAGM 4030, Selection of Remedial Actions at Inactive Hazardous Waste Sites (NYSDEC, 1990). The NYSDEC DER's Presumptive/Proven Remedial Technologies (DER-15) allows for use of the industry's considerable experience on remedial cleanups to quickly focus the evaluation of technologies on those that are already proven to be both feasible and cost-effective for specific site types/or contaminants. The objective of DER-15 is to use the NYSDEC's experience gained at remediation sites, and scientific and engineering evaluation of performance data to make remedy selection quicker and consistent. In addition, assuming that the use of the site and surrounding areas will not substantially change in the foreseeable future, the anticipated acceptance and support from the various stakeholders (including the city of Geneva, the NYSDEC, surrounding property owners and NYSEG) was considered during the screening process.

4.2 General Response Actions

Based on the RAOs identified in Section 3, the following site-specific GRAs were established for impacted media at the site:

- No Action
- Institutional Controls
- Surface Controls (surface and subsurface soil)
- In-Situ Containment/Controls
- In-Situ Treatment (subsurface soil and groundwater)
- Removal
- Ex-Situ Onsite Treatment
- Offsite Treatment and/or Disposal

Within each of these GRAs, remedial technology types were identified for each impacted medium as described in Section 4.3. A No Action GRA has been included and retained through the screening evaluation as required by the USEPA and NCP guidance.

4.3 Identification of Remedial Technologies

Remedial technology types that were potentially applicable for addressing the impacted media at the site were identified through a variety of sources, including vendor information, engineering experience and review of available literature that included the following documents:

- NYSDEC TAGM #4030 – Selection of Remedial Actions at Inactive Hazardous Waste Sites (NYSDEC, 1990)

- NYSDEC DER-15 – Presumptive/Proven Remedial Technologies (NYSDEC, 2007)

- Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (USEPA, 1988)

- Technology Screening Guide for Treatment of CERCLA Soils and Sludges (USEPA, 1988)

- Technology Briefs - Data Requirements for Selecting Remedial Action Technologies (USEPA, various dates)

- Remediation Technologies Screening Matrix and Reference Guide (USEPA and United States Air Force, 2002)

- Management of Manufactured Gas Plant Sites (Gas Research Institute, 1996)

According to the USEPA guidance (USEPA, 1988), technology types and process options can be identified by drawing on a variety of sources, including regulatory references and standard engineering texts not specifically directed toward impacted sites. Although each former MGP site offers its own unique site characteristics, the evaluation of remedial technology types and process options that are applicable to MGP-related impacts, or have been implemented at other MGP sites, is well documented. Therefore, this collective knowledge and experience, and regulatory acceptance of previous FSs performed on MGP-related sites with similar impacts, were used to reduce the universe of potentially applicable process options for the site to those with documented success with achieving similar RAOs.

The GRAs and technology types are included in Table 4-1 for surface soil, Table 4-2 for subsurface soil and Table 4-3 for groundwater.

4.4 Remedial Technology Screening

The potentially applicable remedial technology types and technology process options associated with each of the GRAs underwent preliminary and secondary screening to select the technologies that would most effectively achieve the RAOs identified for the site. Sections 4.4.1 and 4.4.2 summarize the preliminary and secondary screening evaluations.

4.4.1 Preliminary Screening

Preliminary screening was performed to reduce the number of potentially applicable technology types on the basis of technical implementability and effectiveness (long- and short-term). Technical implementability was determined using site characterization information collected during the remedial investigations, including the types and concentrations of impacts and site-specific conditions, to screen out technology types and process options that could not effectively be implemented at the site. The effectiveness of a technology is measured by its ability to meet the established RAOs.

4.4.1.1 Surface Soil

As presented in Table 4-1, the following remedial technology types were identified to address the GRAs identified for surface soil:

- No Action. No active remedial activities would be implemented to address the subsurface soil containing MGP-related impacts.

- Institutional Controls. Remedial technology types associated with this GRA consist of nonintrusive administrative controls focused on minimizing potential contact with MGP-related impacts.

- Surface Controls. The existing surface cover would be maintained to provide continued protection against potential exposure to surface soil containing COCs.

- In-Situ Containment/Controls. Remedial technology types associated with this GRA involve addressing the mobility and/or exposure to impacted surface soil without removing or otherwise treating them. Capping/surface cover was the technology type evaluated for this GRA.

- Removal. Remedial technology types associated with this GRA involve removal of surface soil containing COCs from the ground to achieve the established RAOs. Excavation was the technology type evaluated for this GRA.

- Ex-Situ Onsite Treatment. Remedial technology types associated with this GRA consider the treatment of materials after they have been removed from the ground. Ex-situ onsite remedial treatment technology types evaluated under the preliminary screening evaluation consist of immobilization, extraction (thermal desorption) and thermal destruction.

- Offsite Treatment and/or Disposal. Potential remedial technology types associated with this GRA consider the offsite treatment of subsurface soil containing COCs after it has been removed from the ground. Offsite treatment and/or disposal technology types evaluated under the preliminary screening evaluation consist of recycle/reuse, extraction (thermal desorption) and disposal.

4.4.1.2 Subsurface Soil

As presented in Table 4-2, the following remedial technology types were identified to address the GRAs identified for subsurface soil:

- *No Action*. No active remedial activities would be implemented to address the subsurface soil containing MGP impacts.

- *Institutional Controls*. Remedial technology types associated with this GRA consist of nonintrusive administrative controls focused on minimizing potential contact with MGP impacts.

- *Surface Controls*. The existing surface cover would be maintained to provide continued protection against potential exposure to subsurface soil containing COCs.

- *In-Situ Containment/Controls*. Remedial technology types associated with this GRA involve addressing the mobility and/or exposure to impacted subsurface soil without removing or otherwise treating them. Remedial technology types evaluated under the preliminary screening process consisted of capping/surface cover and containment.

- *In-Situ Treatment*. Remedial technology types associated with this GRA involve addressing the subsurface soil without removing the materials, but treating them to remove or otherwise alter the MGP impacts to achieve the established RAOs. Remedial technology types evaluated for the site included immobilization, extraction, chemical treatment and biological treatment.

- *Removal*. Remedial technology types associated with this GRA involve removal of subsurface soil containing COCs from the ground to achieve the established RAOs. Excavation was the technology type evaluated for this GRA.

- *Ex-Situ Onsite Treatment*. Remedial technology types associated with this GRA consider the treatment of materials after they have been removed from the ground. Ex-situ onsite remedial treatment technology types evaluated under the preliminary screening evaluation consist of immobilization, extraction (thermal desorption) and thermal destruction.

- *Offsite Treatment and/or Disposal*. Potential remedial technology types associated with this GRA consider the offsite treatment of subsurface soil containing COCs after it has been removed from the ground. These remedial treatment technologies consist of recycle/reuse, extraction (thermal desorption) and disposal.

4.4.1.3 Groundwater

As presented in Table 4-3, the following remedial technology types were identified to address the GRAs identified for groundwater:

- *No Action*. No active remedial activities would be implemented to address the COC-impacted groundwater.

- *Institutional Controls*. Remedial technology types associated with this GRA generally consist of nonintrusive administrative controls focused on minimizing potential contact or use of the groundwater. Institutional controls evaluated under the preliminary screening consisted of groundwater use restrictions in the form of governmental and/or proprietary controls, enforcement and/or permit controls and informational devices.

- *In-Situ Containment/Controls*. Remedial technology types associated with this GRA involve addressing the COC-impacted groundwater without removing or otherwise treating the groundwater. Hydraulic control was the technology type evaluated for this GRA.

- *In-Situ Treatment*. Remedial technology types associated with this GRA involve addressing the COC-impacted groundwater without extracting the groundwater. These remedial technology types would remove or otherwise alter the MGP residuals in groundwater to achieve the RAOs for the site. Remedial technology types evaluated included biological treatment and chemical treatment.

- *Removal*. Remedial technology types associated with this GRA involve the removal of COC-impacted groundwater. Groundwater and/or NAPL extraction was the technology type evaluated for this GRA.

- *Ex-Situ Onsite Treatment*. Remedial technology types associated with this GRA consider the treatment of COC-impacted groundwater after the groundwater has been removed. Ex-situ onsite remedial treatment technologies evaluated to address the extracted groundwater under the preliminary screening evaluation consisted of chemical treatment and physical treatment.

- *Offsite Treatment and/or Disposal*. Remedial technology types associated with this GRA consider the offsite disposal of site groundwater that has been removed as part of a remedial alternative or to facilitate the implementation of a remedial alternative.

4.4.2 Secondary Screening

To further reduce the potentially applicable technology types and process options to be assembled into remedial alternatives, process options for site media were subjected to a secondary screening. The objective of the secondary screening was to choose, when possible, one process option to represent each technology type to simplify the subsequent development and evaluation of the remedial alternatives without limiting flexibility during the remedial design. The secondary screening criteria are described below:

- *Effectiveness*. This criterion is used to evaluate each technology process option with respect to other process options within the same technology type. This evaluation focused on the following process options:

    - potential effectiveness at meeting the RAOs by reducing the toxicity, mobility and/or volume of chemical constituents in the impacted medium

    - potential impacts to human health and the environment during the construction and implementation phase

    - reliability with respect to the nature and extent of impacts and conditions at the site

- *Implementability*. Implementability encompasses both the technical and administrative feasibility of implementing a process option. Because technical implementability was used during the preliminary screening, this subsequent, more detailed evaluation places more emphasis on the institutional aspects of implementability. This criterion also evaluates the ability to construct the process option, and availability of specific equipment and technical specialists to design, implement and operate and maintain the equipment.

- *Relative Cost*. This criterion evaluates the overall cost required to implement the remedial technology. As a screening tool, relative capital and operation and maintenance (O&M) costs are used rather than detailed cost estimates. For each remedial technology and associated technology process, relative costs are presented as low, moderate or high and made on the basis of engineering judgment.

Per the USEPA guidance (USEPA, 1988), the evaluation focuses on the effectiveness criterion, with less emphasis on the implementability and cost evaluation.

Results of the secondary screening of technology types and process options are also presented in Table 4-1 (surface soil), Table 4-2 (subsurface soil) and Table 4-3 (groundwater). The technology processes that were not retained have been shaded in these tables.

Based on the results of the secondary screening, the remedial technology types and process options that were retained for further evaluation are discussed below. The basis of selection for each representative subsurface soil and groundwater remedial technology type and process option is briefly presented.

For surface and subsurface soil, all ex-situ onsite treatment technologies were eliminated from further consideration. These technologies were eliminated due to considerations of the current use of the former MGP site, space limitations and generally high costs. Specifically, potential issues associated with ex-situ onsite treatment of soil included:

- Time constraints associated with onsite treatment technologies

- Potential public exposure to/acceptance of an onsite treatment system

- Adequate area within the site for treatment system construction, operation and soil/ groundwater handling

4.4.2.1 Surface Soil

No Action. Consistent with the NCP and USEPA guidance for conducting feasibility studies, the No Action alternative must be developed and examined as a baseline to which other remedial alternatives will be compared. Although this technology does not include any active remedial activity, it will be retained for further consideration. However, it is not anticipated that this technology would receive regulatory approval. Through time, natural attenuation (NA) processes would reduce the toxicity, mobility and volume of impacts to the environment.

Institutional Controls. Institutional controls for access restrictions (restrictions in the form of governmental, proprietary, enforcement or permit controls, deed restrictions and/or informational devices) were retained for further evaluation. Because institutional controls would not treat, contain or remove any MGP-containing surface soil, institutional controls alone would not achieve the RAOs established for the site. However, institutional controls may partly achieve the RAO of reducing human exposure to MGP-related COCs. Additionally, institutional controls could enhance the effectiveness of other technologies/process options, and thus, was retained for further consideration.

Surface Controls. Surface controls were retained for further consideration. The existing cover materials (asphalt, concrete, buildings) would provide continued protection against potential surface soil containing MGP-related COCs. Surface controls would not be effective for the vegetated and gravel area adjacent to Wadsworth Street.

In-Situ Containment/Controls. Capping/surface cover was identified as a potentially suitable remedial technology type for in-situ containment/controls; however, no other containment technologies were evaluated. The capping/surface cover options reviewed as part of the secondary screening included clay/soil, asphalt and multimedia caps/surface covers. All capping/surface cover options are easily implemented, and their relative costs are comparable (moderate to high). Based on current and potential future uses of the site, the multimedia cap technology processes were not retained because this process option is not suitable for use in high-traffic areas. Placement of an asphalt or soil surface cover would be effective in achieving the RAO for surface soil and the asphalt surface cover may also reduce mobility of COCs in subsurface soil by reducing infiltration. In addition, toxicity and volume of impacts would be reduced through removal of vegetation/topsoil to facilitate placement of the surface cover.

Removal. Excavation of surface soil was retained for further evaluation. Removal is a proven technology type and process for removing impacted material, is readily implemented (i.e., equipment capable of soil excavation is available) and has a high capital cost; however, O&M costs are low.

Offsite Treatment and/or Disposal. Remedial technology types and process options retained for evaluation consisted of recycle/reuse (asphalt concrete batch plant, brick/ concrete manufacture and co-burn in a utility boiler), extraction (low-temperature thermal desorption [LTTD]) and offsite disposal (nonhazardous solid waste landfill or RCRA landfill). Multiple offsite treatment technologies could be used to treat or dispose of media with different types/concentrations of impacts.

For this FS Report, the various alternatives for offsite treatment or disposal of impacted soil that may be removed from the site (if a removal remedy is selected) will not be evaluated. However, for alternative evaluation purposes, this FS Report does include an estimated unit cost for offsite LTTD, solid waste landfill and RCRA landfill of materials, where appropriate for soil. The actual disposition of generated waste would be determined during the engineering design phase of the remediation.

4.4.2.2 Subsurface Soil

No Action. Consistent with the NCP and USEPA guidance for conducting FSs, the No Action alternative must be developed and examined as a baseline to which other remedial alternatives will be compared. Although this technology does not include any active remedial activity, it will be retained for further consideration. However, it is not anticipated that this technology will receive regulatory approval. Through time, NA processes would reduce the toxicity, mobility and volume of impacts to the environment.

Institutional Controls. Institutional controls for access restrictions (restrictions in the form of governmental, proprietary, enforcement or permit controls, deed restrictions and/or informational devices) were retained for further evaluation. Because institutional controls would not treat, contain or remove any MGP-impacted subsurface soil, institutional controls alone would not achieve the RAOs established for the site. However, institutional controls may partly achieve the RAO of reducing, to the extent practicable, potential human exposure to MGP-impacted source material. Additionally, institutional controls could enhance the effectiveness of other technologies/process options, and thus, was retained for further consideration.

Surface Controls. Surface controls were retained for further consideration. The existing cover materials would be maintained to provide continued protection against potential exposure to MGP-impacted subsurface soil.

In-Situ Containment/Controls. Capping/surface cover and containment were identified as potentially suitable remedial technology types for in-situ containment/controls. The capping options reviewed as part of the secondary screening included clay/soil, asphalt and multimedia caps. Asphalt and/or concrete surface cover currently exists over areas where MGP-related impacts were observed in subsurface soil. Therefore, capping/surface cover technology process options were not retained. Containment options included sheet piles and slurry walls. All capping options are easily implemented, and their relative costs are comparable (moderate to high).

Slurry walls were retained for further evaluation. This process option can reduce the mobility of the impacts; however, MGP-related impacts do not appear to be readily mobile. For this process option to be considered effective, the confining layer beneath the site needs to be confirmed.

In-Situ Treatment. The in-situ remedial treatment technologies identified for subsurface soil were immobilization, extraction, chemical treatment and biological treatment. Only solidification/stabilization was retained for consideration. Solidification/stabilization is considered effective for immobilizing adsorbed impacts. This technology is potentially implementable with moderate capital and O&M costs. The presence of underground structures and obstructions would limit the methods for implementation.

Dynamic underground stripping and hydrous pyrolysis/oxidation (DUS/HPO), was not retained due to the potential issues with mobilization and recovery of the dissolved plume, reliability of vapor recovery, available space for treatment equipment and potential public acceptance issues.

The chemical treatment option considered was chemical oxidation. Based on the nonhomogeneous nature of the subsurface geology and potential exposure issues during treatment, this technology would likely be very inefficient to implement and operate. A pilot test would be required. Chemical oxidation would not be appropriate for the site for the following reasons:

- Lack of proven efficiency of chemical oxidation for treating MGP residuals; large quantities of oxidant have been required for small treatment areas at other sites
- Adequate delivery of the oxidant to the required soil and need for oxidant contact with the MGP residuals presents a significant concern because of the variable geology within the potential treatment zone
- Low pH conditions have been observed downgradient of treatment areas at other sites; thus, the potential exists for corrosion of utilities/steel structures downgradient from the site that may exist within the saturated zone if the buffering capacity of the soil is not adequate
- Potential to mobilize NAPL

Based on the above concerns, chemical oxidation was not retained for further evaluation.

Biological treatment options include biodegradation, enhanced biodegradation and biosparging. These options would be less effective than other options, especially for the heavier, more condensed PAHs, and would not achieve the remediation objectives for soil in a reasonable timeframe. Biosparging was not retained as this option would be less effective than other options, especially for MGP-related source material.

Removal. Excavation of subsurface soil was retained for further evaluation. This technology type and process is a proven process for removing impacted material, is readily implemented (i.e., equipment capable of soil excavation is available) and has a high capital cost; however, O&M costs are low.

Offsite Treatment and/or Disposal. Remedial technology types and process options retained for evaluation consisted of recycle/reuse (asphalt concrete batch plant, brick/ concrete manufacture and co-burn in a utility boiler), extraction (LTTD) and offsite disposal (nonhazardous solid waste landfill or RCRA landfill). Multiple offsite treatment technologies can be used to treat or dispose of media with different types/concentrations of impacts.

For this FS Report, the various alternatives for offsite treatment or disposal of impacted soil that may be removed from the site (if a removal remedy is selected) would not be evaluated. However, for alternative evaluation purposes, this FS Report does include an estimated unit cost for offsite LTTD, solid waste landfill and RCRA landfill of materials, where appropriate. The actual disposition of generated waste would be determined during the engineering design phase of the remediation.

4.4.2.3 Groundwater

No Action. Consistent with the NCP and USEPA guidance for conducting FSs, the No Action alternative must be developed and examined as a baseline to which other remedial alternatives will be compared. Although this technology does not include any active remedial activity, it will be retained for further consideration. However, it is not anticipated that this technology would receive regulatory approval. Through time, NA processes would reduce the toxicity, mobility and volume of impacts to the environment.

Institutional Controls. Institutional controls for groundwater use restrictions (in the form of governmental, proprietary, enforcement or permit controls and/or informational devices and notification requirements) were retained for further evaluation. Because institutional controls would not treat, contain or remove any constituents of interest in the site groundwater, institutional controls alone would not achieve the RAOs established for the site. However, institutional controls may partly achieve the RAO of reducing, to the extent practicable, human exposure to MGP-impacted groundwater through use restrictions. Institutional controls may enhance the effectiveness of other technologies/technology process options.

In-Situ Containment/Controls. The in-situ containment/control remedial treatment technologies considered for groundwater consisted of hydraulic control (groundwater extraction using recovery wells and slurry walls). Neither groundwater extraction using recovery wells nor slurry walls were retained due to effectiveness, implementability, long-term operation and maintenance requirements, and high relative costs.

In-Situ Treatment. The in-situ remedial treatment technologies considered for groundwater consisted of biological treatment (including NA and oxygen enhancement via introduction of an oxygen-releasing compound, and biosparging) and chemical treatment (using chemical oxidation). The NA process option was retained due to the ease of implementation and low relative costs. Oxygen enhancement was also retained as a means to stimulate indigenous aerobic microbial populations to increase the rate of natural degradation processes. Biosparging was not retained due to limited space. Chemical oxidation was not retained for further evaluation because access to areas that would require oxidant injection was considered limited, and due to the anticipated high oxidant demand and presence of subsurface utilities that may more readily corrode in the presence of the oxidant. Additionally, chemical oxidation has been shown to mobilize NAPL, particularly solvent-enhanced chemical oxidation.

Removal. For this technology type, four technology process options were evaluated for groundwater and/or NAPL extraction, including active pumping using vertical wells, horizontal wells and/or collection trenches, passive NAPL removal using vertical wells, and DUS/HPO. Inefficiencies associated with pump and treat technologies exist, including large volumes of water that require recovery and treatment, potential lack of long-term access to areas that require wells (i.e., implementability issues) and the space required for pumping equipment. In addition, recoverable quantities of NAPL have not been observed at the site. The active removal technology options would not be retained for further evaluation as a stand-alone process option; however, pumping and treatment of water may be necessary, if it enhances the effectiveness or implementability of other technologies (i.e., dewatering during excavation).

Ex-Situ Onsite Treatment. Technology process options evaluated for this technology type consisted of UV/oxidation, chemical oxidation, carbon adsorption, filtration and precipitation/ coagulation/flocculation. Only carbon adsorption, filtration and precipitation/coagulation/ flocculation were retained, as these technologies are effective at treating MGP-impacted groundwater. These process options have been retained in the event that pretreatment of generated groundwater is required prior to disposal. Due to limited space at the site, large full-scale treatment systems are not practicable.

Offsite Treatment and/or Disposal. Technology process options evaluated for groundwater disposal consisted of discharge to a POTW and disposition at a privately owned treatment facility (POTF). These technology process options will be used as, or part of, a treatment regimen for extracted groundwater resulting from dewatering during excavation (if selected).

The options for offsite treatment or disposal of impacted groundwater that may be removed from the site (if a removal remedy is selected) will not be evaluated because the groundwater removal process option was not retained as described above. However, for alternative evaluation purposes, this FS Report does include an estimated unit cost for discharge to the local POTW or POTF, where appropriate.

4.5 Summary of Retained Remedial Technologies

The following table summarizes the remedial technology types and process options that were retained through secondary screening.

Medium	Technology Type	Process Options
Surface Soil	No Action	No Action
	Institutional Controls	Governmental Controls, Proprietary Controls, Enforcement and Permit Controls, and Informational Devices
	Surface Controls	Maintain Existing Surface Cover
	Surface Cover	Asphalt/Soil Surface Cover
	Removal	Excavation
Subsurface Soil	No Action	No Action
	Institutional Controls	Governmental Controls, Proprietary Controls, Enforcement and Permit Controls, and Informational Devices
	Surface Controls	Maintain Existing Surface Cover
	Immobilization	Solidification/Stabilization
	Containment	Slurry Wall
	Removal	Excavation
Groundwater	No Action	No Action
	Institutional Controls	Governmental controls, proprietary controls, enforcement and permit controls, and informational devices
	In-Situ Biological Treatment	NA, enhanced NA
	Physical Treatment	Carbon adsorption, filtration, precipitation/ coagulation/ flocculation

As discussed in previous sections, soil vapor is being addressed as part of an IRM and does not require further consideration as part of this FS Report, however; the potential for soil vapor issues on the NYSEG-owned property north of the PSB remains a concern should the property use ever change.

In addition, as previously discussed, the various alternatives for offsite treatment or disposal of impacted media that may be removed from the site (if a removal remedy is selected) will not be evaluated. This was purposely done to avoid committing NYSEG to a specific process option at this time, and to allow for an evaluation of costs of potential offsite disposal/treatment facilities at the time that the preferred alternative is implemented. This was determined to be the best approach because disposal/treatment facility costs fluctuate significantly based on season, market conditions and facility capacity. However, for alternative evaluation purposes, this FS Report does include an estimated unit cost for offsite LTTD, solid waste landfill and RCRA landfill of materials, and for discharge to the local POTW or POTF, where appropriate. The actual disposition of generated waste will be determined during the engineering design phase of the remediation.

4.6 Development and Assembly of Remedial Alternatives

This section uses the screened technologies listed above to develop the remedial alternatives capable of addressing the RAOs for impacted media at the site.

Using the screened technologies listed above, this section develops site-wide remedial alternatives capable of addressing the impacted environmental media at the site. Consistent with the NCP (40 CFR 300.430) and 6 NYRR Part 375, the following range of alternatives was developed:

- No-Action alternative
- Alternatives that involve little or no treatment, but provide protection of human health and the environment by preventing or minimizing exposure to the COCs by using containment options and/or institutional controls
- Alternatives that remove COCs to the extent possible, thereby minimizing the need for long-term management
- Alternatives that treat the COCs, but vary in the degree of treatment employed and long-term management needed
- Alternative that achieves the unrestricted use soil cleanup objectives for soil

Remedial alternatives that have been developed for addressing the impacted media at the site are presented below. Detailed technical descriptions of the remedial alternatives are presented in Section 5 as part of the detailed remedial alternative evaluations.

4.6.1 Alternative I - No Action

Consistent with the FS requirements, the No Action alternative is retained as a basis for comparison for the other alternatives. Under this alternative, no remedial activities would be conducted.

4.6.2 Alternative II – Institutional Controls/Engineering Controls with Enhanced NA

Under this alternative, no active remedial activities would be conducted; however, implementation of institutional controls in the form of governmental, proprietary, enforcement or permit controls and/or informational devices would be included to limit disturbance of the cover materials, excavation of the subsurface and groundwater usage. Engineering controls would include locking covers on monitoring wells to mitigate public access to groundwater and installing a security fence in the parcel adjacent to Wadsworth Street to minimize potential public exposure to surface soil that exceeded unrestricted use SCOs.

Enhanced NA would consist of the addition of amendments (e.g., nutrients, oxygen) to stimulate the rate of the degradation processes and monitoring groundwater to document the reduction of COCs through these natural processes (e.g., advection, adsorption, dispersion, decay) and to verify that MGP-related impacted groundwater has not migrated beyond the site boundary.

4.6.3 Alternative III – Institutional Controls/Engineering Controls with Enhanced NA, Installation of Surface Cover, and Removal of Subsurface Structure and MGP-Related Impacts at SB-14A

This alternative includes all components of Alternative II (except installation of a security fence), and also involves installing an appropriately designed engineered surface cover over surface soil containing chemical constituents greater than Part 375 unrestricted use SCOs, and excavating the structure and observed MGP-related impacts at SB-14A. The anticipated maximum depth of soil removal is approximately 10 feet below ground surface (bgs) at SB-14A. The surface cover design may incorporate the select removal of existing surface material and consist of an installed surface cover that achieves appropriate sloping of the surface and minimal distortion as possible to the existing surface elevation. The surface cover measure would utilize a demarcation layer separating the existing surface soil from the surface cover. Confirmation sampling and documentation would follow to certify that unrestricted use SCOs were achieved.

4.6.4 Alternative IV – Institutional Controls/Engineering Controls with Enhanced NA, Installation of Surface Cover, Removal of Subsurface Structure and MGP-Related Impacts at SB-14A, and Address Gas Holder 1

This alternative has been developed to address the NAPL-impacted materials associated with former Gas Holder 1, in addition to the risks addressed. Based on the preliminary and secondary screening, three alternatives could be used to address Gas Holder 1:

- Alternative IVA: In-Situ Stabilization
- Alternative IVB: Removal
- Alternative IVC: Containment

Presented below are the detailed descriptions and associated evaluations for Alternative IV.

4.6.4.1 Alternative IV A – Institutional Controls/Engineering Controls with Enhanced NA, Installation of Surface Cover, Removal of Subsurface Structure and MGP-Related Impacts at SB-14A, and In-Situ Stabilization of Gas Holder 1

This alternative includes all components of Alternative III and also involves in-situ stabilization of MGP NAPL-containing soil and soil containing PAHs > 500 ppm. In-situ stabilization (ISS) involves mixing Portland cement or other pozzolanic materials with soil to solidify the material to reduce leaching and mobility of COCs and decrease the hydraulic conductivity of soil. The application of ISS would be focused on the areas where visually NAPL-impacted soil was encountered and/or where soil containing PAHs > 500 ppm was observed, which coincide to an interval from 14 to 24 feet bgs within and below Gas Holder 1.

4.6.4.2 Alternative IV B – Institutional Controls/Engineering Controls with Enhanced NA, Installation of Surface Cover, Removal of Subsurface Structure and MGP-Related Impacts at SB-14A, and Removal of Gas Holder 1

This alternative includes all components of Alternative III and also involves removal of MGP NAPL-containing soil and soil containing PAHs > 500 ppm. Soil removal would be focused on the areas where visually NAPL-impacted soil was encountered and/or where soil containing PAHs > 500 ppm was observed, which coincide with the removal of Gas Holder 1 to a maximum depth of 24 feet bgs.

4.6.4.3 Alternative IV C – Institutional Controls/Engineering Controls with Enhanced NA, Installation of Surface Cover, Removal of Subsurface Structure and MGP-Related Impacts at SB-14A, and Containment of Gas Holder 1

This alternative includes all components of Alternative III and also involves installing a containment barrier wall around Gas Holder 1. The containment wall would extend to the clay confining layer, presumed to be located 85 feet below grade.

4.6.4.4 Alternative V – Removal of Soil Containing MGP-Related Chemical Constituents Greater Than Part 375 Soil Cleanup Objectives for Unrestricted Use

This alternative involves excavating all soil containing chemical constituents at concentrations greater than Part 375 SCOs for unrestricted use. This alternative includes all components of Alternative II, and also involves removal of Gas Holder 1 and surrounding areas, including soil between Gas Holder 1 and the PSB, and several other smaller locations. The anticipated maximum depth of the soil removal activities is approximately 24 feet bgs.

5. Detailed Evaluation of Remedial Alternatives

5.1 General

This section presents additional information and evaluations regarding each of the site-wide remedial alternatives identified in Section 4 of this FS Report. The purpose of this section is to further develop the scope of each remedial alternative and understand the extent to which it would be implemented for the site in consideration of the RAOs and physical site features. Developing each alternative to a pre-design level of detail allows for the performance of alternative-specific evaluations consistent with the criteria presented in 6 NYCRR Part 375 and 40 CFR Part 300 (the NCP). In turn, through a comparative evaluation of the remedial alternatives, the results of the detailed evaluations serve as the basis for the selection of an appropriate remedy for the site.

5.2 Description of Evaluation Criteria

The evaluation of each remedial alternative considers the following criteria consistent with 40 CFR Part 300 and NYCRR Part 375:

- Overall Protection of Human Health and the Environment
- Compliance with SCGs
- Long-Term Effectiveness and Permanence
- Reduction of Toxicity, Mobility, or Volume of Contamination
- Short-Term Impacts and Effectiveness
- Implementability
- Cost Effectiveness

Additional evaluation criteria, including public and state acceptance, will be addressed following submittal of this FS Report.

The evaluation criteria are described in Sections 5.2.1 through 5.2.7.

5.2.1 Overall Protection of Human Health and the Environment

This criterion provides an overall assessment of the degree to which each remedial alternative is protective of human health and the environment, drawing upon the assessment of other evaluation criteria, including long-term and short-term effectiveness and compliance with SCGs. This component of the alternative evaluation assesses how potential exposure pathways are eliminated, reduced, or controlled through removal, treatment, engineering controls, or institutional controls. In addition, the ability of the remedial alternative to meet the RAOs is considered.

5.2.2 Compliance with SCGs

As stated in 6 NYCRR Part 375, this criterion evaluates the remedial alternative in terms of its ability to comply with standards and criteria that are generally applicable, consistently applied and officially promulgated. Such SCGs are either directly applicable or, if not directly applicable, relevant and appropriate, unless good cause exists why conformity should be dispensed with. “Good cause” may apply if any of the following is present:

- The alternative is only part of a complete program or project that would conform to such standard or criterion upon completion

- Conformity to such standard or criterion would result in greater risk to public health or to the environment than alternatives

- Conformity to such standards or criterion is technically impractical from an engineering perspective

- The program or project would attain a level of performance that is equivalent to that required by the standard or criterion through the use of another method or approach

The evaluation of this criterion for each remedial alternative would be based on compliance with:

- Chemical-specific SCGs (Table 2-1)

- Action-specific SCGs (Table 2-2)

- Location-specific SCGs (Table 2-3)

5.2.3 Long-Term Effectiveness and Permanence

The long-term effectiveness and permanence of each remedial alternative considers the potential risks to human health and the environment that may remain following implementation of the remedial alternative. The following factors are considered in the evaluation of the alternative's long-term effectiveness and permanence:

- Potential environmental impacts remaining at the completion of the remedial alternative
- Adequacy and reliability of controls (if any) that would be used to manage the site after the completion of the remedial alternative
- Ability of the remedial alternative to meet the established RAOs

5.2.4 Reduction of Toxicity, Mobility, or Volume of Contamination

This criterion evaluates the degree to which the remedial alternatives would permanently and significantly reduce the toxicity, mobility, or volume of the constituents present in the site media. The evaluation will be based on the following factors:

- Treatment process and the volume of materials to be treated
- Ability of the treatment process to reduce the toxicity, mobility, or volume of contamination
- Nature and quantity of residuals that would remain after treatment
- Relative amount of hazardous substances and/or chemical constituents that would be destroyed, treated, or recycled
- Degree to which the treatment is irreversible

The hierarchy of technologies specified in 6 NYCRR Part 375, ranked from the most-to-least preferable, is presented below:

- Destruction or removal

- Separation or treatment
- Solidification or chemical fixation
- Control or isolation

5.2.5 Short-Term Impacts and Effectiveness

This criterion considers the short-term impacts related to the implementation of the alternative and the effectiveness of each following its implementation. The following factors are considered:

- Short-term impacts to the local community during implementation of the alternative
- Potential impacts to workers during implementation of the remedial alternative
- Potential environmental impacts related to implementation of the remedial alternative
- Time required to achieve the RAOs

5.2.6 Implementability

This criterion evaluates the technical and administrative feasibility of implementing the remedial alternative, including the availability of various services and materials required for implementation. The evaluation of implementability would be based on two factors, as described below.

- *Technical Feasibility* – This refers to the relative ease of implementing the remedial alternative based on specific constraints associated with the site. In addition, the ease of construction, operational reliability, and ability to monitor the effectiveness of the remedial alternative are considered.
- *Administrative Feasibility* – This refers to the feasibility/time required to obtain necessary permits and approvals to implement the remedial alternative, and the availability of personnel, equipment, and materials needed to conduct the remedy.

5.2.6 Cost Effectiveness

This criterion evaluates the estimated total cost to implement the remedial alternative, including (as appropriate) direct capital costs (materials, equipment and labor), indirect capital costs (engineering, licenses/permits and contingency allowances) and operation and maintenance and monitoring (OM&M) costs. OM&M costs may include operating labor, energy, chemicals, and sampling and analysis. OM&M assumptions for each Alternative are noted in the text. These costs will be estimated with an anticipated accuracy between -30 percent to +50 percent in accordance with the USEPA document entitled *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* (USEPA, 1988). A 25 percent contingency factor is included to cover unforeseen costs incurred during implementation of the remedial alternative. Present-worth costs are calculated for alternatives expected to last more than 2 years. In accordance with USEPA guidance presented in OSWER Directive 9355.3-20 as superseded by OSWER 9355.0-75, a 7 percent discount rate (before taxes and after inflation) is used to determine the present-worth factor.

5.3 Detailed Evaluation of Remedial Alternatives

This section presents a detailed analysis of each of the remedial alternatives identified in Section 4:

- Alternative I – No Action
- Alternative II – Institutional Controls/Engineering Controls with Enhanced NA
- Alternative III – Institutional Controls/Engineering Controls with Enhanced NA, Installation of Surface Cover, and Removal of Subsurface Structure and MGP-Related Impacts at SB-14A
- Alternative IV A – Institutional Controls/Engineering Controls with Enhanced NA, Installation of Surface Cover, Removal of Subsurface Structure and MGP-Related Impacts at SB-14A, and In-Situ Stabilization of Gas Holder 1
- Alternative IV B – Institutional Controls/Engineering Controls with Enhanced NA, Installation of Surface Cover, Removal of Subsurface Structure and MGP-Related Impacts at SB-14A, and Removal of Gas Holder 1

- Alternative IV C – Institutional Controls/Engineering Controls with Enhanced NA, Installation of Surface Cover, Removal of Subsurface Structure and MGP-Related Impacts at SB-14A, and Containment of Gas Holder 1

- Alternative V – Removal of Soil Containing MGP-Related Chemical Constituents Greater Than Part 375 Soil Cleanup Objectives for Unrestricted Use

5.4 Alternative I - No Action

The No Action alternative was retained for evaluation as required by USEPA's Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (USEPA, 1988a) and NCP regulations.

The No Action alternative provides a baseline assessment that allows for comparison of the overall effectiveness of the other remedial alternatives. The No Action alternative would not involve implementation of any further remedial activities to address the MGP-related impacts associated with the site. The site would generally be maintained in its current condition for the foreseeable future.

Overall Protection of Human Health and the Environment

The No Action alternative does not include any additional activities to address the MGP-related impacts associated with the site. Therefore, the alternative would not be effective in meeting the RAOs established for this site. However, natural processes may contribute to or result in improved site conditions.

Compliance with SCGs

The compliance status of Alternative I with SCGs is presented below:

- Chemical-Specific SCGs: Because removal or treatment is not included as part of this alternative, chemical-specific SCGs would not be met.

- Action-Specific SCGs: This alternative does not involve implementation of any remedial activities; therefore, the action-specific SCGs are not applicable.

- Location-Specific SCGs: Because no remedial activities would be conducted under this alternative, the location-specific SCGs are not applicable.

Long-Term Effectiveness and Permanence

For the No Action alternative, no additional remedial activities would be implemented. As a result, this alternative would not achieve the RAOs. However, natural processes may contribute to or result in improved site conditions.

Reduction of Toxicity, Mobility, or Volume of Contamination

Under the No Action alternative, MGP-related impacts associated with the site would not be actively treated (other than by natural processes), recycled or destroyed. Therefore, the toxicity, mobility and volume of contamination would not be reduced through active treatment.

Short-Term Impacts and Effectiveness

There would be no short-term environmental impacts or risks posed to the community by this alternative.

Implementability

The No Action alternative does not include implementation of any remedial activities.

Cost Effectiveness

The No Action alternative does not involve implementation of any remedial activities; therefore, there are no costs associated with this alternative.

5.5 Alternative II – Institutional Controls/Engineering Controls with Enhanced NA

Technical Description

This remedial alternative would establish institutional controls/engineering controls (IC/ECs) for the site. Institutional controls would be in the form of environmental land use restrictions (ELURs) to identify:

- Acceptable future uses of the site
- Permissible intrusive (i.e., subsurface) activities and associated health and safety precautions

- Prohibitions regarding groundwater use
- Compliance with an approved Site Management Plan (SMP)
- Future site inspections and certifications of institutional controls

MGP-related impacts have been observed within the limits of the city of Geneva’s property (i.e., PSB property, Railroad Place), therefore, NYSEG would have to enter into an agreement with the city of Geneva to establish ELURs for the affected portions of the PSB property and Railroad Place. In addition, state/local health departments and adjacent property owners would be notified of the components of the ELURs.

These institutional controls would be supported by an SMP that would identify requirements (e.g., environmental oversight, personal protective equipment requirements, excavation procedures, material handling, and restoration requirements) for conducting intrusive activities, and would provide procedures for properly handling and disposing of potentially-impacted materials that may be encountered during future activities. The presence or absence or MGP-related impacts beneath the PSB is currently unknown; however, an IRM will be implemented to address potential MGP-related soil vapor intrusion issues, as discussed in Section 1.4.5. In addition, in the event that the PSB is demolished and/or redeveloped such that soils beneath the PSB are accessible, the SMP would address soil sampling, soil and groundwater management, health and safety protocols, and disposal of MGP-impacted media.

Engineering controls would include locking covers on monitoring wells to mitigate public access to groundwater and installing approximately 800 linear feet of decorative security fence in the parcel adjacent to Wadsworth Street with grass and/or gravel surface cover to minimize potential public exposure to surface soil that exceeds unrestricted use SCOs.

NAPL-impacted media remaining onsite would continue to contribute COCs in the form of dissolved phase hydrocarbons (DPH) to site groundwater; however groundwater currently leaving the site does not exceed NYS Groundwater Quality Standards. Groundwater is not currently used for potable purpose at or downgradient of the site; institutional controls would restrict potential future use of groundwater at the site.

To support the NA activities, information concerning the physical, chemical and biological processes that can act to reduce mass, toxicity, mobility, volume, or concentration of COCs in groundwater would need to be collected as part of pre-design activities. The site appears to be a viable candidate for NA, but additional data must be collected to develop a comprehensive understanding of the nature and extent of dissolved-phase COCs, the advective and diffusive transport of dissolved-phase COCs, and the potential for intrinsic biodegradation of dissolved-phase COCs.

In general, the pre-design activities would consist of the collection and analysis of field and laboratory geochemical data to evaluate the geochemical characteristics of groundwater and to identify the presence and impact of a microbial community. This would consist of the evaluation for electron acceptors (oxygen, nitrate, manganese oxides, ferric iron, sulfate, carbon dioxide) electron donors (VOCs, SVOCs, dissolved organic carbon), metabolic byproducts (carbon dioxide, nitrogen gas, dissolved iron, dissolved manganese, sulfide, methane), general environmental indicators (pH, temperature, ORP) and respiration indicators (benzene and catechol dioxygenases) (Schwarzenbach et al. 1993). The assessment of the presence of cellular and genetic components of key microorganisms, specifically biomarkers (phospholipid fatty acids [PLFAs} and deoxyribonucleic acid [DNA]) used to evaluate in-situ cell biomass, community structure, metabolic status of subsurface microbial populations and the presence of specific microorganisms. In addition, soil property information including carbon content, porosity and bulk density would be required.

This information, along with previously collected site information would allow for a comprehensive assessment of the role of NA and the necessity and selection of amendments for implementation of enhanced NA (if required). For cost estimating purposes, enhanced NA was assumed to be required and would consist of installing four 4-inch-diameter oxygen enhancement wells north of the PSB as shown on Figure 5. Canisters of an oxygen-release compound (ORC) would be installed into the proposed oxygen enhancement wells. It is anticipated that the ORC would require replenishment every 6 months and would be maintained for 2 years and re-evaluated thereafter.

Groundwater monitoring activities would be conducted to document groundwater quality beneath and near the site. Monitoring activities would consist of collecting groundwater field data (e.g., pH, turbidity, ORP, temperature) and groundwater samples for laboratory analysis from select monitoring wells within the existing monitoring well network. For estimating purposes, monitoring would be conducted semiannually for 2 years and annually thereafter for a total duration of 30 years. The initial groundwater monitoring program would likely include MW-2, MW-3, MW-5, MW-6, MW-7, and MW-9. MW-1 or MW-8 would be used for the evaluation of potential of off-site migration. The need for additional monitoring would be evaluated after a period of five years. The actual scope of groundwater monitoring will be defined in the site management plan (SMP).

Annual certification reports would be prepared by NYSEG and submitted to NYSDEC, documenting, for example, that the IC/ECs put in place remain in place, they are effective and are either unchanged from the previous certification or comply with NYSDEC-approved modifications.

Overall Protection of Human Health and the Environment

This alternative would achieve RAO No. 1, 2, and 4 established for the site. While it would not actively reduce the magnitude and extent of MGP-related impacts, concentrations of dissolved-phase COCs in groundwater would likely continue to decrease over time via enhanced natural processes (achieving RAO #6), and the IC/ECs (e.g., ELUR, SMP, fence) would mitigate potential human exposure to MGP-related impacts in soil and groundwater.

Compliance with SCGs

- Chemical-Specific SCGs: Chemical-specific SCGs for soil would not be met as this alternative does not actively address soil through treatment or removal. Depending on the reduction of COC concentrations in groundwater as a result of natural/enhanced processes, this alternative could achieve the applicable SCGs for overburden groundwater (including the NYS Ambient Water Quality Standards and Guidance Values presented in TOGS 1.1.1) over time.

- Action-Specific SCGs: The action-specific SCGs are presented in Table 2-2. Action-specific SCGs that apply to this alternative are associated with installation oxygen enhancement wells, disposal of groundwater generated during well development, monitoring requirements and OSHA health and safety requirements. Workers and worker activities that occur during implementation of this alternative must comply with OSHA requirements for training, safety equipment and procedures, monitoring, recordkeeping and reporting as identified in 29 CFR 1910, 29 CFR 1926 and 29 CFR 1904. Compliance with action-specific SCGs would be accomplished by following a NYSDEC-approved Remedial Design/Remedial Action (RD/RA) Work Plan and site-specific HASP.

Process residuals generated during the implementation of the alternative (e.g., soil cuttings from well installation, well development water, disposable sampling equipment) would be characterized to determine appropriate offsite disposal requirements. If any of the materials are characterized as a hazardous waste, then RCRA UTSs/LDRs and USDOT requirements for the packaging, labeling, transportation and disposal of hazardous or regulated materials may be applicable. Compliance with these requirements would be achieved by utilizing licensed waste transporters and permitted disposal facilities.

- Location-Specific SCGs: The location-specific SCGs are presented in Table 2-3. Remedial activities at the site would be conducted in accordance with local building/construction codes and ordinances.

Long-Term Effectiveness and Permanence

Implementing this alternative would minimize the potential for human exposure to COCs by controlling intrusive activities through deed restrictions and the SMP. This alternative does not involve the removal or treatment of the impacted soils. Institutional controls to be established as part of this alternative (including ELURs and adherence to an SMP) would effectively meet those RAOs related to potential direct contact, ingestion, and inhalation exposure pathways.

Under this alternative, the COCs present in the groundwater would not be addressed through treatment. However the reduction of dissolved-phase COCs would be addressed through the natural degradation processes, which is permanent and monitoring would be conducted to document the effectiveness. A long-term O&M program would be implemented to confirm the ongoing effectiveness of this remedial alternative for the site. O&M activities would consist of monitoring constituent concentrations in the groundwater beneath and hydraulically downgradient of the site.

Reduction of Toxicity, Mobility, and Volume of Contamination

Under this alternative, MGP-related NAPL would not be directly treated, recycled, or destroyed through active treatment. However, MGP-related impacts do not appear to be readily mobile or present offsite. MGP-related impacts to groundwater do not appear to extend beyond the site boundary of the site. The concentrations of COCs in onsite groundwater would be reduced by natural processes or through enhancing the biological degradation of dissolved-phase COCs, and therefore the toxicity and volume of the COCs in groundwater would be reduced.

Short-Term Effectiveness

During the implementation of this alternative, onsite workers may be exposed to chemical constituents in soil, groundwater, and oxygen-releasing material through ingestion, dermal contact and/or inhalation. Potential exposure of onsite workers to chemicals and COCs would be mitigated by the use of engineering and institutional controls and use of PPE, as specified in a site-specific HASP that would be developed during the remedial design phase. Air monitoring would be performed during implementation of this alternative to confirm volatilized organic vapors are within acceptable levels, as specified in a site-specific HASP. The anticipated time necessary to implement this alternative is approximately two weeks.

The community would not have access to the site because a fence would be installed. Risks to the community would be limited, if any, and associated with potential generation of volatile organic vapors or impacted dust during monitoring well installation. Implementation of an air monitoring plan would mitigate the potential for offsite migration of volatile organic vapors or impacted dust.

Implementability

This alternative is readily implementable and would require coordination with the city of Geneva. Institutional controls do not require field implementation and typically can be readily established. Contractors are readily available to install oxygen enhancement wells and the security fence.

Cost

The capital costs associated with this alternative generally includes obtaining environmental easements, conducting a comprehensive NA evaluation and selection of appropriate amendments, preparation of an SMP, and installation of a security fence. Future site monitoring/maintenance activities would include evaluations to confirm that the institutional controls are in place and being followed, replenishment of NA amendments, and conducting groundwater monitoring activities. The present worth cost has been calculated assuming that monitoring/maintenance activities are continued for a period of 30 years. The estimated present worth cost of this alternative is approximately $960,000. A detailed breakdown of the estimated costs associated with this alternative is presented in Table 5-1.

5.6 Alternative III – Institutional Controls/Engineering Controls with Enhanced NA, Installation of Surface Cover, and Removal of Subsurface Structure and MGP-Related Impacts at SB-14A

Technical Description

This alternative includes the following components of Alternative II:

- IC/EC
- Enhanced NA

In addition, this alternative involves installation of a surface cover over surface soil containing chemical constituents greater than Part 375 unrestricted use SCOs and excavating the subsurface structure and observed MGP-related impacts at SB-14A.

Surface soil exceeded unrestricted use SCOs at four locations (SS-1, SS-2, SS-5, SS-6). These samples were collected from the vegetated area adjacent to Wadsworth Street. Based on the limited frequency of samples and in lieu of conducting further delineation sampling, the remaining surface soil in this area would be covered with a surface cover. The surface cover would consist of either a stone base course and a 4-inch-thick bituminous asphalt layer or 12 inches of clean imported soil. Vegetation and topsoil removal may be required to facilitate installation in areas where existing vegetation is present, where features are present (e.g., sidewalks, parking lots) and areas that do not offer sufficient clearance to install a 12-inch surface cover. For cost estimating purposes, the volume of surface soil to be removed to facilitate the asphalt surface cover installation has been estimated at 90 CY.

The anticipated maximum depth of subsurface soil removal is approximately 10 feet bgs at SB-14A, based on the absence of visual impacts and analytical results from adjacent boring SB-14B below 10 feet bgs. Implementation of this alternative may require temporary closure of sidewalks along Railroad Place and Wadsworth Street. The anticipated extent of this remedial alternative is shown on Figure 6.

Air monitoring would be conducted during ground intrusive and/or other site activities with the potential to generate dust, vapors, or odors. Methods would be modified or engineering controls (e.g., polyethylene sheeting, misting with water/BIO SOLVE®, foam) would be implemented to reduce the release of dust, vapors, or odors.

As presented in the NYSDEC-approved RI, a potential buried structure was observed at the SB-14 location. A void space was encountered at approximately 4 to 6.5 feet bgs, which contained a black oil-like fluid. The black oil-like fluid would be removed and placed in appropriate USDOT-approved containers (i.e., 55-gallon drums) for disposal prior to removal of the structure. Excavation and handling of soil would generally be conducted using conventional construction equipment, such as, but not limited to, backhoes, excavators, front-end loaders and dump trucks. The structure would be removed using destructive methods such as a hoe ram or other concrete breaking equipment. Benching/sloping would be used to stabilize the sidewalls of the excavation area and facilitate removal of the structure and impacted soil at SB-14A/B. The actual method of excavation support would be determined during the remedial design. A limited amount of soil excavated from below the groundwater table would be subject to post-excavation gravity dewatering and pre-treatment (e.g., mixing/conditioning, stabilization). Approximately 250 cubic yards (CY) of soil and concrete debris would be transported offsite for treatment and disposal.

Historic pipes or conduits encountered during the soil removal activities at SB-14A/B would be evaluated for the absence/presence of MGP-related impacts. If impacts are observed, the piping and associated impacted material would be removed or immobilized, to the extent practicable, and the pipe/conduit would be capped and/or abandoned in-place.

Due to the limited space to construct support facilities onsite, the excavated soil would be direct loaded into lined roll-offs or dump trucks, to the extent practicable. In the event excavated material requires processing prior to offsite disposition, onsite staging areas would be constructed to facilitate handling, stabilization activities (via gravity dewatering or mixing with dryer soil or stabilizing agents). To facilitate direct loading of excavated material, a pre-characterization program would be conducted during the RD phase. Disposal of MGP-impacted materials would be conducted in accordance with NYSDEC MGP disposal guidance presented in TAGM 4061 (NYSDEC, 2002a). For the purpose of providing a cost for this alternative, it was assumed that MGP-impacted spoils would be transported to a permitted LTTD facility in compliance with TAGM 4061. Additionally, soil determined to be not MGP-impacted would be consolidated and either reused as backfill or transported for offsite treatment/disposal at an approved facility (i.e., a solid waste landfill). Additional disposal/treatment alternatives would be reviewed as part of the RD/RA Work Plan.

Following removal of the former structure associated with SB-14 and installation of the surface cover, remaining NAPL-impacted soil onsite could continue to contribute COCs in the form of DPH to groundwater underlying the site. Groundwater is not currently used for potable purposes at or downgradient of the site. Institutional controls would restrict the potential future use of groundwater at the site.

Site restoration, in the form of backfilling the excavation at SB-14 with imported fill and installing a clean soil surface cover over the entire remediated area would be implemented. This would result in the entire footprint of the former MGP being covered.

Groundwater monitoring activities would be conducted to document groundwater quality beneath and near the site. Monitoring activities would consist of collecting groundwater field data (e.g., pH, turbidity, ORP, temperature) and groundwater samples for laboratory analysis from select monitoring wells within the existing monitoring well network. For estimating purposes, monitoring would be conducted semiannually for 2 years and annually thereafter for a total duration of 30 years and the initial groundwater monitoring program would likely include MW-2, MW-3, MW-5, MW-6, MW-7, and MW-9. MW-1 or MW-8 would be used for the evaluation of potential of off-site migration. The need for additional monitoring would be evaluated after a period of five years. The actual scope of groundwater monitoring will be defined in the SMP.

Annual certification reports would be prepared by NYSEG and submitted to NYSDEC, documenting, for example, that the IC/ECs put in place remain in place, they are effective and are either unchanged from the previous certification or comply with NYSDEC-approved modifications.

Overall Protection of Human Health and the Environment

The installation of the surface cover would achieve RAO No. 1 to reduce human exposure to surface soil containing MGP-related COCs. IC/ECs would mitigate potential exposure pathways to remaining MGP-impacted subsurface soil and groundwater (RAO No. 2 and 4) through the use of ELURs and/or deed restrictions. Removal of the majority of potentially mobile MGP-related NAPL observed at SB-14A would effectively reduce the presence of the most concentrated MGP-related impacts that could migrate or contribute to exceedances of applicable groundwater quality standards (RAO No. 3 and 5). Depending on the reduction of COC concentrations in groundwater as a result of natural/enhanced processes, this alternative could contribute to the achievement of the applicable SCGs for groundwater. Over time, this alternative would potentially achieve the RAOs for the site.

Compliance with SCGs

- Chemical-Specific SCGs: Under this alternative, approximately 250 CY of MGP-impacted material would be removed from the site, however, the restricted use SCOs for protection of groundwater or unrestricted use SCOs presented in 6 NYCRR Part 375 regulations would not be achieved. However, source removal coupled with natural/enhanced processes could achieve the applicable SCGs for overburden groundwater (including the NYS Ambient Water Quality Standards and Guidance Values presented in TOGS 1.1.1) over time.

- Action-Specific SCGs: Action-specific SCGs (Table 2-2) that apply to this alternative are associated with disposal of soils and worker and community health and safety. Workers present and work activities conducted during implementation of this alternative must comply with OSHA requirements for training, safety equipment and procedures, monitoring, recordkeeping, and reporting as identified in 29 CFR 1910, 29 CFR 1926, and 29 CFR 1904. Measures would be taken (as appropriate) to control levels of airborne VOCs and particulate matter during the remedial activities.

Waste materials subject to offsite transport and disposal would be characterized to determine appropriate treatment/disposal requirements. Disposal would be in accordance with applicable rules and regulations, including NYSDEC MGP disposal regulations. If any of the materials are characterized as a hazardous waste, then the RCRA UTSs/LDRs and USDOT requirements for the packaging, labeling, transportation, and disposal of hazardous or regulated materials would be applicable. Compliance with these requirements would be achieved by utilizing licensed waste transporters and permitted disposal facilities. Disposal of water (if any) generated during implementation would be in accordance with POTF requirements.

- Location-Specific SCGs: Permits would be required to temporary close sidewalks to implement construction activities. Remedial activities at the site would be conducted in accordance with local building/construction codes and ordinances.

Long-Term Effectiveness and Permanence

This alternative would permanently remove MGP-related impacts observed at SB-14A that have the greatest potential for being mobile or impacting groundwater quality through dissolution. Implementing this alternative would effectively minimize the potential for future migration of NAPL or dissolution of COCs associated with NAPL to groundwater. The remaining areas of NAPL-containing soils in the site are generally associated with Gas Holder 1 and consist of discrete areas of NAPL blebs and droplets observed from approximately 14 to 24 feet below ground surface. The remaining MGP-related impacts present minimal potential for long term exposure; migration; or serving as source material for further degradation of soil or groundwater quality (via dissociation of COCs) at the site.

Institutional controls to be established as part of this alternative (including ELURs and adherence to an SMP) would effectively meet those RAOs related to potential direct contact, ingestion, and inhalation exposure pathways.

A long-term O&M program would be implemented to confirm the ongoing effectiveness of this remedial alternative for the site. O&M activities would consist of monitoring constituent concentrations in the groundwater beneath and hydraulically downgradient of the site.

Reduction of Toxicity, Mobility, or Volume of Contamination

Removal of the former structure at SB-14, and associated liquids and impacted soil, with offsite treatment/disposal would directly reduce the toxicity, potential mobility and volume of MGP-related impacts at the site. Soil removal provides mass reduction by physically removing and replacing impacted soils with clean imported backfill materials. The impacted soils would then be transported for land disposal, thermal treatment, or incineration.

As discussed in Section 1, the current magnitude and extent of COCs (and therefore toxicity and volume) associated with former Gas Holder 1 (or the structure at SB-14) does not appear to significantly contribute to DPHs in groundwater. Impacts to groundwater appear to be localized and do not appear to extend beyond the hydraulically downgradient site boundary of the former MGP. The concentrations of COCs in onsite groundwater would be reduced by enhancing the biological degradation of dissolved-phase COCs. Groundwater removal (if any) and disposition to a POTF during the removal activities also provides some limited mass reduction of MGP-related impacts.

Short-Term Impacts and Effectiveness

During implementation of this alternative, there would be an increased potential (relative to current conditions) for onsite workers to contact impacted soil, groundwater and NAPL via ingestion, dermal contact, and/or inhalation. However, potential exposure of onsite workers would be mitigated through the use of appropriate PPE, to be specified in a site-specific HASP. Air monitoring would be performed during implementation of this alternative to determine the effectiveness of (and need for additional) engineering controls to confirm that dust or volatilized organic vapors are within acceptable levels, as specified in the site-specific HASP.

The community would not have access to the site during implementation of the remedial activities. Engineering controls (e.g., temporary security fencing) would be employed to reduce the potential for unauthorized or accidental access to the site. Implementation of this alternative may require temporary closure of sidewalks along Railroad Place and Wadsworth Street. Traffic resulting from the transportation of approximately 250 CY of impacted material for offsite disposition (approximately 50 one-way truckloads for soil removal and importing clean fill material) would pose a potential nuisance to the community and increase the risk for accidents and spills.

A site-specific Community Air Monitoring Plan (CAMP) would be implemented during intrusive site activities and would include real-time monitoring for volatile organic compounds and particulates at the downwind perimeter of each designated work area. The CAMP would also include measures to minimize dust generation and action levels which require additional steps to control dust, odor and/or VOCs including work stoppage. The potential for exposure and control of odors would be mitigated using engineering controls (e.g., water spray, foam suppressants).

Implementability

The installation of a surface cover and removal of the former structure and associated subsurface soil to an approximate depth of 10 feet is technically feasible. Due to the relatively shallow depth of excavation, minimal groundwater is anticipated to be generated. Remedial contractors to conduct the onsite activities and offsite treatment and/or disposal contractors/vendors are readily available. Institutional controls would need to be coordinated with the city of Geneva. In addition, permits to temporarily close sidewalks and/or roads would also require coordination with the city of Geneva and/or local shop owners.

The anticipated time necessary to implement this alternative is approximately four weeks, not including the pre-characterization soil sampling program, time to obtain permits, or conduct utility clearance activities. The long-term monitoring/maintenance is assumed to last 30 years.

Cost Effectiveness

The capital costs associated with this alternative generally includes attaining environmental easements, conducting a comprehensive NA evaluation and selection of appropriate amendments, preparation of an SMP, site preparation, soil excavation, backfilling, installation of the surface cover, and waste transportation and treatment/disposal. Future site monitoring/maintenance activities would include evaluations to confirm that the institutional controls are in place and being followed, replenishment of NA amendments, and conducting groundwater monitoring activities. The present worth cost has been calculated assuming that monitoring/maintenance activities are continued for a period of 30 years. The estimated present worth cost of this alternative is approximately $1.3 million. A detailed breakdown of the estimated costs associated with this alternative is presented in Table 5-2.

5.7 Alternative IV - Institutional Controls/Engineering Controls with Enhanced NA, Installation of Surface Cover, Removal of Subsurface Structure and MGP-Related Impacts at SB-14A, and Address Gas Holder 1

The following subsections present the detailed evaluation of 3 separate alternatives to specifically address Gas Holder 1.

5.7.1 Alternative IV A – Institutional Controls/Engineering Controls with Enhanced NA, Installation of Surface Cover, Removal of Subsurface Structure and MGP-Related Impacts at SB-14A, and In-Situ Stabilization of Gas Holder 1

Technical Description

This alternative includes all components of Alternative III which includes the following:

- IC/EC
- Enhanced NA
- Installation of a surface cover
- Removal of subsurface structure and MGP-related impacts observed at SB-14A

In addition, this alternative involves in-situ stabilization of MGP NAPL-containing soil and soil containing PAHs > 500 ppm observed at Gas Holder 1. In-situ stabilization

(ISS) involves the mixing of Portland cement or other pozzolanic materials with soil to solidify the material to reduce leaching and mobility of COCs and decrease the hydraulic conductivity of the soil (to 1x10-5 cm/sec or less). The application of ISS would be focused on the areas where visually NAPL-impacted soil was encountered and/or where soil containing PAHs > 500 ppm was observed, which coincides to an interval from 14 to 24 feet bgs within Gas Holder 1. Gas Holder 1 lies beneath Railroad Place and a review of a utility drawing prepared by the city of Geneva Engineering Department (Exhibit 1) reveals several subsurface utilities are above the footprint of Gas Holder 1, including an 8-inch natural gas line, a 2-inch natural gas service line, and an 8-inch water main. In addition, a 24-inch sanitary sewer transects the southern side of Gas Holder 1 approximately 10 feet below the road surface. Pre-excavation would be conducted to expose the top surface of the utilities to prevent damaging them from drilling operations and/or to monitor them during ISS implementation. For cost estimating purposes, it is assumed that material above Gas Holder would be excavated to a depth of 6 feet to locate the natural gas and water lines, and a trench would be dug to a depth of 10 feet along the alignment of the 24-inch sanitary sewer.

Jet-grouting has been identified as the preferred technology to implement ISS in lieu of traditional excavation techniques because of the multiple subsurface utilities. Jet-grouting consists of drilling a small diameter hole (~ 4-inch) with a specialized drill rod to the target depth and while rotating/raising the drill rod, injecting a high pressure liquid grout (e.g., cement-bentonite) horizontally into the soil. The degree of rotation and rate of removal would dictate the shape of the stabilized area. In addition, angled drilling and jet grouting would be required to stabilize the areas underneath the subsurface utilities. To facilitate angled jet grouting, overhead utilities may need to be relocated or temporarily deactivated.

The resulting material is generally a homogeneous mixture of soil and grout that hardens to become a weakly-cemented material. Jet grouting generates spoils (assumed to be 75% of the volume of material stabilized) during implementation. The estimated diameter per jet grouted column is 3 feet, thus approximately 600 overlapping holes would need to be drilled to stabilize Gas Holder 1 (approximately 2,500 CY of material).

The ISS process would stabilize remaining NAPL-impacted soil (not removed as part of the spoils) and NAPL by both solidifying the soil into a solid mass (microencapsulation) and by solidifying the soil around the NAPL-impacted soil (macroencapsulation) forming a containment barrier to prevent migration of the NAPL outside of the solidified shell. Additionally, the curing process is an exothermic reaction and the heat from the reaction could serve to volatilize a portion of the COCs associated with the impacted media.

A bench-scale study to evaluate the effectiveness of various grout mixtures (i.e., soil stabilization mixtures) at reducing the leachability and permeability of the NAPL-impacted soil at the site would be conducted prior to the commencement of activities. The bench-scale testing activities would consist of testing various solidification mixtures of hydrated reagents (e.g., blast furnace slag, Portland cement, bentonite, and water) for compatibility with the COCs and NAPL in the soil and groundwater at the site. Solidification mixtures would be tested for density, permeability, and strength. The results of bench-scale testing would determine the combination of reagents mixed with the NAPL-impacted soil that would provide the optimal mixture for solidification/stabilization of the site soil.

During the ISS process, excess materials (i.e., spoils consisting of a mixture of soil, groundwater, NAPL, and grout) is estimated at approximately 75% for the jet grouting method. Spoils generated during the ISS process would be stockpiled onsite to facilitate stabilization (if necessary) and characterization of the material prior to offsite disposition. Disposal of MGP-impacted materials would be conducted in accordance with NYSDEC MGP disposal guidance presented in TAGM 4061 (NYSDEC, 2002a). For the purpose of providing a cost for this alternative, it was assumed that MGP-impacted spoils would be transported to a permitted LTTD facility in compliance with TAGM 4061. Additionally, soil determined to be not MGP-impacted would be consolidated and transported for offsite treatment/disposal at an approved facility (i.e., a solid waste landfill), or reused as subsurface backfill. Additional disposal/treatment alternatives would be reviewed as part of the RD/RA Work Plan. For this alternative it has been estimated that 4,400 tons of excavated non-MGP impacted soil/spoils would be transported for offsite disposition at an approved facility.

Post-ISS quality control sampling would consist of sampling the stabilized soil columns to verify that performance criteria (e.g., permeability) are met. Long-term O&M would consist of monitoring constituent concentrations in the groundwater hydraulically downgradient of the ISS treatment area.

Construction of this remedial alternative would require the closure of Railroad Place to vehicular and pedestrian traffic for an extended period of time. The entire NYSEG property (currently a parking lot leased to the restaurant) would be required for support facilities and to stage equipment, requiring the restaurant to close for the duration of construction activities. The anticipated extent of this remedial alternative is shown on Figure 7A.

Air monitoring would be conducted during ground intrusive and/or other site activities with the potential to generate, dust, vapors, or odors. Methods would be modified or engineering controls (e.g., polyethylene sheeting, misting with water/BIO SOLVE®, foam) would be implemented to reduce the release of dust, vapors, or odors.

Groundwater monitoring activities would be conducted to document groundwater quality beneath and near the site. Monitoring activities would consist of collecting groundwater field data (e.g., pH, turbidity, ORP, temperature) and groundwater samples for laboratory analysis from select monitoring wells within the existing monitoring well network. For estimating purposes, monitoring would be conducted semiannually for 2 years and annually thereafter for a total duration of 30 years and the initial groundwater monitoring program would likely include MW-2, MW-3, MW-5, MW-6, MW-7, and MW-9. MW-1 or MW-8 would be used for the evaluation of potential of off-site migration. The need for additional monitoring would be evaluated after a period of five years. The actual scope of groundwater monitoring will be defined in the SMP.

Annual certification reports would be prepared by NYSEG and submitted to NYSDEC, documenting, for example, that the IC/ECs put in place remain in place, they are effective and are either unchanged from the previous certification or comply with NYSDEC-approved modifications.

<u>Overall Protection of Human Health and the Environment</u>

Installation of the asphalt surface cover and implementation of IC/ECs (ELURs and an SMP) would effectively meet those RAOs related to potential direct contact, ingestion, and inhalation exposure pathways (RAOs 1, 2, and 4). Removal of the majority of potentially mobile MGP-related impacts observed at SB-14A and ISS of Gas Holder 1 would effectively reduce the presence of MGP-related impacts that could migrate or contribute to exceedances of applicable groundwater quality standards (RAOs No. 3 and 5).

This alternative would meet the soil RAOs of minimizing potential future offsite migration of MGP-related impacts through reduction in volume and toxicity, and immobilizing MGP-impacted soils. ISS would directly reduce the concentrations of COCs in site groundwater by essentially removing the groundwater from the areas containing NAPL. However former Gas Holder 1 has not been demonstrated to be a source of COCs to groundwater. Based on existing groundwater monitoring data, DPH-impacts to groundwater have been observed hydraulically upgradient of Gas Holder 1 with no discernable increase in DPH concentrations downgradient of Gas Holder 1 (or off-site). Therefore this alternative does not readily appear to provide a higher degree of overall protection as compared with other alternatives, excluding the no action alternatives. The reduction in COC concentrations would also occur through volatilization during the mixing and curing processes. Depending on the reduction of COC concentrations in groundwater as a result of natural/enhanced processes, this alternative could contribute to the achievement of the applicable SCGs for groundwater. Over time, this alternative would potentially achieve all the RAOs for the site.

Compliance with SCGs

- Chemical-Specific SCGs: Under this alternative, approximately 4,400 CY of MGP-impacted material would be removed from the site, however, the restricted use SCOs for protection of groundwater or unrestricted use SCOs presented in 6 NYCRR Part 375 regulations would not be achieved. However, the remaining MGP-impacted material would be bound up in a solidified matrix. Depending on the reduction of COC concentrations in groundwater as a result of natural/enhanced processes, this alternative could achieve the applicable SCGs for overburden groundwater (including the NYS Ambient Water Quality Standards and Guidance Values presented in TOGS 1.1.1) over time.

- Action-Specific SCGs: Action-specific SCGs (Table 2-2) that apply to this alternative are associated with disposal of soils and worker and community health and safety. Workers present and work activities conducted during implementation of this alternative must comply with OSHA requirements for training, safety equipment and procedures, monitoring, recordkeeping, and reporting as identified in 29 CFR 1910, 29 CFR 1926, and 29 CFR 1904. Measures would be taken (as appropriate) to control levels of airborne VOCs and particulate matter during the remedial activities.

Waste materials subject to offsite transport and disposal would be characterized to determine appropriate treatment/disposal requirements. Disposal would be in accordance with applicable rules and regulations, including NYSDEC MGP disposal regulations. If any of the materials are characterized as a hazardous waste, then the RCRA UTSs/LDRs and USDOT requirements for the packaging, labeling, transportation, and disposal of hazardous or regulated materials would be applicable.

Compliance with these requirements would be achieved by utilizing licensed waste transporters and permitted disposal facilities. Disposal of water (if any) generated during implementation would be in accordance with POTF requirements.

- Location-Specific SCGs: Permits would be required to temporary close Railroad Place and sidewalks to implement construction activities. In addition, permits and/or notifications may be required to expose and or work near the buried subsurface utilities. Remedial activities at the site would be conducted in accordance with local building/construction codes and ordinances.

Long-Term Effectiveness and Permanence

This alternative would permanently remove MGP-related impacts observed at SB-14A that have the greatest potential for being mobile or impacting groundwater quality through dissolution. Implementing this alternative would effectively minimize the potential for future migration of NAPL or dissolution of COCs associated with NAPL to groundwater. This alternative also includes ISS of the remaining areas of NAPL-containing soils at the site which generally consist of blebs and droplets of NAPL observed from approximately 14 to 24 feet within and below Gas Holder 1 (observed at SB- 5, SB-7, SB-13) that possess minimal potential for long term exposure; migration; or serving as source material for further degradation of soil or groundwater quality (via dissociation of COCs) at the site. ISS would remove up to 75 percent of the treated volume, thus permanently remove additional MGP-related impacts observed within and below Gas Holder 1.

A long-term O&M program would be implemented to confirm the ongoing effectiveness of this remedial alternative for the site. O&M activities would consist of monitoring constituent concentrations in the groundwater beneath and hydraulically downgradient of the site.

Reduction of Toxicity, Mobility, or Volume of Contamination through Treatment

Soil removal with offsite treatment/disposal would directly reduce the toxicity, potential mobility and volume of MGP-related impacts in the site. Soil removal provides mass reduction by physically removing and replacing impacted soils with clean imported backfill materials. The impacted soils would then be transported for land disposal, thermal treatment, or incineration.

The concentrations of COCs in onsite groundwater would be reduced by enhancing the biological degradation of dissolved-phase COCs. Groundwater removal (if any) and disposition to a POTF during the removal activities also provides mass reduction of MGP-related impacts.

ISS treatment would reduce the volume (through spoils generation and disposal), mobility, and toxicity of MGP-related impacts, minimizing the potential for future downgradient migration of NAPL and impacted groundwater. Also, during ISS, the heat of the reaction would drive off certain volatile COCs from the impacted soil, thus reducing the volume and toxicity of COCs. Additionally, COCs associated with stabilized material within the solidified mixture would no longer be able to volatilize; thus minimizing potential vapor issues at the ground surface.

As discussed in Section 1, the current magnitude and extent of COCs (and therefore toxicity and volume) associated with former Gas Holder 1 (or the structure at SB-14) does not appear to significantly contribute to DPHs in groundwater. Impacts to groundwater appear to be localized and do not appear to extend beyond the hydraulically downgradient site boundary of the former MGP. Therefore, this alternative would not offer further reduction of toxicity of impacted groundwater, as compared with the other alternatives, except the no action alternative. The concentrations of COCs in onsite groundwater would be reduced (by enhancing the biological degradation of dissolved-phase COCs.

<u>Short-Term Impacts and Effectiveness</u>

Implementation of this alternative presents short-term risks to the community through the potential generation of dust, volatile organic vapors, damage to the subsurface/overhead utilities and/or nuisance odors during construction activities. Risk to the community would be minimized through installation of a temporary security fence to reduce potential unauthorized or accidental access to construction areas and the implementation of a CAMP to monitor the potential migration of dust, volatile organic vapors, and/or nuisance odors from the work area and to determine the need for additional engineering controls.

ISS of Gas Holder 1 would adversely affect the community as this alternative would require the closing of Railroad Place for an extended period (estimated eighteen weeks). Closing Railroad Place may disrupt PSB operations, local traffic flow (including emergency vehicles) and may adversely affect local business owners by restricting traffic to their establishments. In addition, the adjacent restaurant may need to close for the duration of the construction activities as their parking lot would be required as a support area. Pedestrian access would also be interrupted along Railroad place, and the community would not be able to walk along Railroad Place (from Wadsworth Street) during the remedial activities.

The presence of subsurface utilities above/within Gas Holder 1 presents potential risks associated with damaging them. Damage to a natural gas lines present a potential explosion hazard that could impact site workers and the community, damage to water lines could disrupt service to the community and damage to the sanitary sewer could create a release of raw sewage to the subsurface or backup of raw sewage into houses and businesses within the community. Pre-excavation to the top surface of the utilities would minimize the potential of damage from drilling operations. Monitoring for uplift would be required during ISS implementation. During angled jet grouting operations, the overhead utility lines (which appear to provide power to the PSB) could be damaged if not relocated or temporarily deactivated.

During implementation of this alternative, there would be an increased potential (relative to current conditions) for onsite workers to contact impacted soil, groundwater and NAPL via ingestion, dermal contact, and/or inhalation. However, potential exposure of onsite workers to chemical constituents would be minimized by the use of PPE, as specified in a site-specific HASP that would be developed during the RD phase. Air monitoring would be performed during implementation of this alternative to determine the need for additional engineering controls (e.g., use of water sprays and/or foam to suppress dust and vapors during ground intrusive activities, modifying the rate of construction activities, etc.) and to confirm that dust or volatilized organic vapors are within acceptable levels, as specified in the site-specific HASP.

Traffic resulting from the transportation of approximately 2,100 CY of impacted material for offsite disposition (approximately 280 one-way truckloads for soil removal and importing clean fill material) would pose a potential nuisance to the community and increase the risk for accidents and spills.

Assuming a production rate of 8 jet grouted holes per day, the implementation of this alternative may require approximately 24 weeks to complete and Railroad Place would be closed for 18 weeks.

Implementability

The removal of surface soil, installation of a surface cover, and removal of subsurface soil to an approximate depth of 10 feet is technically feasible. Remedial contractors to conduct the onsite activities and offsite treatment and/or disposal contractors/vendors are readily available. Institutional controls are would need to be coordinated with the city of Geneva. Permits to temporarily close sidewalks and/or roads would also require coordination with the city of Geneva and/or local shop owners. In addition, as this alternative requires temporarily closing a portion of Railroad Place, which may affect local traffic, operations at the PSB, and local business owners.

Implementation of the ISS process is technically feasible; however, this particular location has limited access and available work area. Overhead electrical lines may also pose an implementation problem for angle drilling/jet grouting around the existing utilities. Remedial contractors for implementing this technology are limited in availability and would need to be contracted well in advance of planned activities. In addition, approximately 2 million gallons of potable water would be needed to conduct the ISS operations (assumed available through local hydrant permit). High-pressure jet-grouting is generally considered a replacement technology and would require management of spoils (estimated up to 75% of treated soil volume). Excavation to visually identify the location of all utilities would be conducted to minimize the potential for damage to utilities.

The presence of previously identified obstructions, and potentially more unobserved obstacles, including the holder bottom, could prohibit the advancement of and potentially damage the drilling/injecting equipment used for ISS. Technical problems could result in schedule delays (e.g., equipment failure, treatment difficulties, traffic issues, coordination issues, etc.), but can be minimized with proper advanced planning and coordination of the remedial activities. In addition, this alternative requires temporary closing a portion of Railroad Place for up to 18 weeks which may affect local traffic, operations at the PSB, and local business owners.

The anticipated time necessary to implement this alternative is approximately 36 weeks, not including the pre-characterization soil sampling program, time to obtain permits, or conduct utility clearance activities. The long-term monitoring/maintenance are assumed to last 30 years.

Cost Effectiveness

The capital costs associated with this alternative generally includes attaining environmental easements, conducting a comprehensive NA evaluation and selection of appropriate amendments, preparation of an SMP, site preparation, soil excavation, backfilling, installation of the surface cover, ISS and waste transportation and treatment/disposal. Future site monitoring/maintenance activities would include evaluations to confirm that the institutional controls are in place and being followed, replenishment of NA amendments, and conducting groundwater monitoring activities. The present worth cost has been calculated assuming that monitoring/maintenance activities are continued for a period of 30 years. The estimated present worth cost of this alternative is approximately $4.4 million. A detailed breakdown of the estimated costs associated with this alternative is presented in Table 5-3.

5.7.2 Alternative IV B – Institutional Controls/Engineering Controls with Enhanced NA, Installation of Surface Cover, Removal of Subsurface Structure and MGP-Related Impacts at SB-14A, and Removal of Gas Holder 1

Technical Description

This alternative includes all components of Alternative III which includes the following:

- IC/EC
- Enhanced NA
- Installation of a surface cover
- Removal of subsurface structure and MGP-related impacts observed at SB-14A

In addition, this alternative involves removal of MGP NAPL-containing soil and soil containing PAHs > 500 ppm observed at Gas Holder 1. Gas Holder 1 lies beneath Railroad Place and several subsurface utilities are above the footprint of Gas Holder 1, including an 8-inch natural gas lines, a 2-inch natural gas service line, and an 8-inch water main. In addition, a 24-inch sanitary sewer transects the southern side of Gas Holder 1 approximately 10 feet below the road surface. For cost estimating purposes, it has been assumed that these utilities would be disconnected and relocated to facilitate soil excavation activities. In addition, the overhead utilities may need to be temporarily deactivated or relocated to facilitate installation of excavation support systems.

Construction of this remedial alternative would require the closure of Railroad Place to vehicular and pedestrian traffic for an extended period of time. The entire NYSEG property (currently a parking lot leased to the restaurant) would be required for support facilities and to stage equipment, requiring the restaurant to close for the duration of construction activities. The anticipated extent of this remedial alternative is shown on Figure 7B.

Soil excavation, management and transportation for offsite treatment and/or disposal would be accomplished using standard construction techniques and equipment and remedial contractors are readily available. The soil removal would be completed using conventional soil excavation equipment and excavation stability methods. Based on the anticipated depth of removal to 24 feet bgs, excavation support would need to be designed by a NYS licensed professional engineer. For cost estimating purposes, excavation support was assumed to consist of cantilevered steel sheetpiles. The actual sheetpiling depth and excavation support would be determined during the remedial design. The need for water (storm water and groundwater) management and treatment is anticipated and (for costing purposes) has been assumed to consist of rental and operation of a temporary treatment system with subsequent discharge to the local POTW.

A site-specific CAMP would be prepared and followed throughout the completion of the remedial construction activities to document and if necessary, reduce airborne particulate and volatile organic vapor concentrations surrounding the excavation area. Air monitoring would be conducted during ground intrusive and/or other site activities with the potential to generate, dust, vapors, or odors. Methods would be modified or engineering controls (e.g., polyethylene sheeting, misting with water/BIO SOLVE®, foam) would be implemented to reduce the release of dust, vapors, or odors.

Following dewatering and/or stabilization and characterization of the excavated materials, disposal of the excavated materials would be conducted in accordance with NYSDEC MGP disposal regulations presented in TAGM 4061 (NYSDEC, 2002a). For the purposes of providing a cost for this option, it was assumed that NAPL-impacted soils would be transported to a permitted facility for permanent thermal treatment using LTTD. Additionally, soil determined to be not NAPL-impacted would be consolidated and transported for offsite treatment/disposal at an approved facility (i.e., a solid waste landfill), or reused as subsurface backfill. Additional disposal/treatment alternatives would be reviewed as part of the RD/RA Work Plan. Based on available site data, it is assumed that approximately 50 percent of the material would be suitable for reuse as backfill, however, for cost estimating purposes reuse was not considered. The anticipated volume of soils to be excavated under this alternative is approximately 4,500 CY.

Surface restoration activities would consist of replacing disturbed surface covers and appurtenances in kind, based on the surface cover present prior to the implementation of this remedial alternative.

Groundwater monitoring activities would be conducted to document groundwater quality beneath and near the site. Monitoring activities would consist of collecting groundwater field data (e.g., pH, turbidity, ORP, temperature) and groundwater samples for laboratory analysis from select monitoring wells within the existing monitoring well network. For estimating purposes, monitoring would be conducted semiannually for 2 years and annually thereafter for a total duration of 30 years and the initial groundwater monitoring program would likely include MW-2, MW-3, MW-5, MW-6, MW-7, and MW-9. MW-1 or MW-8 would be used for the evaluation of potential of off-site migration. The need for additional monitoring would be evaluated after a period of five years. The actual scope of groundwater monitoring will be defined in the SMP.

Annual certification reports would be prepared by NYSEG and submitted to NYSDEC, documenting, for example, that the IC/ECs put in place remain in place, they are effective and are either unchanged from the previous certification or comply with NYSDEC-approved modifications.

Overall Protection of Human Health and the Environment

IC/ECs would mitigate potential exposure pathways through the use of ELURs and an SMP. Installation of a surface cover over remaining surface soil would mitigate human exposure to surface soil containing MGP-related COCs. Removal of the majority of potentially mobile MGP-related impacts observed at SB-14A and Gas Holder 1 would effectively reduce the presence of MGP-related impacts that could contribute to exceedances of applicable groundwater quality standards. However former Gas Holder 1 (or the structure located at SB-14) have not been demonstrated to be a source of COCs to groundwater. Based on existing groundwater monitoring data, DPH-impacts to groundwater have been observed hydraulically upgradient of Gas Holder 1 with no discernable increase in concentrations downgradient or off-site. Therefore this alternative does not readily appear to provide a higher degree of overall protection as compared with other alternatives, excluding the no action alternatives. Depending on the reduction of COC concentrations in groundwater as a result of natural/enhanced processes, this alternative could achieve the applicable SCGs for groundwater. Over time, this alternative would potentially achieve the RAOs for the site.

Compliance with SCGs

- Chemical-Specific SCGs: Under this alternative, approximately 2,700 CY of MGP-impacted material would be removed from the site, however, the Restricted Use Soil Cleanup Objectives for Protection of Groundwater or Unrestricted Use presented in 6 NYCRR Part 375 regulations would not be achieved. Depending on the reduction of COC concentrations in groundwater as a result of natural/enhanced processes, this alternative could achieve the applicable SCGs for overburden groundwater (including the NYS Ambient Water Quality Standards and Guidance Values presented in TOGS 1.1.1) over time.

- Action-Specific SCGs: Action-specific SCGs (Table 2-2) that apply to this alternative are associated with disposal of soils and worker and community health and safety. Workers present and work activities conducted during implementation of this alternative must comply with OSHA requirements for training, safety equipment and procedures, monitoring, recordkeeping, and reporting as identified in 29 CFR 1910, 29 CFR 1926, and 29 CFR 1904. Measures would be taken (as appropriate) to control levels of airborne VOCs and particulate matter during the remedial activities.

Waste materials subject to offsite transport and disposal would be characterized to determine appropriate treatment/disposal requirements. Disposal would be in accordance with applicable rules and regulations, including NYSDEC MGP disposal regulations. If any of the materials are characterized as a hazardous waste, then the RCRA UTSs/LDRs and USDOT requirements for the packaging, labeling, transportation, and disposal of hazardous or regulated materials would be applicable. Compliance with these requirements would be achieved by utilizing licensed waste transporters and permitted disposal facilities. Disposal of water (if any) generated during implementation would be in accordance with POTW requirements.

- Location-Specific SCGs: Permits would be required to temporary close Railroad Place and sidewalks to implement construction activities. Remedial activities at the site would be conducted in accordance with local building/construction codes and ordinances.

Long-Term Effectiveness and Permanence

This alternative would permanently remove MGP-related impacts in surface soil and those observed at SB-14A that have the greatest potential for being mobile or impacting groundwater quality through dissolution. Implementing this alternative would effectively minimize the potential for future migration of NAPL or dissolution of COCs associated with NAPL to groundwater. This alternative also includes removal of the remaining areas of NAPL-impacted soils at the site which generally consist of blebs and droplets of NAPL observed from approximately 14 to 24 feet within and below Gas Holder 1 (observed at SB- 5, SB-7, SB-13) that possess minimal potential for long term exposure; migration; or serving as source material for further degradation of soil or groundwater quality (via dissociation of COCs) at the site.

Institutional controls to be established as part of this alternative (including ELURs and adherence to an SMP) would effectively meet those RAOs related to potential direct contact, ingestion, and inhalation exposure pathways.

A long-term O&M program would be implemented to confirm the ongoing effectiveness of this remedial alternative for the site. O&M activities would consist of monitoring constituent concentrations in the groundwater beneath and hydraulically downgradient of the site.

Reduction of Toxicity, Mobility, or Volume of Contamination through Treatment

Soil removal with offsite treatment/disposal would directly reduce the toxicity, potential mobility and volume of MGP-related impacts in the site. Soil removal provides mass reduction by physically removing and replacing impacted soils with clean imported backfill materials or excavated material that meets the reuse criteria. The impacted soils would then be transported for land disposal, thermal treatment, or incineration.

The concentrations of COCs in onsite groundwater would be reduced by enhancing the biological degradation of dissolved-phase COCs. Groundwater removal (if any) and disposition to a POTF during the removal activities also provides mass reduction of MGP-related impacts.

The current magnitude (i.e., concentrations) and extent of COCs (and therefore toxicity and volume) does not appear to attribute to groundwater impacts. Impacts to groundwater appear to be localized and do not appear to extend beyond the site boundary of the former MGP. The concentrations of COCs in onsite groundwater would be reduced (by enhancing the biological degradation of dissolved-phase COCs.

Short-Term Impacts and Effectiveness

Implementation of this alternative presents short-term risks to the community through the potential generation of dust, volatile organic vapors, and/or nuisance odors during construction activities. Risk to the community would be minimized through installation of a temporary security fence to reduce potential unauthorized or accidental access to construction areas and the implementation of a CAMP to monitor the potential migration of dust, volatile organic vapors, and/or nuisance odors from the work area and to determine the need for additional engineering controls.

Removal of Gas Holder 1 would adversely affect the community as this alternative would require the closing of Railroad Place. Closing Railroad Place may disrupt PSB operations, local traffic (including emergency vehicles) flow and may adversely affect local business owners by limiting access to their establishments. Pedestrian access would also be interrupted along Railroad place, and the community would not be able to walk along Railroad Place (from Wadsworth Street) during the remedial activities. In addition, the adjacent restaurant may need to close for the duration of the construction activities estimated to be 36 weeks as their parking lot would be required as a support area. Relocation of the subsurface utilities could further disrupt utility services to the PSB and surrounding businesses.

If not properly planned or executed, excavation of impacted soil could damage the surrounding roadways and sidewalks.

During implementation of this alternative, there would be an increased potential (relative to current conditions) for onsite workers to contact impacted soil, groundwater and NAPL via ingestion, dermal contact, and/or inhalation. However, potential exposure of onsite workers to chemical constituents would be minimized by the use of PPE, as specified in a site-specific HASP that would be developed during the RD phase. Air monitoring would be performed during implementation of this alternative to determine the need for additional engineering controls (e.g., use of water sprays and/or foam to suppress dust and vapors during ground intrusive activities, modifying the rate of construction activities, etc.) and to confirm that dust or volatilized organic vapors are within acceptable levels, as specified in the site-specific HASP.

Traffic resulting from the transportation of approximately 4,500 CY of impacted material for offsite disposition (approximately 600 one-way truckloads for soil removal and importing clean fill material) would pose a potential nuisance to the community and increase the risk for accidents and spills.

The implementation of this alternative may require approximately 36 weeks to complete, including utility relocation.

Implementability

The installation of an asphalt surface cover, removal of subsurface soil at SB-14A and Gas Holder 1 is technically feasible. Remedial contractors to conduct the onsite activities and offsite treatment and/or disposal contractors/vendors are readily available. Institutional controls would need to be coordinated with the city of Geneva. Permits to temporarily close sidewalks and/or roads would also require coordination with the city of Geneva and/or local shop owners. As this alternative requires temporarily closing a portion of Railroad Place, which may affect local traffic, operations at the PSB, the restaurant, and local shop owners.

The presence of utilities within Railroad Place, as well as the overhead utility lines presents implementation challenges. The utilities will need to be relocated before excavation can be completed, and this may require obtaining new rights of way for the utilities, as well as local approval from the city of Geneva and the utility owners.

If obstructions are present within the fill materials, the obstructions would be an impediment to installing excavation reinforcement, however, a pre-design investigation would evaluate the presence of potential obstructions and pretrenching conducted to address obstructions within the fill material.

During excavation, groundwater management would be required in the form of collection, treatment and offsite disposal. The fine sand layer may produce large quantities of groundwater that need to be collected and treated offsite. Upwelling of groundwater within the fine sand layer could result in an unstable excavation. Therefore, the excavation program would need to be carefully designed to avoid potential damage to the surrounding properties and to ensure that there is adequate capacity to collect and treat the groundwater during the excavation activities.

Technical problems could result in schedule delays (e.g., equipment failure, treatment difficulties, traffic issues, coordination issues, etc.), but can be minimized with proper advanced planning and coordination of the remedial activities.

The anticipated time necessary to implement this alternative is approximately thirty-six weeks, not including the pre-characterization soil sampling program, time to obtain permits, or conduct utility clearance activities. The long-term monitoring/maintenance is assumed to last 30 years.

Cost Effectiveness

The capital costs associated with this alternative generally includes attaining environmental easements, conducting a comprehensive NA evaluation and selection of appropriate amendments, preparation of an SMP, site preparation, soil excavation, backfilling, installation of the surface cover, and waste transportation and treatment/disposal. Future site monitoring/maintenance activities would include evaluations to confirm that the institutional controls are in place and being followed, replenishment of NA amendments, and conducting groundwater monitoring activities. The present worth cost has been calculated assuming that monitoring/maintenance activities are continued for a period of 30 years. The estimated present worth cost of this alternative is approximately $4.9 million. A detailed breakdown of the estimated costs associated with this alternative is presented in Table 5-4.

5.7.3 Alternative IV C – Institutional Controls/Engineering Controls with Enhanced NA, Installation of Surface Cover, Removal of Subsurface Structure and MGP-Related Impacts at SB-14A, and Containment of Gas Holder 1

Technical Description

This alternative includes all components of Alternative III which includes the following:

- IC/EC
- Enhanced NA
- Installation of a surface cover
- Removal of subsurface structure and MGP-related impacts observed at SB-14A

In addition, this alternative involves containment of Gas Holder 1. Containment involves the installation of a low permeability slurry wall (likely a mixture of soil-cement-bentonite [SCB]) to surround the former holder and key into the confining layer, presumed to be located 80 feet below ground surface. For cost estimating purposes, the slurry wall is assumed to key into the confining layer at a depth of 85 feet below ground surface and would have a permeability of 1 x 10 -6 cm/sec.

Installation of a slurry wall would likely require application of clam shell excavation methods and jet grouting (to install the containment around the subsurface utilities). The clam shell would be used to excavate the barrier wall in vertical panel sections and the SCB pumping into the section during excavation. In addition to serving as the stabilizing fluid to maintain trench stability, the SCB slurry would be left in the trench to set up and form the containment barrier wall. Excavated trench soils would be managed for disposal in accordance with applicable rules and regulations.

Both the slurry wall and the jet grout would require the mobilization of specialized equipment to mix and install the wall materials, and the excavated soils would need to be suitable for use in the SCB mix (or soil would need to be imported to the site for this application).

The presence of subsurface utilities or other obstructions would pose an impediment to installing the containment barrier. Gas Holder 1 lies beneath Railroad Place and a review of a utility drawing prepared by the city of Geneva Engineering Department (Exhibit 1) reveals several subsurface utilities are above the footprint of Gas Holder 1, including an 8-inch natural gas line, a 2-inch natural gas service line, and an 8-inch water main. In addition, a 24-inch sanitary sewer transects the southern side of Gas Holder 1 approximately 10 feet below the road surface. To accommodate the utilities, angled jet grouting would be used to create a low permeability wall around each of the utilities.

Pre-excavation would be conducted to expose the top surface of the utilities to prevent damaging them from drilling operations and/or to monitor them during jet grouting. For cost estimating purposes, it is assumed that material above Gas Holder would be excavated to a depth of 6 feet to locate the natural gas and water lines, and a trench would be dug to a depth of 10 feet along the alignment of the 24-inch sanitary sewer.

A bench-scale study to evaluate the effectiveness of various SCB and jet grout mixtures at attaining the desired permeability would be conducted prior to the commencement of activities. The bench-scale testing activities would consist of testing various solidification mixtures of hydrated reagents (e.g., blast furnace slag, Portland cement, bentonite, soil and water) for compatibility with the COCs and NAPL in the soil and groundwater at the site. Solidification mixtures would be tested for density, permeability, and strength. The results of bench-scale testing would determine the combination of reagents mixed with the NAPL-impacted soil that would provide the optimal mixture for creating a low-permeability barrier wall.

During the containment barrier construction process, excess materials (i.e., spoils consisting of a mixture of soil, groundwater and grout) would be generated. Spoils generated during construction would be stockpiled onsite to facilitate stabilization (if necessary) and characterization of the material prior to offsite disposition. Disposal of MGP-impacted materials would be conducted in accordance with NYSDEC MGP disposal guidance presented in TAGM 4061 (NYSDEC, 2002a). For the purpose of providing a cost for this alternative, it was assumed that MGP-impacted spoils would be transported to a permitted LTTD facility in compliance with TAGM 4061. Additionally, soil determined to be not MGP-impacted would be consolidated and transported for offsite treatment/disposal at an approved facility (i.e., a solid waste landfill), or reused as subsurface backfill. Additional disposal/treatment alternatives would be reviewed as part of the RD/RA Work Plan. For this alternative it has been estimated that 2,900 CY of excavated soil/spoils would be transported for offsite disposition at an approved facility.

Quality control sampling would consist of sampling the SCB mixture during emplacement to document that performance criteria (e.g., permeability) are met. Long-term O&M would consist of monitoring constituent concentrations in the groundwater hydraulically downgradient of the containment barrier.

Construction of this remedial alternative would require the closure of Railroad Place to vehicular and pedestrian traffic for an extended period of time. The entire NYSEG property (currently a parking lot leased to the restaurant) would be required for support facilities and to stage equipment, requiring the restaurant to close for the duration of construction activities. The anticipated extent of this remedial alternative is shown on Figure 7C.

Air monitoring would be conducted during ground intrusive and/or other site activities with the potential to generate, dust, vapors, or odors. Methods would be modified or engineering controls (e.g., polyethylene sheeting, misting with water/BIO SOLVE®, foam) would be implemented to reduce the release of dust, vapors, or odors.

Groundwater monitoring activities would be conducted to document groundwater quality beneath and near the site. Monitoring activities would consist of collecting groundwater field data (e.g., pH, turbidity, ORP, temperature) and groundwater samples for laboratory analysis from select monitoring wells within the existing monitoring well network. For estimating purposes, monitoring would be conducted semiannually for 2 years and annually thereafter for a total duration of 30 years and the initial groundwater monitoring program would likely include MW-2, MW-3, MW-5, MW-6, MW-7, and MW-9. MW-1 or MW-8 would be used for the evaluation of potential of off-site migration. The need for additional monitoring would be evaluated after a period of five years. The actual scope of groundwater monitoring will be defined in the SMP.

Annual certification reports would be prepared by NYSEG and submitted to NYSDEC, documenting, for example, that the IC/ECs put in place remain in place, they are effective and are either unchanged from the previous certification or comply with NYSDEC-approved modifications.

Overall Protection of Human Health and the Environment

Installation of the surface cover and implementation of IC/ECs (ELURs and an SMP) would effectively meet those RAOs related to potential direct contact, ingestion, and inhalation exposure pathways (RAOs 1, 2, and 4). Removal of the majority of potentially mobile MGP-related impacts observed at SB-14A and containment of Gas Holder 1 would effectively reduce the presence of MGP-related impacts that could migrate or contribute to exceedances of applicable groundwater quality standards (RAOs No. 3 and 5).

This alternative would meet the soil RAOs of minimizing potential future offsite migration of MGP-related impacts through reduction in volume and toxicity, and immobilizing MGP-impacted soils. Containment would directly reduce the concentrations of COCs in site groundwater by essentially removing the groundwater from the areas containing NAPL within Gas Holder 1. However, former Gas Holder 1 has not been demonstrated to be a source of COCs to groundwater. Based on existing groundwater monitoring data, DPH-impacts to groundwater have been observed hydraulically upgradient of Gas Holder 1 with no discernable increase in concentrations downgradient. Therefore, this alternative does not readily appear to provide a higher degree of overall protection as compared with other alternatives, excluding the no action alternatives Depending on the reduction of COC concentrations in groundwater as a result of natural/enhanced processes, this alternative could contribute to the achievement of the applicable SCGs for groundwater. Over time, this alternative would potentially achieve all the RAOs for the site.

Compliance with SCGs

- Chemical-Specific SCGs: Under this alternative, approximately 250 CY of MGP-impacted material would be removed from the site, however, the restricted use SCOs for protection of groundwater or unrestricted use SCOs presented in 6 NYCRR Part 375 regulations would not be achieved. Depending on the reduction of COC concentrations in groundwater as a result of natural/enhanced processes, this alternative could achieve the applicable SCGs for overburden groundwater (including the NYS Ambient Water Quality Standards and Guidance Values presented in TOGS 1.1.1) over time.

- Action-Specific SCGs: Action-specific SCGs (Table 2-2) that apply to this alternative are associated with disposal of soils and worker and community health and safety. Workers present and work activities conducted during implementation of this alternative must comply with OSHA requirements for training, safety equipment and procedures, monitoring, recordkeeping, and reporting as identified in 29 CFR 1910, 29 CFR 1926, and 29 CFR 1904. Measures would be taken (as appropriate) to control levels of airborne VOCs and particulate matter during the remedial activities.

Waste materials subject to offsite transport and disposal would be characterized to determine appropriate treatment/disposal requirements. Disposal would be in accordance with applicable rules and regulations, including NYSDEC MGP disposal regulations. If any of the materials are characterized as a hazardous waste, then the RCRA UTSs/LDRs and USDOT requirements for the packaging, labeling, transportation, and disposal of hazardous or regulated materials would be applicable. Compliance with these requirements would be achieved by utilizing licensed waste transporters and permitted disposal facilities. Disposal of water (if any) generated during implementation would be in accordance with POTF requirements.

- Location-Specific SCGs: Permits would be required to temporary close Railroad Place and sidewalks to implement construction activities. In addition, permits and/or notifications may be required to expose and or work near the buried subsurface utilities. Remedial activities at the site would be conducted in accordance with local building/construction codes and ordinances.

Long-Term Effectiveness and Permanence

This alternative would permanently remove MGP-related impacts observed at SB-14A that have the greatest potential for being mobile or impacting groundwater quality through dissolution. Implementing this alternative would effectively minimize the potential for future migration of NAPL or dissolution of COCs associated with NAPL to groundwater. This alternative contain the remaining areas of NAPL-impacted soils at the site which generally consist of blebs and droplets of NAPL observed from approximately 14 to 24 feet within and below Gas Holder 1 (observed at SB- 5, SB-7, SB-13). The blebs and droplets of NAPL within Gas Holder 1 currently present minimal potential for long term exposure; migration; or serving as source material for further degradation of soil or groundwater quality (via dissociation of COCs) at the site.

A long-term O&M program would be implemented to confirm the ongoing effectiveness of this remedial alternative for the site. O&M activities would consist of monitoring constituent concentrations in the groundwater beneath and hydraulically downgradient of the site.

Reduction of Toxicity, Mobility, or Volume of Contamination through Treatment

Soil removal with offsite treatment/disposal would directly reduce the toxicity, potential mobility and volume of MGP-related impacts in the site. Soil removal provides mass reduction by physically removing and replacing impacted soils with clean imported backfill materials. The impacted soils would then be transported for land disposal, thermal treatment, or incineration.

Installation of a containment barrier around Gas Holder 1 would reduce the mobility of impacted materials within the holder and minimize the potential for future downgradient migration of NAPL and impacted groundwater. Note that the RI did not indicate the NAPL-impacted materials with Gas Holder 1 were currently mobile or had the potential to become mobile.

The concentrations of COCs in onsite groundwater would be reduced by enhancing the biological degradation of dissolved-phase COCs. Groundwater removal (if any) and disposition to a POTF during the removal activities also provides mass reduction of MGP-related impacts.

The current magnitude (i.e., concentrations) and extent of COCs (and therefore toxicity and volume) does not appear to attribute to groundwater impacts. Impacts to groundwater appear to be localized and do not appear to extend beyond the site boundary of the former MGP. Therefore, this alternative would not offer further reduction of toxicity of impacted groundwater, as compared with the other alternatives, except the no action alternative. The concentrations of COCs in onsite groundwater would be reduced (by enhancing the biological degradation of dissolved-phase COCs.

Short-Term Impacts and Effectiveness

Implementation of this alternative presents short-term risks to the community through the potential generation of dust, volatile organic vapors, damage to the subsurface/overhead utilities and/or nuisance odors during construction activities. Risk to the community would be minimized through installation of a temporary security fence to reduce potential unauthorized or accidental access to construction areas and the implementation of a CAMP to monitor the potential migration of dust, volatile organic vapors, and/or nuisance odors from the work area and to determine the need for additional engineering controls.

Installing a containment barrier around Gas Holder 1 would adversely affect the community as this alternative would require the closing of Railroad Place for an extended period (estimated sixteen weeks). Closing Railroad Place may disrupt PSB operations, local traffic flow (including emergency vehicles) and may adversely affect local business owners by restricting traffic to their establishments. In addition, the adjacent restaurant may need to close for the duration of the construction activities as their parking lot would be required as a support area. Pedestrian access would also be interrupted along Railroad place, and the community would not be able to walk along Railroad Place (from Wadsworth Street) during the remedial activities.

The presence of subsurface utilities above/within Gas Holder 1 presents potential risks associated with damaging them. Damage to a natural gas lines present a potential explosion hazard that could impact site workers and the community, damage to water lines could disrupt service to the community and damage to the sanitary sewer could create a release of raw sewage to the subsurface or backup of raw sewage into houses and businesses within the community. Pre-excavation to the top surface of the utilities would minimize the potential of damage from drilling operations. Monitoring for uplift would be required during barrier wall construction. During angled jet grouting operations, the overhead utility lines (which appear to provide power to the PSB) could be damaged if not relocated or temporarily deactivated.

During implementation of this alternative, there would be an increased potential (relative to current conditions) for onsite workers to contact impacted soil, groundwater and NAPL via ingestion, dermal contact, and/or inhalation. However, potential exposure of onsite workers to chemical constituents would be minimized by the use of PPE, as specified in a site-specific HASP that would be developed during the RD phase. Air monitoring would be performed during implementation of this alternative to determine the need for additional engineering controls (e.g., use of water sprays and/or foam to suppress dust and vapors during ground intrusive activities, modifying the rate of construction activities, etc.) and to confirm that dust or volatilized organic vapors are within acceptable levels, as specified in the site-specific HASP.

Traffic resulting from the transportation of approximately 2,600 CY of spoils for offsite disposition (approximately 325 one-way truckloads for soil removal and importing clean fill and slurry material) would pose a potential nuisance to the community and increase the risk for accidents and spills.

Assuming a barrier wall 70 feet in diameter, and a production rate of 10 linear feet per day for barrier wall installation, the implementation of this alternative may require approximately sixteen weeks to complete, and Railroad place would be closed for up to ten weeks.

Implementability

The removal of surface soil, installation of a surface cover, and removal of subsurface soil to an approximate depth of 10 feet is technically feasible. Remedial contractors to conduct the onsite activities and offsite treatment and/or disposal contractors/vendors are readily available. Institutional controls are would need to be coordinated with the city of Geneva. Permits to temporarily close sidewalks and/or roads would also require coordination with the city of Geneva and/or local business owners. In addition, as this alternative requires temporarily closing a portion of Railroad Place, which may adversely affect local traffic, operations at the PSB, and local business owners.

Construction of a containment barrier is technically feasible; however, this particular location has limited access and available work area. Overhead electrical lines may also pose an implementation problem for angle drilling/jet grouting around the existing utilities, and the small work area would limit productivity for the barrier wall construction. Remedial contractors for implementing this technology are limited in availability and would need to be contracted well in advance of planned activities. In addition, a nearby water source, and approximately 1 million gallons of potable water would be needed to construct the barrier wall. The expansion of treated soils below the utilities could result in irreparable structural damage to the underground utilities (e.g., sanitary sewer, water lines, natural gas lines). Excavation to visually identify the location of all utilities would be conducted to minimize the potential for damage to utilities.

Technical problems such as obstructions and unidentified utilities could result in schedule delays (e.g., equipment failure, treatment difficulties, traffic issues, coordination issues, etc.), but can be minimized with proper advanced planning and coordination of the remedial activities. In addition, this alternative requires temporary closing a portion of Railroad Place which may adversely affect local traffic, operations at the PSB, and local business owners.

The anticipated time necessary to implement this alternative is approximately sixteen weeks, not including the pre-characterization soil sampling program, time to obtain permits, or conduct utility clearance activities. The long-term monitoring/maintenance is assumed to last 30 years

Cost Effectiveness

The capital costs associated with this alternative generally includes attaining environmental easements, conducting a comprehensive NA evaluation and selection of appropriate amendments, preparation of an SMP, site preparation, soil excavation, backfilling, installation of the asphalt surface cover, containment barrier construction and waste transportation and treatment/disposal. Future site monitoring/maintenance activities would include evaluations to confirm that the institutional controls are in place and being followed, replenishment of NA amendments, and conducting groundwater monitoring activities. The present worth cost has been calculated assuming that monitoring/maintenance activities are continued for a period of 30 years. The estimated present worth cost of this alternative is approximately $3.6 million. A detailed breakdown of the estimated costs associated with this alternative is presented in Table 5-5.

5.8 Alternative V – Removal of Soil Containing MGP-Related Chemical Constituents Greater Than Part 375 Soil Cleanup Objectives for Unrestricted Use

Technical Description

Pursuant to 6 NYCRR Part 375-2.8(c)(2)(i), an FS Report shall include a remedial alternative that achieves the soil cleanup objectives in 6 NYCRR Part 375 corresponding to unrestricted site use. These cleanup objectives are chemical-specific and would consider the MGP-related chemical COCs that have been identified at the site.

Remedial Alternative V would involve IC/EC, enhanced NA and excavation to a maximum depth of 24 ft bgs and offsite disposal of observed MGP-impacted soils that exceed the Unrestricted Use SCOs. The anticipated extent of soil to be addressed by this alternative is shown on Figure 8.

Gas Holder 1 lies beneath Railroad Place and several subsurface utilities are above the footprint of Gas Holder 1, including an 8-inch natural gas lines, a 2-inch natural gas service line, and an 8-inch water main. In addition, a 24-inch sanitary sewer transects the southern side of Gas Holder 1 approximately 10 feet below the road surface. For cost estimating purposes, it has been assumed that these utilities would be disconnected and relocated to facilitate soil excavation activities. Construction of this remedial alternative would require the closure of Railroad Place to vehicular and pedestrian traffic for an extended period of time. The entire NYSEG property (currently a parking lot leased to the restaurant) would be required for support facilities and to stage equipment, requiring the restaurant to close for the duration of construction activities. The anticipated volume of soils to be removed under this alternative is approximately 10,400 CY.

Soil excavation, management and transportation for offsite treatment and/or disposal would be accomplished using standard construction techniques and equipment and remedial contractors are readily available. The soil removal would be completed using conventional soil excavation equipment and excavation stability methods. Based on the anticipated depth of removal and proximity to the PSB, excavation support (underpinning, H-piles, sheet piling) would need to be designed by a NYS professional engineer. For cost estimating purposes, excavation support was assumed to consist of cantilevered steel sheetpiles and H-piles. The need for water (storm water and groundwater) management and treatment is anticipated and (for costing purposes) has been assumed to consist of localized sumps, well points and rental and operation of a temporary treatment system with subsequent discharge to the local POTW.

Air monitoring would be conducted during ground intrusive and/or other site activities with the potential to generate, dust, vapors, or odors. Methods would be modified or engineering controls (e.g., polyethylene sheeting, misting with water/BIO SOLVE®, foam) would be implemented to reduce the release of dust, vapors, or odors. A site-specific CAMP would be prepared and followed throughout the completion of the remedial construction activities to document and if necessary, reduce airborne particulate and volatile organic vapor concentrations surrounding the excavation area.

Following dewatering and/or stabilization and characterization of the excavated materials, disposal of the excavated materials would be conducted in accordance with NYSDEC MGP disposal regulations presented in TAGM 4061 (NYSDEC, 2002a). For the purposes of providing a cost for this option, it was assumed that NAPL-impacted soils would be transported to a permitted facility for permanent thermal treatment using LTTD. Additionally, soil determined to be not MGP-impacted would be consolidated and transported for offsite treatment/disposal at an approved facility (i.e., a solid waste landfill). Due to the anticipated inorganic constituents at concentrations above the unrestricted use SCOs, excavated material will not be reused as subsurface backfill. Additional disposal/treatment alternatives would be reviewed as part of the RD/RA Work Plan.

Surface restoration activities would consist of replacing disturbed surface covers and appurtenances in kind, based on the surface cover present prior to the implementation of this remedial alternative.

Groundwater monitoring activities would be conducted to document groundwater quality beneath and near the site. Monitoring activities would consist of collecting groundwater field data (e.g., pH, turbidity, ORP, temperature) and groundwater samples for laboratory analysis from select monitoring wells within the existing monitoring well network. For estimating purposes, monitoring would be conducted semiannually for 2 years to verify that complete source removal has occurred and there are no remaining impacts to groundwater. The groundwater monitoring program would likely include MW-2, MW-3, MW-5, MW-6, MW-7, and MW-9. MW-1 or MW-8 would be used for the evaluation of potential of off-site migration. The need for additional monitoring would be evaluated following the two year period. The actual scope of groundwater monitoring will be defined in the SMP.

Annual certification reports would be prepared by NYSEG and submitted to NYSDEC, documenting, for example, that the IC/ECs put in place remain in place, they are effective and are either unchanged from the previous certification or comply with NYSDEC-approved modifications.

Overall Protection of Human Health and the Environment

This alternative would achieve all of the RAOs for soil, including those that are related to potential exposure pathways, as well as those that focus on reducing the presence of MGP-related impacts.

Excavation would eliminate observed MGP-related impacts in soil, eliminating the mass flux of COCs from these materials into groundwater. Depending on the reduction of COC concentrations in groundwater as a result of natural/enhanced processes, this alternative could contribute to the achievement of the applicable SCGs for groundwater. Over time, this alternative would potentially achieve the RAOs for the site.

Compliance with SCGs

- *Chemical-Specific SCGs*: Chemical-specific SCGs are presented in Table 2-1. This alternative would meet the Unrestricted Use Soil Cleanup Objectives presented in 6 NYCRR Part 375 regulations for the areas currently identified. It is also expected that the removal of materials would meet the applicable SCGs for overburden groundwater (including NYS Groundwater Quality Standards and Guidance Values presented in TOGS 1.1.1) as impacted materials containing COCs at concentrations greater than 6 NYCRR Part 375 Unrestricted Use Soil Cleanup Objectives would be addressed and remaining dissolved-phase impacts in overburden groundwater would be addressed via natural processes.

- *Action-Specific SCGs*: Action-specific SCGs (Table 2-2) that apply to this alternative are associated with, disposal of impacted soils, and OSHA health and safety requirements. Workers present and work activities conducted during implementation of this alternative must comply with OSHA requirements for training, safety equipment and procedures, monitoring, recordkeeping, and reporting as identified in 29 CFR 1910, 29 CFR 1926, and 29 CFR 1904. Measures would be taken (as appropriate) to control levels of airborne particulate matter during soil excavation activities.

Waste materials generated during implementation of this alternative (i.e., excavated soil) would be characterized to determine appropriate offsite disposal requirements. Disposal of MGP-impacted materials would be in accordance with NYSDEC MGP disposal regulations. If any of the materials are characterized as a hazardous waste, then the RCRA UTSs/LDRs and USDOT requirements for the packaging, labeling, transportation, and disposal of hazardous or regulated materials may be applicable. Compliance with these requirements would be achieved by utilizing licensed waste transporters and permitted disposal facilities.

- *Location-Specific SCGs*: Permits would be required to temporary close Railroad Place and sidewalks to implement construction activities. Remedial activities at the site would be conducted in accordance with local building/construction codes and ordinances.

Long-Term Effectiveness and Permanence

This alternative would permanently remove visible NAPL, as well as other observed MGP-related impacts (i.e., purifier waste) and soil observed to contain COCs at concentrations greater than the Part 375 Unrestricted Use Soil Cleanup Objectives.

This remedial alternative would meet the RAO of preventing ingestion/direct contact between humans and MGP-impacted soil and all MGP-impacted overburden soil would be addressed. Similarly the alternative would be effective at meeting environmental protection RAOs of preventing further migration of COCs to groundwater or surface water as NAPL-impacted soil and soil containing COCs at elevated concentrations would be removed.

Reduction of Toxicity, Mobility, or Volume of Contamination

Soil removal with offsite treatment would reduce the toxicity, mobility and volume of MGP-related impacts at the site. Soil removal provides mass reduction by way of physically removing and replacing impacted soils with clean imported backfill materials. The impacted soils would then be transported for land disposal, thermal treatment, or incineration. Groundwater removal, to facilitate soil excavation and subsequent treatment/discharge to a POTW, also provides mass reduction of MGP-related impacts.

Short-Term Impacts and Effectiveness

Implementation of this alternative presents the greatest short-term risks to the community through the potential generation of dust, volatile organic vapors, and/or nuisance odors during construction activities. Risk to the community would be minimized through installation of a temporary security fence to reduce potential unauthorized or accidental access to construction areas and the implementation of a CAMP to monitor the potential migration of dust, volatile organic vapors, and/or nuisance odors from the work area and to determine the need for additional engineering controls.

Removal of Gas Holder 1 and surrounding soils would adversely affect the community as this alternative would require the closing of Railroad Place. Closing Railroad Place may disrupt PSB operations, local traffic flow and may adversely affect local business owners. In addition, the adjacent restaurant may need to close for the duration of the construction activities as their parking lot would be required as a support area.

This alternative also presents the greatest short-term risk to onsite workers associated with contact impacted soil, groundwater and NAPL via ingestion, dermal contact, and/or inhalation. However, potential exposure of onsite workers to chemical constituents would be minimized by the use of PPE, as specified in a site-specific HASP that would be developed during the RD phase. Air monitoring would be performed during implementation of this alternative to determine the need for additional engineering controls (e.g., use of water sprays and/or foam to suppress dust and vapors during ground intrusive activities, modifying the rate of construction activities, etc.) and to confirm that dust or volatilized organic vapors are within acceptable levels, as specified in the site-specific HASP.

Working around subsurface utilities also present a risk to onsite workers and the community. Damage to a natural gas lines present a potential explosion hazard that could impact site workers and the community, damage to water lines could disrupt service to the community and damage to the sanitary sewer could create a backup of raw sewage into houses and businesses within the community.

Traffic resulting from the transportation of approximately 10,400 CY of impacted material for offsite disposition (approximately 1,500 one-way truckloads for soil removal and importing clean fill material) would pose a potential nuisance to the community and increase the risk for accidents and spills.

The implementation of this alternative may require approximately 48 weeks to complete.

Implementability

This alternative would be the most difficult to implement. Excavation of soil to a depth of over twenty feet adjacent to the PSB would present several design and construction challenges for implementation of this alternative. Substantial excavation support (underpinning, H-piles, sheet piling and/or other excavation support techniques) would need to be conducted in close coordination with the city of Geneva to minimize disruption to operations associated with the PSB. Permits to temporarily close sidewalks and/or roads would also require coordination with the city of Geneva and/or local shop owners. In addition, as this alternative requires temporarily closing a portion of Railroad Place which could adversely affect local traffic, operations at the PSB, and local business owners. Remedial contractors for implementing the remedial technology(ies) associated with this alternative are readily available.

The presence of utilities within Railroad Place, as well as the overhead utility lines presents implementation challenges. The utilities will need to be relocated before excavation can be completed, and this may require obtaining new rights of way for the utilities, as well as local approval from the city of Geneva and the utility owners.

If obstructions are present within the fill materials, the obstructions would be an impediment to installing excavation reinforcement, however, a pre-design investigation would evaluate the presence of potential obstructions and pretrenching conducted to address obstructions within the fill material.

During excavation, groundwater management would be required in the form of collect, treatment and offsite disposal. The fine sand layer may produce large quantities of groundwater that need to be collected and treated offsite. Upwelling of groundwater within the fine sand layer could result in an unstable excavation. Therefore, the excavation program would need to be carefully designed to avoid potential damage to the surrounding properties and to ensure that there is adequate capacity to collect and treat the groundwater during the excavation activities.

Technical problems could result in schedule delays (e.g., equipment failure, treatment difficulties, traffic issues, coordination issues, etc.), but can be minimized with proper advanced planning and coordination of the remedial activities.

The time associated with successful implementation of this alternative would be approximately forty-eight weeks (excluding treatability studies, permitting and approvals). The long-term monitoring/maintenance is assumed to last 30 years

Cost Effectiveness

The capital costs associated with this alternative include site preparation, soil excavation, and waste transportation and disposal. The present worth cost has been calculated assuming that monitoring/maintenance activities are continued for a period of 2 years. The estimated present worth cost of this alternative is approximately $9.51 million. A detailed breakdown of the estimated costs associated with this alternative is presented in Table 5-6.

6. Comparative Analysis of Remedial Alternatives

6.1 General

This section presents the comparative analysis of the site-wide remedial alternatives using the seven evaluation criteria identified in Section 5. The comparative analysis identifies the relative advantages and disadvantages between remedial alternatives using the evaluation criteria described in Section 5.2. The results of the comparative analysis were used as a basis for selecting the preferred remedial alternatives (discussed in Section 7).

6.2 Comparative Analysis for OU1 Alternatives

This section provides a comparative analysis of the five remedial alternatives evaluated for OU1 with respect to the seven evaluation criteria identified in Section 5.2. For reference throughout this section, the alternatives are summarized below:

- Alternative I – No Action.
- Alternative II – Institutional Controls/Engineering Controls with Enhanced NA.
- Alternative III – Institutional Controls/Engineering Controls with Enhanced NA, Installation of a Surface Cover, and Removal of Subsurface Structure and MGP-Related Impacts at SB-14A
- Alternative IV A – Institutional Controls/Engineering Controls with Enhanced NA, Installation of a Surface Cover, Removal Subsurface Structure and MGP-Related Impacts at SB-14A, and In-Situ Stabilization of Gas Holder 1
- Alternative IV B – Institutional Controls/Engineering Controls with Enhanced NA, Installation of Surface Cover, Removal of Subsurface Structure and MGP-Related Impacts at SB-14A, and Removal of Gas Holder 1
- Alternative IV C – Institutional Controls/Engineering Controls with Enhanced NA, Installation of a Surface Cover, Removal of Subsurface Structure and MGP-Related Impacts at SB-14A, and Containment of Gas Holder 1
- Alternative V – Removal of Soil Containing MGP-Related Chemical Constituents Greater Than Part 375 Soil Cleanup Objectives for Unrestricted Use

6.2.1 Compliance with SCGs

The SCGs identified in Sections 2.1, 2.2, and 2.3 supported several different aspects of the remedial evaluations presented in this FS Report. For example, chemical-specific SCGs were considered in the identification of certain of the RAOs presented in Section 3 (e.g., attainment of applicable groundwater quality standards), as well as potential remedial alternatives (e.g., achievement of 6 NYCRR Part 375 SCOs). Further, as appropriate, the action and location-specific SCGs were important in the detailed development of each remedial alternative, which supported the evaluation of each alternative relative to the evaluation criteria (e.g., implementability, short-term impacts and effectiveness). Therefore, the comparative evaluation of the alternatives on the basis of compliance with SCGs results in several differences as discussed below.

Currently, portions of the site exceed SCGs related to soil and groundwater quality. Each of the site-wide alternatives could be designed and implemented to comply with the majority of SCGs for this site.

- Alternative I does not involve active removal, treatment, or containment of MGP-impacted material and therefore would not comply with the chemical-specific SCGs. In addition, action- and location-specific SCGs are not applicable.

- Alternative II does not involve active removal of MGP-impacted material, but provides protection of human health and the environment by minimizing exposure to MGP-related COCs through the use of containment options and institutional controls. Alternative II includes treatment through oxygen enhancement and/or other amendments to enhance natural attenuation of groundwater. Depending on the reduction of COC concentrations in groundwater as a result of the enhanced natural processes, this alternative could meet the NYS Groundwater Quality Standards over time.

Alternatives III, IVA, IVB, and IVC involve removal, treatment, or containment of MGP-impacted material, but vary in degree of impacted media addressed and/or methods employed.

- Alternative III would achieve the chemical-specific SCGs for surface soil and MGP-related impacts observed at SB-14A through active removal and through oxygen enhancement and/or other amendments to enhance natural attenuation of groundwater. The remaining MGP-related impacts observed at Gas Holder 1 and impacts to groundwater would be managed through institutional controls.

Depending on the reduction of COC concentrations in groundwater as a result of the enhanced natural processes, this alternative could meet the NYS Groundwater Quality Standards over time.

- Alternative IVA would achieve the chemical-specific SCGs for surface soil and MGP-related impacts observed at SB-14A through active removal, treatment of MGP-related impacts observed at Gas Holder 1 through ISS, and through oxygen enhancement and/or other amendments to enhance natural attenuation of groundwater. The treated MGP-related impacts observed at Gas Holder 1 and impacts to groundwater would be managed through institutional controls. Depending on the reduction of COC concentrations in groundwater as a result of the enhanced natural processes, this alternative could meet the NYS Groundwater Quality Standards over time.

- Alternative IVB would achieve the chemical-specific SCGs for surface soil and MGP-related impacts observed at SB-14A and Gas Holder 1 through surface controls, active removal, and through oxygen enhancement and/or other amendments to enhance natural attenuation of groundwater. The impacts to groundwater would be managed through institutional controls. Depending on the reduction of COC concentrations in groundwater as a result of the enhanced natural processes, this alternative could meet the NYS Groundwater Quality Standards over time.

- Alternative IVC would achieve the chemical-specific SCGs for surface soil and MGP-related impacts observed at SB-14A through active removal and through oxygen enhancement and/or other amendments to enhance natural attenuation of groundwater. The remaining MGP-related impacts observed at Gas Holder 1 would be addressed by isolating the holder contents so that is cannot serve as a source of DPH to downgradient groundwater. Depending on the reduction of COC concentrations in groundwater as a result of the enhanced natural processes, this alternative could meet the NYS Groundwater Quality Standards over time.

- Alternative V achieves the unrestricted use soil cleanup objectives for the observed MGP-related impacts through active removal and oxygen enhancement and/or other amendments to enhance natural attenuation of groundwater. It is worth noting that the area of soil exceeding unrestricted use objectives is primarily under Railroad Place and the PSB driveway and will likely never be used for residential use. The impacts to groundwater and soil beneath the PSB would be managed through institutional controls. Depending on the reduction of COC concentrations in groundwater as a result of natural processes, this alternative could meet the NYS Groundwater Quality Standards over time.

Overburden groundwater samples indicated only limited exceedances of groundwater SCGs. It is expected that removal of MGP impacted materials would contribute to meeting groundwater SCGs for overburden groundwater over time. However, for all alternatives, the applicable SCGs identified in Table 2-1 would not be achieved unless and/or until natural/enhanced biological processes reduce COCs.

6.2.2 Long-Term Effectiveness and Permanence

The long-term effectiveness and permanence of the remedial alternatives considers the potential risks remaining at the site at the conclusion of the remedial efforts and the effectiveness of the controls that would be applied to manage risks (if any) posed by post-remediation site conditions. With the exception of the No Action alternative, each of the remedial alternatives would (relative to current conditions) increase the overall level of protection for human health and the environment, and would be effective at maintaining the incremental increase (relative to No Action) that would be realized.

- Institutional controls would be implemented for Alternatives II through V to prohibit the future use and extraction of groundwater at and in the vicinity of the site. These controls would eliminate the potential exposure pathway to impacted groundwater prior to meeting SCGs through enhanced natural attenuation. Institutional controls would be augmented by an SMP. The SMP would identify requirements for implementing intrusive activities in areas where environmental easements are established in order to mitigate the potential for exposure of site workers to MGP-related impacts.

- Enhanced natural attenuation is a component of Alternatives II through V to reduce MGP-related dissolved-phase COCs in groundwater. The effectiveness of Alternatives II through V in restoring, to the extent practicable, COC-impacted groundwater to NYS Groundwater Quality Standards (RAO No. 6) relies on the enhanced natural degradation process. Enhanced natural attenuation of groundwater is a long term remedy that is irreversible.

- Alternative II is not permanent and relies on effective maintenance of engineering controls to surface soil containing MGP-related COCs.

- Alternatives III, IVA, IVB, IVC and V are all permanent and considered effective on a long-term basis. Each of these alternatives would provide significant and permanent reduction of MGP related impacts observed in soil. In combination with the establishment of institutional controls (as needed), the RAOs related to controlling potential exposure pathways (RAOs No. 1, 2 and 4) are equally achieved by these alternatives and considered effective in the long-term.

- Alternatives III, IVA, IVB, IVC and V are also considered effective to varying degrees in achieving RAO No. 3, which focuses on reducing the potential migration of MGP-related source material through active removal, ISS, or both.

- RAO No. 5 focuses on the reduction, to the extent practicable, of MGP-related source material in soil that causes or contributes to the exceedance of applicable groundwater quality standards. Alternatives III, IVA, IVB, IVC and V, each address, at minimum a vast majority of MGP-related source material observed at the site.

6.2.3 Reduction of Toxicity, Mobility, or Volume of Contamination

Each of the site-wide alternatives would reduce toxicity, mobility, or volume of MGP-related impacts by natural degradation processes over time.

- Alternative I would not actively treat, remove, recycle, or destroy MGP-related impacts; therefore, the toxicity, mobility, or volume of MGP- related impacts would only be reduced by natural processes.

- Alternatives II would not actively treat, remove, recycle, or destroy MGP-related impacts; however, enhancement of the natural biodegradation process would increase the rate of reduction of toxicity, mobility, or volume of MGP- related impacts.

- Alternative III removes the mass of MGP-related impacts observed at SB-14A; impacts that pose the greatest potential for mobility.

- Alternative IVA also removes the mass of MGP-related impacts observed at SB-14A. In addition, this alternative reduces the potential for future migration and/or dissociation of COCs from MGP-related impacts observed at Gas Holder 1 through stabilization and volatilization of COCs as a result of the stabilization process.

- Alternative IVB also removes the mass of MGP-related impacts observed at SB-14A. In addition, this alternative removes MGP-related impacts observed at Gas Holder 1.

- Alternative IVC also removes the mass of MGP-related impacts observed at SB-14A. In addition, this alternative reduces the potential for future migration and/or dissociation of COCs from MGP-related impacts observed at Gas Holder 1 through isolation of the impacted material from the surrounding groundwater.

- Alternative V was developed to provide a remedial alternative with the objective of achieving unrestricted use soil cleanup objectives as presented in 6 NYCRR Part 375, and therefore, represents the largest reduction in volume of MGP-impacted soil.

Because the impacted materials within Gas Holder 1 (NAPL blebs and droplets) are unlikely to become mobile in the future, and currently are not impacting downgradient groundwater, Alternatives III, IVA, IVB and IVC would attain roughly the same reduction of potential mobility as Alternative V. The volume of impacted materials removed/addressed increases from Alternative III to Alternative V.

6.2.4 Short-Term Impacts and Effectiveness

Short-term effectiveness considers potential community, site and environmental impact during implementation of the alternative, the effectiveness of measures to be used to mitigate those short-term impacts, and the relative time frame for implementation.

- Alternative I does not include the implementation of active remedial measures; therefore there are no potential short-term effects to the community or environment that are associated with this alternative.

- Alternative II has the potential for exposure of onsite workers conducting monitoring activities to chemical constituents in soil, groundwater, and chemical amendments to enhance natural degradation (e.g. oxygen release material). The potential risks to onsite workers would be mitigated through the use of trained personnel, appropriate use of PPE, implementation of engineering controls, and adherence to the site-specific HASP. Closing a lane of Wadsworth Street to conduct monitoring activities may disrupt of local traffic flow, however, this would be the only short-term effects to the community. No short-term affects to the environment are associated with this alternative.

- Alternatives III, IVA, IVB, IVC and V include the excavation, transportation, and offsite treatment/disposal of MGP-impacted material from the subsurface. Even though control/mitigation measures would be employed, soil removal would create an increased potential for onsite workers to contact impacted soil, groundwater and NAPL via ingestion, dermal contact, and/or inhalation. The potential for exposure would be mitigated through the use of appropriate PPE to be specified in a site-specific HASP.

- Alternatives III, IVA, IVB, IVC and V all present short-term risks to the community through the potential generation of dust, volatile organic vapors, and/or nuisance odors during construction activities. Risk to the community would be minimized through installation of a temporary security fence to reduce potential unauthorized or accidental access to construction areas and the implementation of a CAMP to monitor the potential migration of dust, volatile organic vapors, and/or nuisance odors from the work area and to determine the need for additional engineering controls. The short-term impacts would increase from Alternative III to Alternative V with Alternative V having a significantly higher short-term impact due to the much greater extent of the soil removal and the duration of the remedial construction.

- Alternative III is the least disruptive of the three alternatives and poses the least potential to adversely affect the community. The limits of soil excavation are contained to NYSEG property. It is anticipated that this field activities associated with this alternative could be conducted in 4 weeks.

- For each of the Alternative IV options and Alternative V, the presence of subsurface utilities above/within Gas Holder 1 presents potential risks associated with damage to the utilities. Damage to natural gas lines presents a potential explosion hazard that could impact site workers and the community, damage to water lines could disrupt service to the community and damage to the sanitary sewer could create a release of raw sewage to the subsurface or backup of raw sewage into houses and businesses within the community. In addition, the presence of overhead utilities may require temporary deactivation or relocation during implementation..

- Alternative IVA includes all of the components of Alternative III, and includes ISS of Gas Holder 1. ISS of Gas Holder 1 would adversely affect the community as this alternative would require the closing of Railroad Place. Closing Railroad Place may disrupt PSB operations, local traffic flow (including emergency vehicles) and may adversely affect local business owners by restricting traffic to their establishments.

In addition, the adjacent restaurant may need to close for the duration of the construction activities as their parking lot would be required as a support area. Pedestrian access would also be interrupted along Railroad Place, and the community would not be able to walk along Railroad Place (from Wadsworth Street) during the remedial activities. In addition, uplift of the utilities may occur due to jet grouting activities, causing irreparable damage to the utilities. It is anticipated that this field activities associated with this alternative could be conducted in 24 weeks.

- Alternative IVB includes all of the components of Alternative III, and includes removal of Gas Holder 1. The excavation of Gas Holder 1 would adversely affect the community as this alternative would require the closing of Railroad Place, relocation of several utilities, including an 8-inch natural gas lines, a 2-inch natural gas service line, an 8-inch water main, and a 24-inch sanitary sewer that transects the southern side of Gas Holder 1 approximately 10 feet below the road surface. Utility service to customers may be disrupted during utility relocation required to facilitate construction. Closing Railroad Place may disrupt PSB operations, local traffic flow and may adversely affect local business owners. Noise and vibrations associated with driving steel sheetpiles or other construction related activities would adversely impact the surrounding community throughout construction of this alternative. It is anticipated that this field activities associated with this alternative could be conducted in 36 weeks.

- Alternative IVC includes all of the components of Alternative III, and includes containment of Gas Holder 1. Containment of Gas Holder 1 would adversely affect the community as this alternative would require the closing of Railroad Place. Closing Railroad Place may disrupt PSB operations, local traffic flow (including emergency vehicles) and may adversely affect local business owners. In addition, the adjacent restaurant may need to close for the duration of the construction activities as their parking lot would be required as a support area. Pedestrian access would also be interrupted along Railroad Place, and the community would not be able to walk along Railroad Place (from Wadsworth Street) during the remedial activities. It is anticipated that this field activities associated with this alternative could be conducted in 16 weeks.

- Alternative V would be the most disruptive alternative and presents the greatest potential nuisance to the community due to the location and volume of soil excavation activities. The excavation of Gas Holder 1 would adversely affect the community as this alternative would require the closing of Railroad Place, relocation of several utilities, including an 8-inch natural gas lines, a 2-inch natural gas service line, an 8-inch water main, and a 24-inch sanitary sewer that transects the southern side of Gas Holder 1 approximately 10 feet below the road surface. Utility service to customers may be disrupted during utility relocation required to facilitate construction. Closing Railroad Place may disrupt PSB operations, local traffic flow and may adversely affect local business owners. Noise and vibrations associated with driving steel sheetpiles, H-piles or other construction related activities would adversely impact the surrounding community throughout construction of this alternative. Access to the PSB Building may not be permitted for a short duration based on the proximity of excavation activities to the PSB, It is anticipated that this field activities associated with this alternative could be conducted in 48 weeks.

As previously discussed, none of the alternatives that specifically address Gas Holder 1 provide a higher degree of overall protection as compared with Alternatives II or III, despite the added short-term impacts to the community during implementation.

6.2.5 Overall Protection of Human Health and the Environment

As discussed in Section 3 of this FS Report, RAOs were identified to be protective of human health and the environment, in consideration of the nature and extent of MGP related impacts, physical site features and setting, applicable SCGs, and current/future site risks. Therefore, a comparative evaluation of the remedial alternatives for this criterion considers the extent to which the RAO can be achieved. Of these, RAO No. 1 and RAO No. 2 are the most applicable in terms of protecting human health and the environment by reducing the direct exposure to MGP-related impacted soil.

Groundwater beneath the site is not currently used as a potable source, and therefore exposure via ingestion of groundwater is unlikely. Further, given the existence of a municipal water supply, it is unlikely that water supply wells would be constructed in the area at some time in the future. Likewise, exposure of trespassers, commercial visitors, and residents to groundwater is unlikely based on the depth to groundwater and the lack of surface expressions (i.e., seeps). Future construction and maintenance workers may be exposed to shallow groundwater during intrusive activities, but exposures would likely be mitigated with the use of personal protective equipment. Improvement in the groundwater quality would occur slowly over time as a result of natural process addressing the dissolved phase COCs.

Of the remedial alternatives, Alternative V is theoretically the most protective of human health and the environment when considering that removal of soil with observed MGP-impacts would occur to achieve the unrestricted use SCOs under 6NYCRR Part 375. However, given the current use of the area, there will be no actual increase in protection of human health and the environment. In contrast, the No Action alternative (Alternative I) does not remove any MGP-related impacts or include any other measures (i.e., institutional controls) to address potential risks, and is therefore, the least protective remedial alternative.

The three remaining alternatives range between these two extremes relative to their level protection of human health and the environment.

- Alternative II employs institutional controls to reduce potential exposure to site impacts. This is an effective measure when the institutional controls are followed. However, the potential for future offsite migration of MGP related impacts is still present under Alternative II.

- Alternatives III, IVA, IVB and IVC improve the overall protection of human health and the environment. Each of these alternatives includes multiple components that would, as a whole, effectively protect human health and the environment. The soil removal, institutional controls, enhanced NA, and surface cover are a consistent aspect for these alternatives and provide equivalent protection of human health and the environment.

- Alternatives IVA. IVB and IVC address a greater volume of MGP-related source material that could cause or contribute to exceedances in NYS Groundwater Quality Standards through ISS/removal/containment of Gas Holder 1, though groundwater impacts attributed to Gas Holder 1 have not been observed.

Alternatives III, IVA, IVB, IVC and V would achieve each of the RAOs established for surface and subsurface soil, and to varying degrees, would achieve the RAOs established for groundwater over time through natural/enhanced biological processes. Because former Gas Holder 1 has not been demonstrated to be a source of COCs to downgradient or off-site groundwater, none of the alternatives that specifically address Gas Holder 1 provide a higher degree of overall protection as compared with Alternatives II or III.

6.2.6 Implementability

All of the remedial alternatives are considered technically and administratively implementable.

- Alternative I would be the most easily implementable alternative because it requires no active remedial site work.

- Alternative II would require periodic monitoring and would also be relatively easy to implement.

- Alternatives III, IVA, IVB, IVC and V are considered implementable; however, some technical and administrative difficulties exist, primarily dealing with physical constraints associated with the location of Gas Holder 1 and associated utilities in Railroad Place (Alternative IVA, IVB, IVC and V) and excavation adjacent to the PSB (Alternatives IVB, IVC and V). Remedial contractors capable of completing the remedial technologies for these alternatives are available, though specialized contractors required for Alternatives IVA and IVC are limited.

Although each soil removal alternative generally has similar potential technical challenges, the extent and degree of these challenges is proportional to the removal volumes and areal extent. The implementability becomes more difficult with greater volume of soil being addressed.

- Alternative III is the most implementable soil removal alternative because the majority of the removal activities occur outside of the active roadway, does not require utility removal/relocation and does not require sheetpile installation or dewatering activities to implement.

- Alternative IVA includes the same technical challenges as Alternative III and additional challenges associated with design and implementation of ISS. The presence of previously identified obstructions, and potentially more unobserved obstacles, could prohibit the advancement of and potentially damage the drilling/injecting equipment used for ISS. The expansion of treated soils within and below Gas Holder 1 could result in irreparable structural damage underground utilities (e.g., sanitary sewer, natural gas lines). Technical problems could result in schedule delays (e.g., equipment failure, treatment difficulties, traffic issues, coordination issues, etc.), but can be minimized with proper advanced planning and coordination of the remedial activities.

- Alternatives IVB, IVC, and V are the least implementable of the remedial alternatives due to space limitations, obstructions, subsurface and aboveground utilities water management, etc. associated with the increased extent and depth of soil removal. These alternatives would cause the greatest disruption to the local community and would be the most difficult to implement due to the location, size and depth of excavation relative to the local infrastructure. The uncertainties and technical problems associated with Alternatives III and IVA would also be associated with these alternatives. Additional difficulties associated with this alternative include the following:

    - Excavation beneath the groundwater table, excavation dewatering, and soil dewatering

    - Temporary relocation of existing underground utilities

In addition, for Alternatives IVB and V, excavation adjacent to the PSB could potentially undermine or otherwise damage the building foundation.

The likelihood of technical and administrative problems during implementation of Alternatives IVA, IVB, IVC and V is greatest due to the increased complexity compared to Alternatives II and III. As previously discussed, none of the alternatives that specifically address Gas Holder 1 provide a higher degree of overall protection as compared with Alternatives II or III, despite the added complexity and degree of difficulty associated with their implementation.

6.2.7 Cost

The following table summarizes the estimated costs associated with each of the five remedial alternatives. Detailed cost estimates for the remedial alternatives are provided in Tables 5-1 through 5-4.

Alternative	Estimated Capital Cost	Estimated Present Worth O&M Cost	Estimated Total Cost (rounded)
Alternative I	$ 0	$ 0	$ 0
Alternative II	$343,000	$620,500	$960,000
Alternative III	$656,824	$620,500	$1,300,000
Alternative IVA	$3,787,425	$620,500	$4,400,000
Alternative IVB	$4,281,340	$620,500	$4,900,000
Alternative IVC	$2,989,356	$620,500	$3,600,000
Alternative V	$9,420,212	$90,500	$9,510,712

7. Recommended Site-Wide Remedy

Based on the results of the detailed evaluation presented in Section 5, and comparative analysis in Section 6, Alternative III has been selected as the recommended remedy. Alternative III includes the following remedial components:

- Institutional Controls/Engineering Controls with Enhanced NA
- Installation of Surface Cover
- Removal of Subsurface Structure and MGP-Related Impacts at SB-14A

As discussed in Section 6, Alternatives III, IVA, IVB, IVC and V each could achieve the RAOs established for the site, however, none of the alternatives that specifically address Gas Holder 1 provide a higher degree of overall protection as compared with Alternatives II or III. Alternative III was selected because this approach permanently removes MGP-related impacts observed at SB-14A that have the greatest potential for becoming mobile in the future or impacting groundwater quality through dissolution; is fully implementable; and equipment, materials and contractors necessary to construct this remedy are available. In addition, while implementation of this alternative would be disruptive and could pose shore term exposure risks to the surrounding community, these risk could be managed through proper planning of the construction activities and adherence to a community air monitoring plan. In addition, this alternative has the least amount of disruption to local businesses, the PSB operations and will not require excavation or relocation of utilities within Railroad Place, thus limiting the potential for damage to the existing subsurface utilities.

The total estimated cost for Alternative III is $1,300,000 and this alternative would require approximately 4 weeks to complete.

8. References

ARCADIS BBL, 2007. Vapor Intrusion Evaluation Report, Geneva (Wadsworth Street) Former MGP Site, Geneva, New York. Prepared for New York State Electric & Gas Corporation. May 2007 (Revised August 2007).

ARCADIS, 2008. Remedial Investigation Report. February 2008,

Atlantic Environmental Services, Inc. (AES), 1991. Manufactured Gas Plant Site Screening Report, Wadsworth Street Site, Geneva, New York. Prepared on behalf of NYSEG. September 1991.

Blasland, Bouck, & Lee, Inc. (BBL). 2005. Site Characterization Work Plan, Wadsworth Street Former MGP Site, Geneva, New York. Prepared for New York State Electric & Gas Corporation. November 2005.

Coates, D.R., 1968, Finger Lakes, Fairbridge, R. W., ed., Encyclopedia of geomorphology: New York, Reinhold Corporation, p. 351-357.

Coates, D. R., 1974, Reappraisal of the glaciated Appalacian Plateau, in Coates, D. R., ed., Glacial geomorphology: Binghamton, New York, State University of New York Publications, p. 205-243.

Domenico, P.A. and F.W. Schwartz, 1998. Physical and Chemical Hydrogeology. John Wiley & Sons, Inc., New York. 506 p.

Fetter, C.W., Jr., 1994, Applied Hydrogeology, Third Edition, Macmillan College Publishing Co., New York. New York.

Freeze and Cherry. 1979. Groundwater. Prentice-Hall, Inc., New Jersey.

Ghosh. R. S., Nakles, D.V., Mukarka, I., and Neuhauser, E., 2004. Cyanide Speciation in Soil and Groundwater at Manufactured Gas Plant (MGP) Sites. Environmental Engineering Science. 21(6):752-767.

Halfman, J. D., 2000, Stratigraphy, sedimentology, and geochemistry of Seneca Lake, New York, in Field Trip Guide, 72nd annual meeting of the New York State Geological Association: Hobart and William Smith Colleges, Geneva, New York, p. 27-38.

Maxey, G.B., 1964. Hydrostratigraphic Units. Journal of Hydrology *2*, pp. 124-129.

Muller, E. H., and Cadwell, D. H., 1986, Surficial geologic map of New York – Finger Lakes sheet: Albany, New York State Museum, Geological Survey Map and Chart Series no. 40, 1 sheet, scale 1:250,000.

New York State Department of Environmental Conservation. 1989. *Guidelines for Remedial Investigations/Feasibility Studies*. NYSDEC Division of HWR, TAGM HWR-4025. March 31, 1989.

New York State Department of Environmental Conservation. 1990a. *Selection of Remedial Actions at Inactive Hazardous Waste Sites*. NYSDEC Division of Hazardous Waste Remediation (HWR), Technical and Administrative Guidance Memorandum (TAGM) (TAGM HWR-4030). May 15, 1990.

New York State Department of Environmental Conservation. 1990b. TAGM #4030 – *Selection of Remedial Actions at Inactive Hazardous Waste Sites.* 1990.

New York State Department of Environmental Conservation. 2000. *Division of Water, Technical and Operational Guidance Series (TOGS 1.1.1) Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations*. Reissued June 1998 and addended April 2000).

New York State Department of Environmental Conservation. 2002a. *Draft DER-10 Technical Guidance for Site Investigation and Remediation*. NYSDEC Division of Environmental Remediation. December 25, 2002.

New York State Department of Environmental Conservation. 2002b. TAGM HWR-4061, *Management of Coal Tar Waste and Coal Tar Contaminated Soils and Sediment from Former Manufactured Gas Plants.* 2002.

New York State Department of Environmental Conservation. 1994. TAGM 4046, *Determination of Soil Cleanup Objectives and Cleanup Levels.* 1994.

New York State Department of Environmental Conservation. 2002. *Guidance on the Management of Coal Tar Waste and Coal Tar Contaminated Soils and Sediment from Former Manufactured Gas Plants*. 2002.

New York State Department of Environmental Conservation (NYSDEC). 1994. *Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites*. October 1994.

NYSDEC. 2002b. *Ecological Communities of New York State – Second Edition*. January 2002.

NYSDEC, 2006. 6 NYCRR Part 375, Environmental Remedial Programs. December 14, 2006.

NYSDEC. 2007. Letter to Jason C. Vogel (ARCADIS BBL) from Tara Seoane (NY Natural Heritage Program), providing a report of rare or state-listed animals and plants, significant natural communities, and other significant habitats that may occur, on site or in the immediate vicinity of the site. July 31, 2007.

NYSDEC. 2007. Letter to John J. Ruspantini, NYSEG, from Douglas MacNeal, NYSDEC, regarding the vapor intrusion evaluation for the NYSEG Wadsworth Street Former MGP Site in Geneva, New York. Dated June 12, 2007.

New York State Department of Health (NYSDOH). 2002. Qualitative Human Health Exposure Assessment as presented in NYSDEC's Draft DER-10 Technical Guidance for Site Investigation and Remediation. December 2002.

NYSDOH, 2006. Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York, October 2006.

New York State Electric and Gas Corporation (NYSEG). 2006a. Letter to Douglas MacNeal, NYSDEC, from John J. Ruspantini, NYSEG, providing site characterization results for Wadsworth Street Former MGP Site, Geneva, New York. Dated March 29, 2006.

NYSEG. 2006b. Letter to Douglas MacNeal, NYSDEC, from John J. Ruspantini, NYSEG, providing remedial investigation results for Wadsworth Street Former MGP Site, Geneva, New York. Dated November 27, 2006.

NYSEG. 2007. Letter to Douglas MacNeal, NYSDEC, from John J. Ruspantini, NYSEG, providing response to NYSDEC June 12, 2007 comment letter for vapor intrusion report at Wadsworth Street Former MGP Site, Geneva, New York. Dated August 3, 2007.

New York State Museum/Geological Survey, The State Education Department and The University of the State of New York. 2000. Geology of New York State A Simplified Account (2nd Edition).

Seaber, P.R. 1988. Hydrostratigraphic Units, In: Hydrogeology (W. Back, J.S. Rosenshein, and P.R. Seaber, eds.), The Geology of North America, V. 0-2, Geol. Soc. Amer., pp. 9-14.

Schwarzenbach, R.P., P.M. Gschwend, and D.M. Imboden. 1993. Environmental Organic Chemistry. Wiley-Interscience, New York, pp. 494-502.

TRC Environmental Consultants, Inc., 1986. Investigation of the former coal gasification site, Geneva, New York, Task 1 Report, preliminary site evaluation. Prepared for New York State Electric & Gas Corporation. 57 p.

TRC Environmental Consultants, Inc. 1987. Investigation of the former coal gasification site, Geneva, New York, Task 2 Report, Volume 1 – technical report. Prepared for New York State Electric & Gas Corporation. 127 p.

United States Environmental Protection Agency. 1998a *Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA.* 1988.

United States Environmental Protection Agency. 1988b. *Technology Screening Guide for Treatment of CERCLA Soils and Sludges.* 1988.

United States Environmental Protection Agency. 1990. *Code of Federal Regulations: Protection of Environment*. 40 CFR. March 8, 1990. Revised July 1, 1990.

United States Environmental Protection Agency. 1994. *National Oil and Hazardous Substances Pollution Contingency Plan Under the Comprehensive Environmental Response, Compensation and Liability Act of 1980* (NCP). Applicable provisions contained in the Code of Federal Regulations (40 CFR Part 300). September 15, 1994.

United States Environmental Protection Agency and United States Air Force. 2002. *Remediation Technologies Screening Matrix and Reference Guide.* 2002.

United States Environmental Protection Agency. 2002. *USEPA's Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils* (Table 2a) (Office of Solid Waste and Emergency Response), November 2002.

United States Environmental Protection Agency (USEPA). 2002. A resource for MGP Site Characterization and Remediation. EPA 542-R-00-005. Solid and Emergency Response. July 2000.

USEPA. 2002. *Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils*. Available at http://www.epa.gov/correctiveaction/eis/vapor/complete.pdf.

USEPA, 1988. U.S. Production of Manufactured Gases: Assessment of Past Disposal Practices. USEPA Report No. 600/2-88/012, February 1988.

Von Engelin, O.D. 1961. The Finger Lakes Region, Its Origin and Nature. Cornell University Press. Ithaca, New York, 156 p.

9. Acronyms and Abbreviations

bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene and xylene
CAMP	Community Air Monitoring Plan
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
COC	constituent of concern
CFR	Code of Federal Regulations
CY	cubic yards
DER	Division of Environmental Remediation
DPH	dissolved phase hydrocarbons
DNAPL	dense nonaqueous-phase liquid
ELUR	environmental land use restriction
FS Report	Feasibility Study Report
FWIA	Fish and Wildlife Impact Analysis
GRA	General Response Action
HASP	Health and Safety Plan
HHEE	human health exposure evaluation
IRM	Interim Remedial Measure
ISS	in-situ stabilization
LDR	Land Disposal Restriction
LTTD	low-temperature thermal desorption

MGP	manufactured gas plant
NAPL	nonaqueous-phase liquid
NCP	National Contingency Plan
NYCRR	New York State Codes, Rules and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYSEG	New York State Electric and Gas Corporation
O&M	Operations and Maintenance
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
PAH	polycyclic aromatic hydrocarbon
POTW	Publicly Owned Treatment Works
PPE	personal protective equipment
RAO	remedial action objective
RCRA	Resource Conservation and Recovery Act
RD/RA	remedial design/removal action
RI Report	Remedial Investigation Report
RI/FS	Remedial Investigation/Feasibility Study
SCGs	Standards, Criteria and Guidelines
SCOs	soil cleanup objectives
SVOCs	semivolatile organic compounds

TAGM	Technical and Administrative Guidance Memorandum
TAL	Target Analyte List
TCL	Target Compound List
TOGS	Technical and Operational Guidance Series
USDOT	U.S. Department of Transportation
USEPA	United States Environmental Protection Agency
UST	underground storage tank
UTS	Universal Treatment Standard
VOCs	volatile organic compounds

Tables

Table 1-1

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Soil Data Summary

Sample ID: Sample Depth (feet): Date Collected:	Unrestricted Use SCOs	Restricted Use SCOs Commercial	Units	MW-3 19.5 - 20 12/08/05	SB-1 4 - 6.5 12/06/05	SB-2 8 - 10 12/13/05	SB-3 10 - 11.8 12/06/05	SB-4 10 - 12 12/05/05	SB-4 18 - 20 12/05/05	SB-5 16 - 16.8 12/14/05	SB-5 17.8 - 19.4 12/14/05	SB-5 23 - 23.3 12/14/05	SB-6 19.8 - 21.4 12/01/05
VOCs													
1,1,1-Trichloroethane	0.68 f	500 b	mg/kg	0.60 U	0.0060 U	0.0060 U [0.0059 U]	0.0060 U	0.0062 U	0.62 U	0.60 U	0.60 U	0.60 U	0.0056 U
1,1,2,2-Tetrachloroethane	- -	- -	mg/kg	0.12 U	0.0012 UJ	0.0012 U [0.0012 U]	0.0012 UJ	0.0012 UJ	0.12 U	0.12 U	0.12 U	0.12 U	0.0011 UJ
1,1,2-Trichloroethane	- -	- -	mg/kg	0.36 U	0.0036 U	0.0036 U [0.0036 U]	0.0036 U	0.0037 U	0.37 U	0.36 U	0.36 U	0.36 U	0.0034 U
1,1-Dichloroethane	0.27 f	240	mg/kg	0.60 UJ	0.0060 U	0.0060 U [0.0059 U]	0.0060 U	0.0062 U	0.62 UJ	0.60 U	0.60 U	0.60 U	0.0056 U
1,1-Dichloroethene	0.33 f	500 b	mg/kg	0.24 U	0.0024 UJ	0.0024 UJ [0.0024 UJ]	0.0024 UJ	0.0025 UJ	0.25 U	0.24 UJ	0.24 UJ	0.24 UJ	0.0022 UJ
1,2,4-Trichlorobenzene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dibromo-3-chloropropane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dibromoethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	1.1 f	500 b	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	0.02 c	30	mg/kg	0.24 U	0.0024 U	0.0024 U [0.0024 U]	0.0024 U	0.0025 U	0.25 U	0.24 U	0.24 U	0.24 U	0.0022 U
1,2-Dichloropropane	- -	- -	mg/kg	0.12 U	0.0012 UJ	0.0012 U [0.0012 U]	0.0012 UJ	0.0012 UJ	0.12 U	0.12 U	0.12 U	0.12 U	0.0011 U
1,3-Dichlorobenzene	2.4 f	280	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	1.8	130	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Butanone	0.12	500 b	mg/kg	0.60 UJ	0.0060 UJ	0.0060 U [0.0059 U]	0.0060 UJ	0.0062 UJ	0.62 U	0.60 U	0.60 U	0.60 U	0.0056 UJ
2-Hexanone	- -	- -	mg/kg	0.60 UJ	0.0060 UJ	0.0060 UJ [0.0059 UJ]	0.0060 UJ	0.0062 UJ	0.62 UJ	0.60 UJ	0.60 UJ	0.60 UJ	0.0056 UJ
4-Methyl-2-Pentanone	- -	- -	mg/kg	0.60 U	0.0060 UJ	0.0060 U [0.0059 U]	0.0060 UJ	0.0062 UJ	0.62 U	0.60 U	0.60 U	0.60 U	0.0056 UJ
Acetone	0.05	500 b	mg/kg	**1.6**	0.0060 UJ	0.0060 U [0.0059 U]	0.0060 UJ	0.026 UJ	0.62 U	0.60 U	0.60 UJ	0.60 U	0.018 UJ
Benzene	0.06	44	mg/kg	**0.15**	0.0022	0.0010 J [0.0018]	0.0017	0.0020	**4.5**	**6.6**	**1.5**	**3.4**	0.016
Bromodichloromethane	- -	- -	mg/kg	0.12 U	0.0012 U	0.0012 U [0.0012 U]	0.0012 U	0.0012 U	0.12 U	0.12 U	0.12 U	0.12 U	0.0011 U
Bromoform	- -	- -	mg/kg	0.48 UJ	0.0048 U	0.0048 UJ [0.0048 UJ]	0.0048 U	0.0049 U	0.50 UJ	0.48 UJ	0.48 UJ	0.48 UJ	0.0045 U
Bromomethane	- -	- -	mg/kg	0.60 U	0.0060 U	0.0060 UJ [0.0059 UJ]	0.0060 U	0.0062 U	0.62 U	0.60 UJ	0.60 UJ	0.60 UJ	0.0056 U
Carbon Disulfide	- -	- -	mg/kg	0.60 U	0.0020 J	0.0060 U [0.0059 U]	0.0060 UJ	0.0062 UJ	0.62 U	0.60 U	0.60 UJ	0.60 U	0.0056 UJ
Carbon Tetrachloride	0.76 f	22	mg/kg	0.24 U	0.0024 U	0.0024 U [0.0024 U]	0.0024 U	0.0025 U	0.25 U	0.24 U	0.24 U	0.24 U	0.0022 U
Chlorobenzene	1.1	500 b	mg/kg	0.60 UJ	0.0060 U	0.0060 UJ [0.0059 UJ]	0.0060 U	0.0062 U	0.62 UJ	0.60 UJ	0.60 U	0.60 UJ	0.0056 U
Chloroethane	- -	- -	mg/kg	0.60 U	0.0060 U	0.0060 U [0.0059 U]	0.0060 U	0.0062 U	0.62 U	0.60 U	0.60 U	0.60 U	0.0056 U
Chloroform	0.37	350	mg/kg	0.60 U	0.0060 U	0.0060 U [0.0059 U]	0.0060 U	0.0062 U	0.62 U	0.60 U	0.60 U	0.60 U	0.0056 U
Chloromethane	- -	- -	mg/kg	0.60 U	0.0060 U	0.0060 U [0.0059 U]	0.0060 U	0.0062 U	0.62 U	0.60 U	0.60 U	0.60 U	0.0056 U
cis-1,2-Dichloroethene	0.25 f	500 b	mg/kg	0.60 U	0.0060 U	0.0060 U [0.0059 U]	0.0060 U	0.0062 U	0.62 U	0.60 U	0.60 U	0.60 U	0.0056 U
cis-1,3-Dichloropropene	- -	- -	mg/kg	0.60 U	0.0060 U	0.0060 U [0.0059 U]	0.0060 U	0.0062 U	0.62 U	0.60 U	0.60 U	0.60 U	0.0056 U
Cyclohexane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibromochloromethane	- -	- -	mg/kg	0.60 U	0.0060 U	0.0060 U [0.0059 U]	0.0060 U	0.0062 U	0.62 UJ	0.60 U	0.60 UJ	0.60 U	0.0056 U
Dichlorodifluoromethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	1 f	390	mg/kg	0.37 J	0.0048 U	0.0048 U [0.0048 U]	0.0048 U	0.0049 U	0.33 J	**1.4**	0.20 J	0.58	0.0045 U
Isopropylbenzene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl acetate	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl tert-butyl ether	0.93 f	500 b	mg/kg	0.60 U	0.0060 UJ	0.0060 U [0.0059 U]	0.0060 UJ	0.0062 UJ	0.62 U	0.60 U	0.60 UJ	0.60 U	0.0056 U
Methylcyclohexane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	0.05	500 b	mg/kg	0.36 UJ	0.0036 U	0.0036 UJ [0.0036 UJ]	0.0036 U	0.0037 U	0.37 UJ	0.36 UJ	0.36 UJ	0.36 UJ	0.0034 U
Styrene	- -	- -	mg/kg	0.60 UJ	0.0060 U	0.0060 UJ [0.0059 UJ]	0.0060 U	0.0062 U	0.62 UJ	0.60 UJ	0.60 UJ	1.3 J	0.0056 U
Tetrachloroethene	1.3	150	mg/kg	0.12 U	0.0012 U	0.0012 U [0.0012 U]	0.0012 U	0.0012 U	0.12 U	0.12 U	0.12 U	0.12 U	0.0011 U

See Notes on Page 13

Table 1-1

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Soil Data Summary

Sample ID:	Unrestricted Use SCOs	Restricted Use SCOs Commercial	Units	**MW-3**	**SB-1**	**SB-2**	**SB-3**	**SB-4**	**SB-4**	**SB-5**	**SB-5**	**SB-5**	**SB-6**
Sample Depth (feet):				**19.5 - 20**	**4 - 6.5**	**8 - 10**	**10 - 11.8**	**10 - 12**	**18 - 20**	**16 - 16.8**	**17.8 - 19.4**	**23 - 23.3**	**19.8 - 21.4**
Date Collected:				**12/08/05**	**12/06/05**	**12/13/05**	**12/06/05**	**12/05/05**	**12/05/05**	**12/14/05**	**12/14/05**	**12/14/05**	**12/01/05**
VOCs (Cont'd.)													
Toluene	0.7	500 b	mg/kg	0.077 J	0.0034 J	0.0010 J [0.0020 J]	0.0015 J	0.0012 J	0.62 U	**12**	**1.5**	**5.6**	0.0010 J
trans-1,2-Dichloroethene	0.19 f	500 b	mg/kg	0.60 U	0.0060 U	0.0060 U [0.0059 U]	0.0060 U	0.0062 U	0.62 U	0.60 U	0.60 UJ	0.60 U	0.0056 U
trans-1,3-Dichloropropene	- -	- -	mg/kg	0.60 U	0.0060 U	0.0060 U [0.0059 U]	0.0060 U	0.0062 U	0.62 U	0.60 U	0.60 U	0.60 U	0.0056 U
Trichloroethene	0.47	200	mg/kg	0.12 U	0.0012 UJ	0.0012 U [0.0012 U]	0.0012 UJ	0.0012 UJ	0.12 U	0.12 U	0.12 U	0.12 U	0.0011 UJ
Trichlorofluoromethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl Chloride	0.02 f	13	mg/kg	0.60 U	0.0060 U	0.0060 U [0.0059 U]	0.0060 U	0.0062 U	0.62 U	0.60 U	0.60 U	0.60 U	0.0056 U
Xylene (Total)	0.26	500 b	mg/kg	**1.4 J**	0.0031 J	0.0060 UJ [0.0059 UJ]	0.0016 J	0.0062 U	0.19 J	**19 J**	**2.2**	**7.7 J**	0.0031 J
Total BTEX	- -	- -	mg/kg	2.0 J	0.0087 J	0.0020 J [0.0038 J]	0.0048 J	0.0032 J	5.0 J	39 J	5.4 J	17 J	0.020 J
Total VOCs	- -	- -	mg/kg	3.6 J	0.011 J	0.0020 J [0.0038 J]	0.0048 J	0.0032 J	5.0 J	39 J	5.4 J	19 J	0.020 J
SVOCs													
1,2,4-Trichlorobenzene	- -	- -	mg/kg	1.0 U	0.040 U	0.040 U [0.041 U]	0.040 U	0.043 U	0.042 U	0.82 U	0.040 U	10 U	0.040 U
1,2-Dichlorobenzene	1.1 f	500 b	mg/kg	10 U	0.40 U	0.40 U [0.41 U]	0.40 U	0.43 U	0.42 U	8.2 U	0.40 U	100 U	0.40 U
1,3-Dichlorobenzene	2.4 f	280	mg/kg	10 U	0.40 U	0.40 U [0.41 U]	0.40 U	0.43 U	0.42 U	8.2 U	0.40 U	100 U	0.40 U
1,4-Dichlorobenzene	1.8	130	mg/kg	10 U	0.40 U	0.40 U [0.41 U]	0.40 U	0.43 U	0.42 U	8.2 U	0.40 U	100 U	0.40 U
2,4,5-Trichlorophenol	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,6-Trichlorophenol	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dichlorophenol	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dimethylphenol	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrophenol	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	- -	- -	mg/kg	2.0 U	0.080 U	0.080 U [0.083 U]	0.081 U	0.086 U	0.085 U	1.6 U	0.081 U	20 U	0.079 U
2,6-Dinitrotoluene	- -	- -	mg/kg	2.0 U	0.080 U	0.080 U [0.083 U]	0.081 U	0.086 U	0.085 U	1.6 U	0.081 U	20 U	0.079 U
2-Chloronaphthalene	- -	- -	mg/kg	10 U	0.40 U	0.40 U [0.41 U]	0.40 U	0.43 U	0.42 U	8.2 U	0.40 U	100 U	0.40 U
2-Chlorophenol	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	- -	- -	mg/kg	1.1 J	0.40 U	0.40 U [0.41 U]	0.40 U	0.43 U	0.42 U	53	2.2	1,100	0.022 J
2-Methylphenol	0.33 b, f	500 b	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Nitroaniline	- -	- -	mg/kg	20 U	0.80 U	0.80 U [0.83 U]	0.81 U	0.86 U	0.85 U	16 U	0.81 U	200 U	0.79 U
2-Nitrophenol	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3,3'-Dichlorobenzidine	- -	- -	mg/kg	20 UJ	0.80 U	0.80 UJ [0.83 UJ]	0.81 U	0.86 U	0.85 U	16 UJ	0.81 UJ	200 UJ	0.79 UJ
3-Nitroaniline	- -	- -	mg/kg	20 U	0.80 U	0.80 U [0.83 U]	0.81 U	0.86 U	0.85 U	16 U	0.81 U	200 U	0.79 U
4-Bromophenyl-phenylether	- -	- -	mg/kg	10 U	0.40 U	0.40 U [0.41 U]	0.40 U	0.43 U	0.42 U	8.2 U	0.40 U	100 U	0.40 U
4-Chloro-3-methylphenol	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Chloroaniline	- -	- -	mg/kg	10 U	0.40 UJ	0.40 U [0.41 U]	0.40 UJ	0.43 UJ	0.42 UJ	8.2 U	0.40 U	100 U	0.40 U
4-Chlorophenyl-phenylether	- -	- -	mg/kg	10 U	0.40 U	0.40 U [0.41 U]	0.40 U	0.43 U	0.42 U	8.2 U	0.40 U	100 U	0.40 U
4-Methylphenol	0.33 b, f	500 b	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4-Nitroaniline	- -	- -	mg/kg	20 U	0.80 U	0.80 U [0.83 U]	0.81 U	0.86 U	0.85 U	16 U	0.81 U	200 U	0.79 U
4-Nitrophenol	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	20	500 b	mg/kg	6.7 J	0.40 U	0.40 U [0.41 U]	0.40 U	0.43 U	0.42 U	4.5 J	0.32 J	**180**	0.40 U
Acenaphthylene	100 a, f	500 b	mg/kg	33	0.030 J	0.40 U [0.41 U]	0.40 U	0.43 U	0.42 U	26	1.3	**760**	0.023 J
Anthracene	100 a, f	500 b	mg/kg	40	0.028 J	0.40 UJ [0.41 UJ]	0.40 U	0.43 U	0.42 U	24 J	2.1 J	**1,100 J**	0.027 J
Benzo(a)anthracene	1 c, f	5.6	mg/kg	**24**	0.13	0.040 U [0.041 U]	0.018 J	0.043 U	0.042 U	**15**	**2.8**	**710**	0.016 J

See Notes on Page 13

Table 1-1

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Soil Data Summary

Sample ID: Sample Depth (feet): Date Collected:	Unrestricted Use SCOs	Restricted Use SCOs Commercial	Units	MW-3 19.5 - 20 12/08/05	SB-1 4 - 6.5 12/06/05	SB-2 8 - 10 12/13/05	SB-3 10 - 11.8 12/06/05	SB-4 10 - 12 12/05/05	SB-4 18 - 20 12/05/05	SB-5 16 - 16.8 12/14/05	SB-5 17.8 - 19.4 12/14/05	SB-5 23 - 23.3 12/14/05	SB-6 19.8 - 21.4 12/01/05
SVOCs (Cont'd.)													
Benzo(a)pyrene	1 c	1 f	mg/kg	**18**	0.14	0.040 U [0.041 U]	0.017 J	0.043 U	0.042 U	**9.0**	**2.3**	**400**	0.011 J
Benzo(b)fluoranthene	1 c, f	5.6	mg/kg	**9.1**	0.098	0.040 U [0.041 U]	0.011 J	0.043 U	0.042 U	**4.9**	**1.6**	**240**	0.040 U
Benzo(g,h,i)perylene	100 f	500 b	mg/kg	6.6 J	0.091 J	0.40 UJ [0.41 UJ]	0.40 U	0.43 U	0.42 U	3.2 J	1.1 J	88 J	0.40 U
Benzo(k)fluoranthene	0.8 c, f	56	mg/kg	**19 J**	0.15	0.040 UJ [0.041 UJ]	0.020 J	0.043 U	0.042 U	**8.8 J**	**2.1 J**	**420 J**	0.040 UJ
bis(2-Chloroethoxy)methane	- -	- -	mg/kg	10 U	0.40 U	0.40 U [0.41 U]	0.40 U	0.43 U	0.42 U	8.2 U	0.40 U	100 U	0.40 U
bis(2-Chloroethyl)ether	- -	- -	mg/kg	1.0 U	0.040 UJ	0.040 UJ [0.041 UJ]	0.040 UJ	0.043 UJ	0.042 UJ	0.82 UJ	0.040 UJ	10 UJ	0.040 U
bis(2-chloroisopropyl)ether	- -	- -	mg/kg	10 U	0.40 U	0.40 U [0.41 U]	0.40 U	0.43 U	0.42 U	8.2 U	0.40 U	100 U	0.40 U
bis(2-Ethylhexyl)phthalate	- -	- -	mg/kg	10 U	0.40 U	0.40 UJ [0.41 UJ]	0.40 U	0.43 U	0.10 J	8.2 UJ	0.40 UJ	100 UJ	0.40 U
Butylbenzylphthalate	- -	- -	mg/kg	10 U	0.40 U	0.40 U [0.41 U]	0.40 U	0.43 U	0.42 U	8.2 U	0.40 U	100 U	0.40 U
Carbazole	- -	- -	mg/kg	2.2 J	0.40 U	0.40 U [0.41 U]	0.40 U	0.43 U	0.42 U	5.2 J	0.43	44 J	0.40 U
Chrysene	1 c, f	56	mg/kg	**22**	0.14 J	0.40 U [0.41 U]	0.018 J	0.43 U	0.42 U	**12**	**2.3**	**580**	0.015 J
Dibenz(a,h)anthracene	0.33 b, f	0.56	mg/kg	**1.2**	0.030 J	0.040 U [0.041 U]	0.040 U	0.043 U	0.042 U	**1.3**	**0.40**	**46**	0.040 U
Dibenzofuran	7 f	350	mg/kg	**29**	0.40 U	0.40 U [0.41 U]	0.40 U	0.43 U	0.42 U	**16**	1.0	**690**	0.016 J
Diethylphthalate	- -	- -	mg/kg	10 U	0.40 U	0.40 U [0.41 U]	0.40 U	0.43 U	0.42 U	8.2 U	0.40 U	100 U	0.40 U
Dimethylphthalate	- -	- -	mg/kg	10 U	0.40 U	0.40 U [0.41 U]	0.40 U	0.43 U	0.42 U	8.2 U	0.40 U	100 U	0.40 U
Di-n-butylphthalate	- -	- -	mg/kg	10 U	0.40 U	0.40 UJ [0.41 UJ]	0.40 U	0.43 U	0.42 U	8.2 UJ	0.40 UJ	100 UJ	0.40 U
Di-n-octylphthalate	- -	- -	mg/kg	10 U	0.40 U	0.40 U [0.41 U]	0.40 U	0.43 U	0.42 U	8.2 U	0.40 U	100 U	0.40 U
Fluoranthene	100 a, f	500 b	mg/kg	53	0.20 J	0.40 UJ [0.41 UJ]	0.042 J	0.43 U	0.42 U	25 J	4.7 J	**1,100 J**	0.030 J
Fluorene	30	500 b	mg/kg	**47**	0.40 U	0.40 U [0.41 U]	0.40 U	0.43 U	0.42 U	28	1.6	**1,200**	0.031 J
Hexachlorobenzene	0.33 b, f	6	mg/kg	1.0 U	0.040 U	0.040 U [0.041 U]	0.040 U	0.043 U	0.042 U	0.82 U	0.040 U	10 U	0.040 U
Hexachlorobutadiene	- -	- -	mg/kg	2.0 U	0.080 U	0.080 U [0.083 U]	0.081 U	0.086 U	0.085 U	1.6 U	0.081 U	20 U	0.079 U
Hexachlorocyclopentadiene	- -	- -	mg/kg	10 UJ	0.40 UJ	0.40 U [0.41 U]	0.40 UJ	0.43 UJ	0.42 UJ	8.2 U	0.40 U	100 U	0.40 UJ
Hexachloroethane	- -	- -	mg/kg	1.0 U	0.040 U	0.040 U [0.041 U]	0.040 U	0.043 U	0.042 U	0.82 U	0.040 U	10 U	0.040 U
Indeno(1,2,3-cd)pyrene	0.5 c, f	5.6	mg/kg	**7.0**	0.085	0.040 U [0.041 U]	0.040 U	0.043 U	0.042 U	**3.5**	**1.2**	**100**	0.040 U
Isophorone	- -	- -	mg/kg	10 U	0.40 U	0.40 U [0.41 U]	0.40 U	0.43 U	0.42 U	8.2 U	0.40 U	100 U	0.40 U
Naphthalene	12 f	500 b	mg/kg	7.0 J	0.017 J	0.40 U [0.41 U]	0.40 U	0.43 U	0.056 J	**100**	4.9	**120**	0.11 J
Nitrobenzene	- -	- -	mg/kg	1.0 UJ	0.040 UJ	0.040 UJ [0.041 UJ]	0.040 UJ	0.043 UJ	0.042 UJ	0.82 UJ	0.040 UJ	10 UJ	0.040 UJ
N-Nitroso-di-n-propylamine	- -	- -	mg/kg	1.0 U	0.040 U	0.040 U [0.041 U]	0.040 U	0.043 U	0.042 U	0.82 U	0.040 U	10 U	0.040 U
N-Nitrosodiphenylamine	- -	- -	mg/kg	10 U	0.40 U	0.40 UJ [0.41 UJ]	0.40 U	0.43 U	0.42 U	8.2 UJ	0.40 UJ	100 UJ	0.40 U
Pentachlorophenol	0.8 b	6.7	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	100 f	500 b	mg/kg	95	0.064 J	0.40 U [0.41 U]	0.029 J	0.43 U	0.42 U	51	4.6	**2,100**	0.058 J
Phenol	0.33 b	500 b	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	100 f	500 b	mg/kg	38	0.19 J	0.40 U [0.41 U]	0.032 J	0.43 U	0.42 U	20	3.9	**870**	0.025 J
Total PAHs	- -	- -	mg/kg	430 J	1.4 J	ND [ND]	0.19 J	ND	0.056 J	390 J	39 J	11,000 J	0.37 J
Total SVOCs	- -	- -	mg/kg	460 J	1.4 J	ND [ND]	0.19 J	ND	0.16 J	410 J	41 J	12,000 J	0.38 J
Inorganics													
Cyanide, Total	27 e, f	27 h	mg/kg	0.500 U	1.40	1.60 [0.960]	0.500 U	0.500 U	0.500 U	15.2	1.20	0.500 U	0.500 U

See Notes on Page 13

Table 1-1

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Soil Data Summary

Sample ID: Sample Depth (feet): Date Collected:	Unrestricted Use SCOs	Restricted Use SCOs Commercial	Units	SB-7 14 - 16.5 12/01/05	SB-7 20.5 - 21.3 12/01/05	SB-8 6 - 8 12/05/05	SB-8 14 - 16 12/05/05	SB-9 6 - 6.8 12/13/05	SB-10 9.2 - 10.7 12/14/05	SB-11 20 - 22 09/20/06	SB-11 38 - 40 09/20/06	SB-12 16 - 18 09/19/06	SB-12 38 - 40 09/19/06
VOCs													
1,1,1-Trichloroethane	0.68 f	500 b	mg/kg	0.63 U [0.66 U]	0.60 U	0.0061 U	0.64 U	0.0059 U	0.0056 U	0.0060 U	0.0060 U	0.0070 U	0.0060 U
1,1,2,2-Tetrachloroethane	- -	- -	mg/kg	0.13 U [0.13 U]	0.12 U	0.0012 UJ	0.13 U	0.0012 U	0.0011 U	0.0060 U	0.0060 U	0.0070 U	0.0060 U
1,1,2-Trichloroethane	- -	- -	mg/kg	0.38 U [0.40 U]	0.36 U	0.0036 U	0.38 U	0.0035 U	0.0034 U	0.0060 U	0.0060 U	0.0070 U	0.0060 U
1,1-Dichloroethane	0.27 f	240	mg/kg	0.63 UJ [0.66 UJ]	0.60 UJ	0.0061 U	0.64 UJ	0.0059 U	0.0056 U	NA	NA	NA	NA
1,1-Dichloroethene	0.33 f	500 b	mg/kg	0.25 U [0.26 U]	0.24 U	0.0024 UJ	0.26 U	0.0023 UJ	0.0022 UJ	0.0060 U	0.0060 U	0.0070 U	0.0060 U
1,2,4-Trichlorobenzene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	0.0060 U	0.0060 U	0.0070 U	0.0060 U
1,2-Dibromo-3-chloropropane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	0.0060 U	0.0060 U	0.0070 U	0.0060 U
1,2-Dibromoethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	0.0060 U	0.0060 U	0.0070 U	0.0060 U
1,2-Dichlorobenzene	1.1 f	500 b	mg/kg	NA	NA	NA	NA	NA	NA	0.0060 U	0.0060 U	0.0070 U	0.0060 U
1,2-Dichloroethane	0.02 c	30	mg/kg	0.25 U [0.26 U]	0.24 U	0.0024 U	0.26 U	0.0023 U	0.0022 U	0.0060 U	0.0060 U	0.0070 U	0.0060 U
1,2-Dichloropropane	- -	- -	mg/kg	0.13 U [0.13 U]	0.12 U	0.0012 UJ	0.13 U	0.0012 U	0.0011 U	0.0060 U	0.0060 U	0.0070 U	0.0060 U
1,3-Dichlorobenzene	2.4 f	280	mg/kg	NA	NA	NA	NA	NA	NA	0.0060 U	0.0060 U	0.0070 U	0.0060 U
1,4-Dichlorobenzene	1.8	130	mg/kg	NA	NA	NA	NA	NA	NA	0.0060 U	0.0060 U	0.0070 U	0.0060 U
2-Butanone	0.12	500 b	mg/kg	0.63 U [0.66 U]	0.60 U	0.0061 UJ	0.64 U	0.015	0.0056 U	0.030 U	0.030 U	0.037 U	0.030 U
2-Hexanone	- -	- -	mg/kg	0.63 U [0.66 U]	0.60 U	0.0061 UJ	0.64 UJ	0.0059 UJ	0.0056 UJ	0.030 U	0.030 U	0.037 U	0.030 U
4-Methyl-2-Pentanone	- -	- -	mg/kg	0.63 U [0.66 U]	0.60 U	0.0061 UJ	0.64 U	0.0059 U	0.0056 U	0.030 U	0.030 U	0.037 U	0.030 U
Acetone	0.05	500 b	mg/kg	**1.2 [1.3]**	0.60 U	0.061 UJ	0.64 U	**0.054**	0.039 J	0.017 J	0.0060 J	0.011 J	0.030 U
Benzene	0.06	44	mg/kg	**22 [15]**	**2.2**	0.0012 U	**0.60**	0.0012	0.0015	**0.067**	0.0060 U	0.041	0.0060 U
Bromodichloromethane	- -	- -	mg/kg	0.13 U [0.13 U]	0.12 U	0.0012 U	0.13 U	0.0012 U	0.0011 U	0.0060 U	0.0060 U	0.0070 U	0.0060 U
Bromoform	- -	- -	mg/kg	0.51 UJ [0.53 UJ]	0.48 UJ	0.0048 U	0.51 UJ	0.0047 UJ	0.0045 UJ	0.0060 U	0.0060 U	0.0070 U	0.0060 U
Bromomethane	- -	- -	mg/kg	0.63 UJ [0.66 UJ]	0.60 UJ	0.0061 U	0.64 U	0.0059 UJ	0.0056 UJ	0.0060 U	0.0060 U	0.0070 U	0.0060 U
Carbon Disulfide	- -	- -	mg/kg	0.12 J [0.13 J]	0.60 U	0.0061 UJ	0.64 U	0.011	0.0056 UJ	0.0040 J	0.0060 U	0.0070 U	0.0060 U
Carbon Tetrachloride	0.76 f	22	mg/kg	0.25 U [0.26 U]	0.24 U	0.0024 U	0.26 U	0.0023 U	0.0022 U	0.0060 U	0.0060 U	0.0070 U	0.0060 U
Chlorobenzene	1.1	500 b	mg/kg	0.63 U [0.66 U]	0.60 U	0.0061 U	0.64 UJ	0.0059 UJ	0.0056 U	0.0060 U	0.0060 U	0.0070 U	0.0060 U
Chloroethane	- -	- -	mg/kg	0.63 U [0.66 U]	0.60 U	0.0061 U	0.64 U	0.0059 U	0.0056 U	0.0060 U	0.0060 U	0.0070 U	0.0060 U
Chloroform	0.37	350	mg/kg	0.63 U [0.66 U]	0.60 U	0.0061 U	0.64 U	0.0059 U	0.0056 U	0.0060 U	0.0060 U	0.0070 U	0.0060 U
Chloromethane	- -	- -	mg/kg	0.63 U [0.66 U]	0.60 U	0.0061 U	0.64 U	0.0059 U	0.0056 U	0.0060 U	0.0060 U	0.0070 U	0.0060 U
cis-1,2-Dichloroethene	0.25 f	500 b	mg/kg	0.63 U [0.66 U]	0.60 U	0.0061 U	0.64 U	0.0059 U	0.0056 U	0.0060 U	0.0060 U	0.0070 U	0.0060 U
cis-1,3-Dichloropropene	- -	- -	mg/kg	0.63 U [0.66 U]	0.60 U	0.0061 U	0.64 U	0.0059 U	0.0056 U	0.0060 U	0.0060 U	0.0070 U	0.0060 U
Cyclohexane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	0.0030 J	0.0060 U	0.0070 U	0.0060 U
Dibromochloromethane	- -	- -	mg/kg	0.63 UJ [0.66 UJ]	0.60 UJ	0.0061 U	0.64 UJ	0.0059 U	0.0056 UJ	0.0060 U	0.0060 U	0.0070 U	0.0060 U
Dichlorodifluoromethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	0.0060 U	0.0030 J	0.0070 U	0.0060 U
Ethylbenzene	1 f	390	mg/kg	**9.8 [3.9]**	1.0	0.0048 U	**3.6**	0.0047 U	0.0045 U	0.046	0.0060 U	0.0070 U	0.0060 U
Isopropylbenzene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	0.010	0.0060 U	0.0070 U	0.0060 U
Methyl acetate	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	0.0060 U	0.0060 U	0.0070 U	0.0060 U
Methyl tert-butyl ether	0.93 f	500 b	mg/kg	0.63 U [0.66 U]	0.60 U	0.0061 UJ	0.64 U	0.0059 U	0.0056 UJ	0.0060 U	0.0060 U	0.0070 U	0.0060 U
Methylcyclohexane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	0.0020 J	0.0060 U	0.0070 U	0.0060 U
Methylene Chloride	0.05	500 b	mg/kg	0.38 UJ [0.40 UJ]	0.36 UJ	0.0036 U	0.38 UJ	0.0035 UJ	0.0034 UJ	0.0060 UJ	0.012 UJ	0.014 UJ	0.0080 UJ
Styrene	- -	- -	mg/kg	1.6 [0.62 J]	1.4	0.0061 U	0.64 UJ	0.0059 UJ	0.0056 UJ	0.0060 U	0.0060 U	0.0070 U	0.0060 U
Tetrachloroethene	1.3	150	mg/kg	0.13 U [0.13 U]	0.12 U	0.0012 U	0.13 U	0.0012 U	0.0011 U	0.0060 U	0.0060 U	0.0070 U	0.0060 U

See Notes on Page 13

Table 1-1

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Soil Data Summary

Sample ID: Sample Depth (feet): Date Collected:	Unrestricted Use SCOs	Restricted Use SCOs Commercial	Units	SB-7 14 - 16.5 12/01/05	SB-7 20.5 - 21.3 12/01/05	SB-8 6 - 8 12/05/05	SB-8 14 - 16 12/05/05	SB-9 6 - 6.8 12/13/05	SB-10 9.2 - 10.7 12/14/05	SB-11 20 - 22 09/20/06	SB-11 38 - 40 09/20/06	SB-12 16 - 18 09/19/06	SB-12 38 - 40 09/19/06
VOCs (Cont'd.)													
Toluene	0.7	500 b	mg/kg	**6.6 [3.2]**	**4.4**	0.0061 U	0.64 U	0.0059 U	0.0024 J	0.0090	0.0060 U	0.0070 U	0.0060 U
trans-1,2-Dichloroethene	0.19 f	500 b	mg/kg	0.63 U [0.66 U]	0.60 U	0.0061 U	0.64 U	0.0059 U	0.0056 UJ	0.0060 U	0.0060 U	0.0070 U	0.0060 U
trans-1,3-Dichloropropene	- -	- -	mg/kg	0.63 U [0.66 U]	0.60 U	0.0061 U	0.64 U	0.0059 U	0.0056 U	0.0060 U	0.0060 U	0.0070 U	0.0060 U
Trichloroethene	0.47	200	mg/kg	0.13 U [0.13 U]	0.12 U	0.0012 UJ	0.13 U	0.0012 U	0.0011 U	0.0060 U	0.0060 U	0.0070 U	0.0060 U
Trichlorofluoromethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	0.0060 U	0.0060 U	0.0070 U	0.0060 U
Vinyl Chloride	0.02 f	13	mg/kg	0.63 U [0.66 U]	0.60 U	0.0061 U	0.64 U	0.0059 U	0.0056 U	0.012 U	0.012 U	0.015 U	0.012 U
Xylene (Total)	0.26	500 b	mg/kg	**56 [20]**	**5.1**	0.0061 U	**4.8 J**	0.0059 UJ	0.0018 J	0.075	0.018 U	0.022 U	0.018 U
Total BTEX	- -	- -	mg/kg	94 [42]	13	ND	9.0 J	0.0012	0.0057 J	0.20	ND	0.041	ND
Total VOCs	- -	- -	mg/kg	97 J [44 J]	14	ND	9.0 J	0.081	0.045 J	0.23 J	0.0090 J	0.052 J	ND
SVOCs													
1,2,4-Trichlorobenzene	- -	- -	mg/kg	1.1 U [0.44 U]	2.1 U	0.041 U	0.044 U	0.040 U	0.039 U	0.39 U	0.39 U	0.49 U	0.39 U
1,2-Dichlorobenzene	1.1 f	500 b	mg/kg	11 U [4.4 U]	21 U	0.41 U	0.44 U	0.40 U	0.39 U	0.39 U	0.39 U	0.49 U	0.39 U
1,3-Dichlorobenzene	2.4 f	280	mg/kg	11 U [4.4 U]	21 U	0.41 U	0.44 U	0.40 U	0.39 U	0.39 U	0.39 U	0.49 U	0.39 U
1,4-Dichlorobenzene	1.8	130	mg/kg	11 U [4.4 U]	21 U	0.41 U	0.44 U	0.40 U	0.39 U	0.39 U	0.39 U	0.49 U	0.39 U
2,4,5-Trichlorophenol	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	0.94 U	0.96 U	1.2 U	0.96 U
2,4,6-Trichlorophenol	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	0.39 U	0.39 U	0.49 U	0.39 U
2,4-Dichlorophenol	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	0.39 U	0.39 U	0.49 U	0.39 U
2,4-Dimethylphenol	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	0.39 U	0.39 U	0.49 U	0.39 U
2,4-Dinitrophenol	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	1.9 UJ	1.9 UJ	2.4 U	1.9 U
2,4-Dinitrotoluene	- -	- -	mg/kg	2.2 U [0.89 U]	4.2 U	0.082 U	0.087 U	0.080 U	0.078 U	0.39 U	0.39 U	0.49 U	0.39 U
2,6-Dinitrotoluene	- -	- -	mg/kg	2.2 U [0.89 U]	4.2 U	0.082 U	0.087 U	0.080 U	0.078 U	0.39 U	0.39 U	0.49 U	0.39 U
2-Chloronaphthalene	- -	- -	mg/kg	11 U [4.4 U]	21 U	0.41 U	0.44 U	0.40 U	0.39 U	0.39 U	0.39 U	0.49 U	0.39 U
2-Chlorophenol	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	0.39 U	0.39 U	0.49 U	0.39 U
2-Methylnaphthalene	- -	- -	mg/kg	57 [19]	14 J	0.41 U	0.12 J	0.12 J	0.020 J	0.39 U	0.39 U	0.10 J	0.035 J
2-Methylphenol	0.33 b, f	500 b	mg/kg	NA	NA	NA	NA	NA	NA	0.39 U	0.39 U	0.49 U	0.39 U
2-Nitroaniline	- -	- -	mg/kg	22 U [8.9 U]	42 U	0.82 U	0.87 U	0.80 U	0.78 U	1.9 U	1.9 U	2.4 U	1.9 U
2-Nitrophenol	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	0.39 U	0.39 U	0.49 U	0.39 U
3,3'-Dichlorobenzidine	- -	- -	mg/kg	22 UJ [8.9 UJ]	42 UJ	0.82 U	0.87 U	0.80 UJ	0.78 UJ	1.9 U	1.9 U	2.4 UJ	1.9 UJ
3-Nitroaniline	- -	- -	mg/kg	22 U [8.9 U]	42 U	0.82 U	0.87 U	0.80 U	0.78 U	1.9 U	1.9 U	2.4 U	1.9 U
4-Bromophenyl-phenylether	- -	- -	mg/kg	11 U [4.4 U]	21 U	0.41 U	0.44 U	0.40 U	0.39 U	0.39 U	0.39 U	0.49 U	0.39 U
4-Chloro-3-methylphenol	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	0.39 U	0.39 U	0.49 U	0.39 U
4-Chloroaniline	- -	- -	mg/kg	11 U [4.4 U]	21 U	0.41 UJ	0.44 UJ	0.40 U	0.39 U	0.39 U	0.39 U	0.49 U	0.39 U
4-Chlorophenyl-phenylether	- -	- -	mg/kg	11 U [4.4 U]	21 U	0.41 U	0.44 U	0.40 U	0.39 U	0.39 U	0.39 U	0.49 U	0.39 U
4-Methylphenol	0.33 b, f	500 b	mg/kg	NA	NA	NA	NA	NA	NA	0.39 U	0.39 U	0.49 U	0.39 U
4-Nitroaniline	- -	- -	mg/kg	22 U [8.9 U]	42 U	0.82 U	0.87 U	0.80 U	0.78 U	1.9 U	1.9 U	2.4 U	1.9 U
4-Nitrophenol	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	1.9 U	1.9 U	2.4 U	1.9 U
Acenaphthene	20	500 b	mg/kg	6.0 J [2.0 J]	18 J	0.014 J	0.036 J	0.41	0.043 J	0.39 U	0.39 U	0.030 J	0.39 U
Acenaphthylene	100 a, f	500 b	mg/kg	28 [9.2]	82	0.0086 J	0.44 U	0.93	0.025 J	0.39 U	0.39 U	0.36 J	0.39 U
Anthracene	100 a, f	500 b	mg/kg	30 [9.5]	76	0.032 J	0.0088 J	1.9 J	0.043 J	0.39 U	0.39 U	0.18 J	0.39 U
Benzo(a)anthracene	1 c, f	5.6	mg/kg	**19 [7.6]**	**45**	0.076	0.010 J	**5.2**	0.031 J	0.39 U	0.024 J	0.88	0.39 U

See Notes on Page 13

Table 1-1

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Soil Data Summary

Sample ID: **Sample Depth (feet):** **Date Collected:**	**Unrestricted Use SCOs**	**Restricted Use SCOs Commercial**	**Units**	**SB-7** **14 - 16.5** **12/01/05**	**SB-7** **20.5 - 21.3** **12/01/05**	**SB-8** **6 - 8** **12/05/05**	**SB-8** **14 - 16** **12/05/05**	**SB-9** **6 - 6.8** **12/13/05**	**SB-10** **9.2 - 10.7** **12/14/05**	**SB-11** **20 - 22** **09/20/06**	**SB-11** **38 - 40** **09/20/06**	**SB-12** **16 - 18** **09/19/06**	**SB-12** **38 - 40** **09/19/06**
SVOCs (Cont'd.)													
Benzo(a)pyrene	1 c	1 f	mg/kg	**13 [7.0]**	**26**	0.079	0.044 U	**4.9**	0.019 J	0.39 U	0.39 U	**1.3**	0.39 U
Benzo(b)fluoranthene	1 c, f	5.6	mg/kg	**7.9 [3.1]**	**14**	0.060	0.044 U	**4.0**	0.0096 J	0.39 U	0.39 U	**1.1**	0.39 U
Benzo(g,h,i)perylene	100 f	500 b	mg/kg	3.6 J [1.9 J]	5.3 J	0.037 J	0.44 U	1.7 J	0.39 UJ	0.39 U	0.39 U	0.97	0.0080 J
Benzo(k)fluoranthene	0.8 c, f	56	mg/kg	**15 J [7.2 J]**	**28 J**	0.072	0.044 U	**3.7 J**	0.016 J	0.39 U	0.39 U	0.57	0.39 U
bis(2-Chloroethoxy)methane	- -	- -	mg/kg	11 U [4.4 U]	21 U	0.41 U	0.44 U	0.40 U	0.39 U	0.39 U	0.39 U	0.49 U	0.39 U
bis(2-Chloroethyl)ether	- -	- -	mg/kg	1.1 U [0.44 U]	2.1 U	0.041 UJ	0.044 UJ	0.040 UJ	0.039 UJ	0.39 U	0.39 U	0.49 U	0.39 U
bis(2-chloroisopropyl)ether	- -	- -	mg/kg	11 U [4.4 U]	21 U	0.41 U	0.44 U	0.40 U	0.39 U	0.39 U	0.39 U	0.49 U	0.39 U
bis(2-Ethylhexyl)phthalate	- -	- -	mg/kg	11 U [4.4 U]	21 U	0.23 J	0.44 U	0.40 U	0.39 UJ	0.39 U	0.39 U	0.49 U	0.11 J
Butylbenzylphthalate	- -	- -	mg/kg	11 U [4.4 U]	21 U	0.41 U	0.44 U	0.40 U	0.39 U	0.39 U	0.39 U	0.49 U	0.39 U
Carbazole	- -	- -	mg/kg	6.8 J [2.1 J]	5.1 J	0.41 U	0.016 J	0.54	0.39 U	0.39 U	0.39 U	0.026 J	0.39 U
Chrysene	1 c, f	56	mg/kg	**17 [7.2]**	**39**	0.095 J	0.015 J	**4.7**	0.025 J	0.39 U	0.39 U	0.77	0.39 U
Dibenz(a,h)anthracene	0.33 b, f	0.56	mg/kg	**1.6 [0.86]**	**2.3**	0.041 U	0.044 U	**0.76**	0.039 U	0.39 U	0.39 U	0.20 J	0.39 U
Dibenzofuran	7 f	350	mg/kg	**20 [7.0]**	**52**	0.010 J	0.021 J	0.46	0.016 J	0.025 J	0.029 J	0.033 J	0.39 U
Diethylphthalate	- -	- -	mg/kg	11 U [4.4 U]	21 U	0.41 U	0.44 U	0.40 U	0.39 U	0.39 U	0.39 U	0.49 U	0.39 U
Dimethylphthalate	- -	- -	mg/kg	11 U [4.4 U]	21 U	0.41 U	0.44 U	0.40 U	0.39 U	0.39 U	0.39 U	0.49 U	0.39 U
Di-n-butylphthalate	- -	- -	mg/kg	11 U [4.4 U]	21 U	0.41 U	0.44 U	0.40 UJ	0.39 UJ	0.39 U	0.39 U	0.49 U	0.39 U
Di-n-octylphthalate	- -	- -	mg/kg	11 U [4.4 U]	21 U	0.41 U	0.44 U	0.40 UJ	0.39 U	0.39 U	0.39 U	0.49 UJ	0.39 UJ
Fluoranthene	100 a, f	500 b	mg/kg	41 [15]	92	0.15 J	0.023 J	7.2 J	0.060 J	0.39 U	0.39 U	1.3	0.39 U
Fluorene	30	500 b	mg/kg	**35 [11]**	**99**	0.018 J	0.028 J	1.0	0.059 J	0.39 U	0.39 U	0.085 J	0.39 U
Hexachlorobenzene	0.33 b, f	6	mg/kg	1.1 U [0.44 U]	2.1 U	0.041 U	0.044 U	0.040 U	0.039 U	0.39 U	0.39 U	0.49 U	0.39 U
Hexachlorobutadiene	- -	- -	mg/kg	2.2 U [0.89 U]	4.2 U	0.082 U	0.087 U	0.080 U	0.078 U	0.39 U	0.39 U	0.49 U	0.39 U
Hexachlorocyclopentadiene	- -	- -	mg/kg	11 UJ [4.4 UJ]	21 UJ	0.41 UJ	0.44 UJ	0.40 U	0.39 U	0.39 UJ	0.39 UJ	0.49 UJ	0.39 UJ
Hexachloroethane	- -	- -	mg/kg	1.1 U [0.44 U]	2.1 U	0.041 U	0.044 U	0.040 U	0.039 U	0.39 U	0.39 U	0.49 U	0.39 U
Indeno(1,2,3-cd)pyrene	0.5 c, f	5.6	mg/kg	**3.8 [2.4]**	**6.1**	0.032 J	0.044 U	**2.1**	0.039 U	0.39 U	0.39 U	**0.75**	0.39 U
Isophorone	- -	- -	mg/kg	11 U [4.4 U]	21 U	0.41 U	0.44 U	0.40 U	0.39 U	0.39 U	0.39 U	0.49 U	0.39 U
Naphthalene	12 f	500 b	mg/kg	**160 [54]**	**29**	0.013 J	7.2	0.47	0.39 U	0.19 J	0.088 J	0.24 J	0.16 J
Nitrobenzene	- -	- -	mg/kg	1.1 UJ [0.44 UJ]	2.1 UJ	0.041 UJ	0.044 UJ	0.040 UJ	0.039 UJ	0.39 U	0.39 U	0.49 U	0.39 U
N-Nitroso-di-n-propylamine	- -	- -	mg/kg	1.1 U [0.44 U]	2.1 U	0.041 U	0.044 U	0.040 U	0.039 U	0.39 U	0.39 U	0.49 U	0.39 U
N-Nitrosodiphenylamine	- -	- -	mg/kg	11 U [4.4 U]	21 U	0.41 U	0.44 U	0.40 UJ	0.39 UJ	0.39 U	0.39 U	0.49 U	0.39 U
Pentachlorophenol	0.8 b	6.7	mg/kg	NA	NA	NA	NA	NA	NA	1.9 U	1.9 U	2.4 U	1.9 U
Phenanthrene	100 f	500 b	mg/kg	72 [25]	**180**	0.12 J	0.032 J	4.6	0.083 J	0.063 J	0.067 J	0.62	0.39 U
Phenol	0.33 b	500 b	mg/kg	NA	NA	NA	NA	NA	NA	0.39 U	0.39 U	0.49 U	0.39 U
Pyrene	100 f	500 b	mg/kg	29 [12]	65	0.15 J	0.017 J	6.7	0.046 J	0.39 U	0.39 U	1.4	0.39 U
Total PAHs	- -	- -	mg/kg	540 J [190 J]	820 J	0.96 J	7.5 J	50 J	0.48 J	0.25 J	0.18 J	11 J	0.20 J
Total SVOCs	- -	- -	mg/kg	570 J [200 J]	880 J	1.2 J	7.5 J	51 J	0.50 J	0.28 J	0.21 J	11 J	0.31 J
Inorganics													
Cyanide, Total	27 e, f	27 h	mg/kg	9.20 [13.8]	0.500 U	0.500 U	0.870	15.3	0.500 U	0.780 U	1.00 U	0.940 U	1.00 U

See Notes on Page 13

Table 1-1

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Soil Data Summary

Sample ID: Sample Depth (feet): Date Collected:	Unrestricted Use SCOs	Restricted Use SCOs Commercial	Units	SB-13 16 - 18 09/19/06	SB-13 36 - 38 09/19/06	SB-14A 4 - 6.5 09/18/06	SB-14B 10 - 12 09/18/06	SB-14B 38 - 40 09/18/06	SB-15 4 - 5 09/20/06	SB-15 23.4 - 24 09/20/06	SB-15 38 - 40 09/20/06	TP-1 7 12/02/05	TP-2 6.2 12/02/05	TP-3 6 12/02/05
VOCs														
1,1,1-Trichloroethane	0.68 f	500 b	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0059 U	0.0061 U	0.0064 U
1,1,2,2-Tetrachloroethane	- -	- -	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0012 UJ	0.0012 UJ	0.0013 UJ
1,1,2-Trichloroethane	- -	- -	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0036 U	0.0037 U	0.0039 U
1,1-Dichloroethane	0.27 f	240	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	0.0059 U	0.0061 U	0.0064 U
1,1-Dichloroethene	0.33 f	500 b	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0024 UJ	0.0024 UJ	0.0026 UJ
1,2,4-Trichlorobenzene	- -	- -	mg/kg	4.2 UJ [3.6 UJ]	0.0060 U	4.8 UJ	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	NA	NA	NA
1,2-Dibromo-3-chloropropane	- -	- -	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	NA	NA	NA
1,2-Dibromoethane	- -	- -	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	NA	NA	NA
1,2-Dichlorobenzene	1.1 f	500 b	mg/kg	4.2 UJ [3.6 UJ]	0.0060 U	4.8 UJ	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	NA	NA	NA
1,2-Dichloroethane	0.02 c	30	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0024 U	0.0024 U	0.0026 U
1,2-Dichloropropane	- -	- -	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0012 U	0.0012 U	0.0013 U
1,3-Dichlorobenzene	2.4 f	280	mg/kg	4.2 UJ [3.6 UJ]	0.0060 U	4.8 UJ	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	NA	NA	NA
1,4-Dichlorobenzene	1.8	130	mg/kg	4.2 UJ [3.6 UJ]	0.0060 U	4.8 UJ	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	NA	NA	NA
2-Butanone	0.12	500 b	mg/kg	21 U [18 U]	0.030 U	24 U	0.032 U	0.030 U	0.030 U	0.013 J	0.029 U	0.0059 UJ	0.0061 UJ	0.0064 UJ
2-Hexanone	- -	- -	mg/kg	21 U [18 U]	0.030 U	24 U	0.032 U	0.030 U	0.030 U	0.030 U	0.029 U	0.0059 UJ	0.0061 UJ	0.0064 UJ
4-Methyl-2-Pentanone	- -	- -	mg/kg	21 U [18 U]	0.030 U	24 U	0.032 U	0.030 U	0.030 U	0.030 U	0.029 U	0.0059 UJ	0.0061 UJ	0.0064 UJ
Acetone	0.05	500 b	mg/kg	21 U [18 U]	0.030 U	24 U	0.015 J	0.030 U	0.0090 J	**0.057**	0.029 U	0.021 UJ	0.012 UJ	0.0064 UJ
Benzene	0.06	44	mg/kg	**240 [180]**	0.0050 J	**64**	0.0060 U	0.016	0.045	0.0040 J	0.0020 J	0.0014	0.0020	0.0017
Bromodichloromethane	- -	- -	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0012 U	0.0012 U	0.0013 U
Bromoform	- -	- -	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0048 U	0.0049 U	0.0052 U
Bromomethane	- -	- -	mg/kg	4.2 UJ [3.6 UJ]	0.0060 U	4.8 UJ	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0059 U	0.0061 U	0.0064 U
Carbon Disulfide	- -	- -	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0059 UJ	0.0061 UJ	0.0064 UJ
Carbon Tetrachloride	0.76 f	22	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0024 U	0.0024 U	0.0026 U
Chlorobenzene	1.1	500 b	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0059 U	0.0061 U	0.0064 U
Chloroethane	- -	- -	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0059 U	0.0061 U	0.0064 U
Chloroform	0.37	350	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0059 U	0.0061 U	0.0064 U
Chloromethane	- -	- -	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0059 U	0.0061 U	0.0064 U
cis-1,2-Dichloroethene	0.25 f	500 b	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0059 U	0.0061 U	0.0064 U
cis-1,3-Dichloropropene	- -	- -	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0059 U	0.0061 U	0.0064 U
Cyclohexane	- -	- -	mg/kg	4.2 U [3.6 U]	0.0060 U	44	0.0060 U	0.0060 U	0.0050 J	0.0060 U	0.0060 U	NA	NA	NA
Dibromochloromethane	- -	- -	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0059 U	0.0061 U	0.0064 U
Dichlorodifluoromethane	- -	- -	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 UJ	NA	NA	NA
Ethylbenzene	1 f	390	mg/kg	**42 [33]**	0.0060 U	**16**	0.0060 U	0.0060 U	0.024	0.0030 J	0.0060 U	0.0048 U	0.0049 U	0.0052 U
Isopropylbenzene	- -	- -	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0070	0.0060 U	0.0060 U	NA	NA	NA
Methyl acetate	- -	- -	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	NA	NA	NA
Methyl tert-butyl ether	0.93 f	500 b	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0059 U	0.0061 U	0.0064 U
Methylcyclohexane	- -	- -	mg/kg	6.4 [4.6]	0.0060 U	74	0.0060 U	0.0060 U	0.0030 J	0.0060 U	0.0060 U	NA	NA	NA
Methylene Chloride	0.05	500 b	mg/kg	4.2 UJ [3.6 UJ]	0.010 UJ	4.8 UJ	0.0060 UJ	0.0060 UJ	0.0060 UJ	0.0060 UJ	0.0080 UJ	0.0036 U	0.0037 U	0.0039 U
Styrene	- -	- -	mg/kg	30 [13]	0.0020 J	50	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0059 U	0.0061 U	0.0064 U
Tetrachloroethene	1.3	150	mg/kg	4.2 UJ [3.6 UJ]	0.0060 U	4.8 UJ	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0012 U	0.0012 U	0.0013 U

See Notes on Page 13

Table 1-1

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Soil Data Summary

Sample ID:	Unrestricted Use SCOs	Restricted Use SCOs Commercial	Units	**SB-13**	**SB-13**	**SB-14A**	**SB-14B**	**SB-14B**	**SB-15**	**SB-15**	**SB-15**	**TP-1**	**TP-2**	**TP-3**
Sample Depth (feet):				**16 - 18**	**36 - 38**	**4 - 6.5**	**10 - 12**	**38 - 40**	**4 - 5**	**23.4 - 24**	**38 - 40**	**7**	**6.2**	**6**
Date Collected:				**09/19/06**	**09/19/06**	**09/18/06**	**09/18/06**	**09/18/06**	**09/20/06**	**09/20/06**	**09/20/06**	**12/02/05**	**12/02/05**	**12/02/05**
VOCs (Cont'd.)														
Toluene	0.7	500 b	mg/kg	**340 [220]**	0.0090	**76**	0.0060 U	0.0060 U	0.0060 U	0.023	0.0020 J	0.0014 J	0.0026 J	0.0020 J
trans-1,2-Dichloroethene	0.19 f	500 b	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0059 U	0.0061 U	0.0064 U
trans-1,3-Dichloropropene	- -	- -	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0059 U	0.0061 U	0.0064 U
Trichloroethene	0.47	200	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0012 UJ	0.0012 UJ	0.0013 UJ
Trichlorofluoromethane	- -	- -	mg/kg	4.2 U [3.6 U]	0.0060 U	4.8 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	0.0060 U	NA	NA	NA
Vinyl Chloride	0.02 f	13	mg/kg	8.4 U [7.1 U]	0.012 U	9.6 U	0.013 U	0.012 U	0.012 U	0.012 U	0.012 U	0.0059 U	0.0061 U	0.0064 U
Xylene (Total)	0.26	500 b	mg/kg	**360 [230]**	0.012 J	**210**	0.019 U	0.018 U	0.0080 J	0.060	0.0050 J	0.0012 J	0.0019 J	0.0015 J
Total BTEX	- -	- -	mg/kg	980 [660]	0.026 J	370	ND	0.016	0.077 J	0.090 J	0.0090 J	0.0040 J	0.0065 J	0.0052 J
Total VOCs	- -	- -	mg/kg	1,000 [680]	0.028 J	530	0.015 J	0.016	0.10 J	0.16 J	0.0090 J	0.0040 J	0.0065 J	0.0052 J
SVOCs														
1,2,4-Trichlorobenzene	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 U	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	0.040 U	0.042 U	0.044 U
1,2-Dichlorobenzene	1.1 f	500 b	mg/kg	46 U [46 U]	0.40 U	6.3 U	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	0.40 U	0.42 U	0.44 U
1,3-Dichlorobenzene	2.4 f	280	mg/kg	46 U [46 U]	0.40 U	6.3 U	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	0.40 U	0.42 U	0.44 U
1,4-Dichlorobenzene	1.8	130	mg/kg	46 U [46 U]	0.40 U	6.3 U	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	0.40 U	0.42 U	0.44 U
2,4,5-Trichlorophenol	- -	- -	mg/kg	110 U [110 U]	0.97 U	15 UJ	1.0 U	0.96 U	0.95 U	0.93 U	0.95 U	NA	NA	NA
2,4,6-Trichlorophenol	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 UJ	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	NA	NA	NA
2,4-Dichlorophenol	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 UJ	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	NA	NA	NA
2,4-Dimethylphenol	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 UJ	0.42 U	0.39 U	0.095 J	0.38 U	0.39 U	NA	NA	NA
2,4-Dinitrophenol	- -	- -	mg/kg	220 U [220 U]	1.9 U	31 UJ	2.1 U	1.9 U	1.9 UJ	1.9 UJ	1.9 UJ	NA	NA	NA
2,4-Dinitrotoluene	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 U	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	0.080 U	0.084 U	0.087 U
2,6-Dinitrotoluene	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 U	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	0.080 U	0.084 U	0.087 U
2-Chloronaphthalene	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 U	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	0.40 U	0.42 U	0.44 U
2-Chlorophenol	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 UJ	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	NA	NA	NA
2-Methylnaphthalene	- -	- -	mg/kg	430 [520]	0.087 J	400 DJ	0.27 J	0.11 J	2.0	0.38 U	0.038 J	0.40 U	0.42 U	0.44 U
2-Methylphenol	0.33 b, f	500 b	mg/kg	**1.5 J [46 U]**	0.40 U	**3.6 J**	0.42 U	0.39 U	0.22 J	0.38 U	0.39 U	NA	NA	NA
2-Nitroaniline	- -	- -	mg/kg	220 U [220 U]	1.9 U	31 U	2.1 U	1.9 U	1.9 U	1.9 U	1.9 U	0.80 U	0.84 U	0.87 U
2-Nitrophenol	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 UJ	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	NA	NA	NA
3,3'-Dichlorobenzidine	- -	- -	mg/kg	220 UJ [220 UJ]	1.9 U	31 UJ	2.1 UJ	1.9 UJ	1.9 U	1.9 U	1.9 U	0.80 UJ	0.84 UJ	0.87 UJ
3-Nitroaniline	- -	- -	mg/kg	220 U [220 U]	1.9 U	31 U	2.1 U	1.9 U	1.9 U	1.9 U	1.9 U	0.80 U	0.84 U	0.87 U
4-Bromophenyl-phenylether	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 UJ	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	0.40 U	0.42 U	0.44 U
4-Chloro-3-methylphenol	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 UJ	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	NA	NA	NA
4-Chloroaniline	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 U	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	0.40 U	0.42 U	0.44 U
4-Chlorophenyl-phenylether	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 U	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	0.40 U	0.42 U	0.44 U
4-Methylphenol	0.33 b, f	500 b	mg/kg	**3.3 J [5.2 J]**	0.40 U	6.3 UJ	0.42 U	0.39 U	**0.53**	0.38 U	0.39 U	NA	NA	NA
4-Nitroaniline	- -	- -	mg/kg	220 U [220 U]	1.9 U	31 U	2.1 U	1.9 U	1.9 U	1.9 U	1.9 U	0.80 U	0.84 U	0.87 U
4-Nitrophenol	- -	- -	mg/kg	220 U [220 U]	1.9 U	31 UJ	2.1 U	1.9 U	1.9 U	1.9 U	1.9 U	NA	NA	NA
Acenaphthene	20	500 b	mg/kg	**40 J [47]**	0.021 J	6.3 U	0.041 J	0.39 U	0.20 J	0.38 U	0.39 U	0.011 J	0.42 U	0.44 U
Acenaphthylene	100 a, f	500 b	mg/kg	**180 [240]**	0.087 J	9.3	0.060 J	0.013 J	0.35 J	0.068 J	0.39 U	0.40 U	0.42 U	0.44 U
Anthracene	100 a, f	500 b	mg/kg	**190 [240]**	0.14 J	7.1 J	0.10 J	0.39 U	1.1	0.38 U	0.39 U	0.40 U	0.42 U	0.011 J
Benzo(a)anthracene	1 c, f	5.6	mg/kg	**100 [140]**	0.077 J	**22**	0.26 J	0.010 J	1.0	0.38 U	0.036 J	0.040 U	0.016 J	0.042 J

See Notes on Page 13

Table 1-1

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Soil Data Summary

Sample ID: Sample Depth (feet): Date Collected:	**Unrestricted Use SCOs**	**Restricted Use SCOs Commercial**	**Units**	**SB-13 16 - 18 09/19/06**	**SB-13 36 - 38 09/19/06**	**SB-14A 4 - 6.5 09/18/06**	**SB-14B 10 - 12 09/18/06**	**SB-14B 38 - 40 09/18/06**	**SB-15 4 - 5 09/20/06**	**SB-15 23.4 - 24 09/20/06**	**SB-15 38 - 40 09/20/06**	**TP-1 7 12/02/05**	**TP-2 6.2 12/02/05**	**TP-3 6 12/02/05**
SVOCs (Cont'd.)														
Benzo(a)pyrene	1 c	1 f	mg/kg	**84 [110]**	0.056 J	6.3 U	0.31 J	0.39 U	0.59	0.38 U	0.39 U	0.040 U	0.030 J	0.048
Benzo(b)fluoranthene	1 c, f	5.6	mg/kg	**80 [100]**	0.063 J	6.3 U	0.36 J	0.39 U	0.72	0.38 U	0.021 J	0.040 U	0.013 J	0.026 J
Benzo(g,h,i)perylene	100 f	500 b	mg/kg	30 J [43 J]	0.030 J	6.3 U	0.24 J	0.39 U	0.30 J	0.38 U	0.39 U	0.40 U	0.016 J	0.030 J
Benzo(k)fluoranthene	0.8 c, f	56	mg/kg	**37 J [53 J]**	0.020 J	6.3 U	0.15 J	0.39 U	0.24 J	0.38 U	0.39 U	0.040 UJ	0.027 J	0.048 J
bis(2-Chloroethoxy)methane	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 U	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	0.40 U	0.42 U	0.44 U
bis(2-Chloroethyl)ether	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 U	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	0.040 U	0.042 U	0.044 U
bis(2-chloroisopropyl)ether	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 U	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	0.40 U	0.42 U	0.44 U
bis(2-Ethylhexyl)phthalate	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 U	0.42 U	0.39 U	0.39 U	0.38 U	0.14 J	0.40 U	0.42 U	0.44 U
Butylbenzylphthalate	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 U	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	0.40 U	0.42 U	0.44 U
Carbazole	- -	- -	mg/kg	38 J [53]	0.049 J	6.3 UJ	0.039 J	0.39 U	0.33 J	0.38 U	0.39 U	0.40 U	0.42 U	0.44 U
Chrysene	1 c, f	56	mg/kg	**90 [120]**	0.062 J	**21**	0.23 J	0.39 U	0.78	0.38 U	0.025 J	0.40 U	0.017 J	0.046 J
Dibenz(a,h)anthracene	0.33 b, f	0.56	mg/kg	**13 J [17 J]**	0.014 J	6.3 U	0.071 J	0.39 U	0.16 J	0.38 U	0.39 U	0.040 U	0.042 U	0.044 U
Dibenzofuran	7 f	350	mg/kg	**140 [170]**	0.081 J	6.3 U	0.039 J	0.39 U	0.82	0.049 J	0.39 U	0.40 U	0.42 U	0.44 U
Diethylphthalate	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 U	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	0.40 U	0.42 U	0.44 U
Dimethylphthalate	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 U	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	0.40 U	0.42 U	0.44 U
Di-n-butylphthalate	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 UJ	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	0.40 U	0.42 U	0.44 U
Di-n-octylphthalate	- -	- -	mg/kg	46 UJ [46 UJ]	0.40 U	6.3 UJ	0.42 UJ	0.39 UJ	0.39 U	0.38 U	0.39 U	0.40 U	0.42 U	0.44 U
Fluoranthene	100 a, f	500 b	mg/kg	**220 [270]**	0.16 J	6.3 UJ	0.49	0.39 U	2.0	0.38 U	0.39 U	0.40 U	0.020 J	0.066 J
Fluorene	30	500 b	mg/kg	**210 [270]**	0.15 J	**76**	0.070 J	0.016 J	1.2	0.38 U	0.39 U	0.40 U	0.42 U	0.44 U
Hexachlorobenzene	0.33 b, f	6	mg/kg	46 U [46 U]	0.40 U	6.3 UJ	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	0.040 U	0.042 U	0.044 U
Hexachlorobutadiene	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 U	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	0.080 U	0.084 U	0.087 U
Hexachlorocyclopentadiene	- -	- -	mg/kg	46 U [46 UJ]	0.40 U	6.3 UJ	0.42 UJ	0.39 UJ	0.39 UJ	0.38 UJ	0.39 UJ	0.40 UJ	0.42 UJ	0.44 UJ
Hexachloroethane	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 U	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	0.040 U	0.042 U	0.044 U
Indeno(1,2,3-cd)pyrene	0.5 c, f	5.6	mg/kg	**32 J [42 J]**	0.027 J	6.3 U	0.20 J	0.39 U	0.29 J	0.38 U	0.39 U	0.040 U	0.016 J	0.027 J
Isophorone	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 U	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	0.40 U	0.42 U	0.44 U
Naphthalene	12 f	500 b	mg/kg	**1,200 D [1,400 D]**	0.12 J	**3,100 D**	1.2	0.83	3.1	0.38 U	0.39 U	0.40 U	0.42 U	0.44 U
Nitrobenzene	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 U	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	0.040 UJ	0.042 UJ	0.044 UJ
N-Nitroso-di-n-propylamine	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 U	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	0.040 U	0.042 U	0.044 U
N-Nitrosodiphenylamine	- -	- -	mg/kg	46 U [46 U]	0.40 U	6.3 UJ	0.42 U	0.39 U	0.39 U	0.38 U	0.39 U	0.40 U	0.42 U	0.44 U
Pentachlorophenol	0.8 b	6.7	mg/kg	220 U [220 U]	1.9 U	31 UJ	2.1 U	1.9 U	1.9 U	1.9 U	1.9 U	NA	NA	NA
Phenanthrene	100 f	500 b	mg/kg	**390 [460]**	0.31 J	99 J	0.36 J	0.011 J	3.2	0.38 U	0.086 J	0.40 U	0.010 J	0.025 J
Phenol	0.33 b	500 b	mg/kg	46 U [46 U]	0.40 U	**4.0 J**	0.42 U	0.39 U	0.20 J	0.38 U	0.39 U	NA	NA	NA
Pyrene	100 f	500 b	mg/kg	**170 [200]**	0.11 J	6.3 U	0.36 J	0.39 U	1.5	0.38 U	0.042 J	0.40 U	0.016 J	0.048 J
Total PAHs	- -	- -	mg/kg	3,500 J [4,300 J]	1.5 J	3,700 J	4.8 J	0.99 J	19 J	0.068 J	0.25 J	0.011 J	0.18 J	0.42 J
Total SVOCs	- -	- -	mg/kg	3,700 J [4,500 J]	1.7 J	3,700 J	4.9 J	0.99 J	20 J	0.12 J	0.39 J	0.011 J	0.18 J	0.42 J
Inorganics														
Cyanide, Total	27 e, f	27 h	mg/kg	26.7 [11.2]	1.00 U	**2,170**	1.10 U	1.10 U	0.900 U	0.850 U	1.10 U	0.500 U	0.500 U	1.70

See Notes on Page 13

Table 1-1

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Soil Data Summary

Sample ID: Sample Depth (feet): Date Collected:	Unrestricted Use SCOs	Restricted Use SCOs Commercial	Units	SS-1 0-0.2 12/07/05	SS-2 0-0.2 12/07/05	SS-3 0-0.2 12/07/05	SS-4 0-0.2 12/07/05	SS-5 0-0.2 12/07/05	SS-6 0-0.2 12/07/05
VOCs									
1,1,1-Trichloroethane	0.68 f	500 b	mg/kg	0.0063 U	0.0058 U	0.0056 U	0.0062 U	0.0064 U	0.0063 U
1,1,2,2-Tetrachloroethane	- -	- -	mg/kg	0.0012 UJ	0.0012 U	0.0011 UJ	0.0012 UJ	0.0013 UJ	0.0012 UJ
1,1,2-Trichloroethane	- -	- -	mg/kg	0.0038 U	0.0035 U	0.0034 U	0.0037 U	0.0038 U	0.0038 U
1,1-Dichloroethane	0.27 f	240	mg/kg	0.0063 UJ	0.0058 UJ	0.0056 UJ	0.0062 UJ	0.0064 UJ	0.0063 UJ
1,1-Dichloroethene	0.33 f	500 b	mg/kg	0.0025 U	0.0023 U	0.0022 U	0.0025 U	0.0026 U	0.0025 U
1,2,4-Trichlorobenzene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA
1,2-Dibromo-3-chloropropane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA
1,2-Dibromoethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	1.1 f	500 b	mg/kg	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	0.02 c	30	mg/kg	0.0025 U	0.0023 U	0.0022 U	0.0025 U	0.0026 U	0.0025 U
1,2-Dichloropropane	- -	- -	mg/kg	0.0012 U	0.0012 U	0.0011 U	0.0012 U	0.0013 U	0.0012 U
1,3-Dichlorobenzene	2.4 f	280	mg/kg	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	1.8	130	mg/kg	NA	NA	NA	NA	NA	NA
2-Butanone	0.12	500 b	mg/kg	0.0063 UJ	0.0058 U	0.0056 UJ	0.0062 UJ	0.0064 UJ	0.0063 UJ
2-Hexanone	- -	- -	mg/kg	0.0063 UJ	0.0058 UJ	0.0056 UJ	0.0062 UJ	0.0064 UJ	0.0063 UJ
4-Methyl-2-Pentanone	- -	- -	mg/kg	0.0063 UJ	0.0058 U	0.0056 UJ	0.0062 UJ	0.0064 UJ	0.0063 UJ
Acetone	0.05	500 b	mg/kg	0.0063 U	0.032	**0.059**	0.0062 U	**0.20**	0.043
Benzene	0.06	44	mg/kg	0.0011 J	0.0011 J	0.00070 J	0.0012 U	0.0013 U	0.0018
Bromodichloromethane	- -	- -	mg/kg	0.0012 U	0.0012 U	0.0011 U	0.0012 U	0.0013 U	0.0012 U
Bromoform	- -	- -	mg/kg	0.0050 UJ	0.0046 UJ	0.0045 UJ	0.0049 UJ	0.0051 UJ	0.0050 UJ
Bromomethane	- -	- -	mg/kg	0.0063 U	0.0058 U	0.0056 U	0.0062 U	0.0064 U	0.0063 U
Carbon Disulfide	- -	- -	mg/kg	0.0063 U	0.0058 U	0.0056 U	0.0062 U	0.0064 U	0.0063 U
Carbon Tetrachloride	0.76 f	22	mg/kg	0.0025 U	0.0023 U	0.0022 U	0.0025 U	0.0026 U	0.0025 U
Chlorobenzene	1.1	500 b	mg/kg	0.0063 UJ	0.0058 UJ	0.0056 UJ	0.0062 UJ	0.0064 UJ	0.0063 UJ
Chloroethane	- -	- -	mg/kg	0.0063 U	0.0058 U	0.0056 U	0.0062 U	0.0064 U	0.0063 U
Chloroform	0.37	350	mg/kg	0.0063 U	0.0058 U	0.0056 U	0.0062 U	0.0064 U	0.0063 U
Chloromethane	- -	- -	mg/kg	0.0063 U	0.0058 U	0.0056 U	0.0062 U	0.0064 U	0.0063 U
cis-1,2-Dichloroethene	0.25 f	500 b	mg/kg	0.0063 U	0.0058 U	0.0056 U	0.0062 U	0.0064 U	0.0063 U
cis-1,3-Dichloropropene	- -	- -	mg/kg	0.0063 U	0.0058 U	0.0056 U	0.0062 U	0.0064 U	0.0063 U
Cyclohexane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA
Dibromochloromethane	- -	- -	mg/kg	0.0063 U	0.0058 U	0.0056 U	0.0062 U	0.0064 U	0.0063 U
Dichlorodifluoromethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA
Ethylbenzene	1 f	390	mg/kg	0.0050 U	0.0046 U	0.0045 U	0.0049 U	0.0051 U	0.0050 U
Isopropylbenzene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA
Methyl acetate	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA
Methyl tert-butyl ether	0.93 f	500 b	mg/kg	0.0063 UJ	0.0058 UJ	0.0056 UJ	0.0062 UJ	0.0064 UJ	0.0063 UJ
Methylcyclohexane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA
Methylene Chloride	0.05	500 b	mg/kg	0.0038 UJ	0.0035 UJ	0.0034 UJ	0.0037 UJ	0.0038 UJ	0.0038 UJ
Styrene	- -	- -	mg/kg	0.0063 UJ	0.0058 UJ	0.0056 UJ	0.0062 UJ	0.0064 UJ	0.0063 UJ
Tetrachloroethene	1.3	150	mg/kg	0.0012 U	0.0012 U	0.0011 U	0.0012 U	0.0013 U	0.0012 U

See Notes on Page 13

Table 1-1

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Soil Data Summary

Sample ID: Sample Depth (feet): Date Collected:	Unrestricted Use SCOs	Restricted Use SCOs Commercial	Units	SS-1 0-0.2 12/07/05	SS-2 0-0.2 12/07/05	SS-3 0-0.2 12/07/05	SS-4 0-0.2 12/07/05	SS-5 0-0.2 12/07/05	SS-6 0-0.2 12/07/05
VOCs (Cont'd.)									
Toluene	0.7	500 b	mg/kg	0.0063 U	0.00090 J	0.0056 U	0.0062 U	0.0064 U	0.0063 U
trans-1,2-Dichloroethene	0.19 f	500 b	mg/kg	0.0063 U	0.0058 U	0.0056 U	0.0062 U	0.0064 U	0.0063 U
trans-1,3-Dichloropropene	- -	- -	mg/kg	0.0063 U	0.0058 U	0.0056 U	0.0062 U	0.0064 U	0.0063 U
Trichloroethene	0.47	200	mg/kg	0.0012 U	0.0012 U	0.0011 U	0.0012 U	0.0013 U	0.0012 U
Trichlorofluoromethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA
Vinyl Chloride	0.02 f	13	mg/kg	0.0063 U	0.0058 U	0.0056 U	0.0062 U	0.0064 U	0.0063 U
Xylene (Total)	0.26	500 b	mg/kg	0.0063 UJ	0.0058 UJ	0.0056 UJ	0.0062 UJ	0.0064 UJ	0.0063 UJ
Total BTEX	- -	- -	mg/kg	0.0011 J	0.0020 J	0.00070 J	ND	ND	0.0018
Total VOCs	- -	- -	mg/kg	0.0011 J	0.034 J	0.060 J	ND	0.20	0.045
SVOCs									
1,2,4-Trichlorobenzene	- -	- -	mg/kg	8.7 U	0.040 U	0.039 U	0.043 U	0.044 U	0.044 U
1,2-Dichlorobenzene	1.1 f	500 b	mg/kg	87 U	0.40 U	0.39 U	0.43 U	0.44 U	0.44 U
1,3-Dichlorobenzene	2.4 f	280	mg/kg	87 U	0.40 U	0.39 U	0.43 U	0.44 U	0.44 U
1,4-Dichlorobenzene	1.8	130	mg/kg	87 U	0.40 U	0.39 U	0.43 U	0.44 U	0.44 U
2,4,5-Trichlorophenol	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA
2,4,6-Trichlorophenol	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA
2,4-Dichlorophenol	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA
2,4-Dimethylphenol	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA
2,4-Dinitrophenol	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA
2,4-Dinitrotoluene	- -	- -	mg/kg	17 U	0.080 U	0.079 U	0.087 U	0.088 U	0.088 U
2,6-Dinitrotoluene	- -	- -	mg/kg	17 U	0.080 U	0.079 U	0.087 U	0.088 U	0.088 U
2-Chloronaphthalene	- -	- -	mg/kg	87 U	0.40 U	0.39 U	0.43 U	0.44 U	0.44 U
2-Chlorophenol	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	- -	- -	mg/kg	15 J	0.068 J	0.019 J	0.028 J	0.20 J	0.063 J
2-Methylphenol	0.33 b, f	500 b	mg/kg	NA	NA	NA	NA	NA	NA
2-Nitroaniline	- -	- -	mg/kg	170 U	0.80 U	0.79 U	0.87 U	0.88 U	0.88 U
2-Nitrophenol	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA
3,3'-Dichlorobenzidine	- -	- -	mg/kg	170 UJ	0.80 UJ	0.79 UJ	0.87 UJ	0.88 UJ	0.88 UJ
3-Nitroaniline	- -	- -	mg/kg	170 U	0.80 U	0.79 U	0.87 U	0.88 U	0.88 U
4-Bromophenyl-phenylether	- -	- -	mg/kg	87 U	0.40 U	0.39 U	0.43 U	0.44 U	0.44 U
4-Chloro-3-methylphenol	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA
4-Chloroaniline	- -	- -	mg/kg	87 U	0.40 U	0.39 U	0.43 U	0.44 U	0.44 U
4-Chlorophenyl-phenylether	- -	- -	mg/kg	87 U	0.40 U	0.39 U	0.43 U	0.44 U	0.44 U
4-Methylphenol	0.33 b, f	500 b	mg/kg	NA	NA	NA	NA	NA	NA
4-Nitroaniline	- -	- -	mg/kg	170 U	0.80 U	0.79 U	0.87 U	0.88 U	0.88 U
4-Nitrophenol	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA
Acenaphthene	20	500 b	mg/kg	**26 J**	0.077 J	0.015 J	0.036 J	0.15 J	0.060 J
Acenaphthylene	100 a, f	500 b	mg/kg	**110**	0.15 J	0.030 J	0.026 J	0.58	0.17 J
Anthracene	100 a, f	500 b	mg/kg	**190**	0.27 J	0.053 J	0.075 J	0.86	0.38 J
Benzo(a)anthracene	1 c, f	5.6	mg/kg	**130**	0.76	0.21	0.32	**2.8**	**1.4**

See Notes on Page 13

Table 1-1

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Soil Data Summary

Sample ID: **Sample Depth (feet):** **Date Collected:**	**Unrestricted Use SCOs**	**Restricted Use SCOs Commercial**	**Units**	**SS-1** **0-0.2** **12/07/05**	**SS-2** **0-0.2** **12/07/05**	**SS-3** **0-0.2** **12/07/05**	**SS-4** **0-0.2** **12/07/05**	**SS-5** **0-0.2** **12/07/05**	**SS-6** **0-0.2** **12/07/05**
SVOCs (Cont'd.)									
Benzo(a)pyrene	1 c	1 f	mg/kg	**140**	0.84	0.34	0.50	**3.4**	**1.7**
Benzo(b)fluoranthene	1 c, f	5.6	mg/kg	**66**	0.64	0.31	0.38	**3.0**	**1.3**
Benzo(g,h,i)perylene	100 f	500 b	mg/kg	46 J	0.24 J	0.13 J	0.12 J	0.90	0.63
Benzo(k)fluoranthene	0.8 c, f	56	mg/kg	**98 J**	**0.86 J**	0.36 J	0.56 J	**3.4 J**	**1.8 J**
bis(2-Chloroethoxy)methane	- -	- -	mg/kg	87 U	0.40 U	0.39 U	0.43 U	0.44 U	0.44 U
bis(2-Chloroethyl)ether	- -	- -	mg/kg	8.7 U	0.040 U	0.039 U	0.043 U	0.044 U	0.044 U
bis(2-chloroisopropyl)ether	- -	- -	mg/kg	87 U	0.40 U	0.39 U	0.43 U	0.44 U	0.44 U
bis(2-Ethylhexyl)phthalate	- -	- -	mg/kg	87 U	0.091 J	0.091 J	0.089 J	0.51	0.44 U
Butylbenzylphthalate	- -	- -	mg/kg	87 U	0.40 U	0.39 U	0.43 U	0.44 U	0.44 U
Carbazole	- -	- -	mg/kg	87 U	0.094 J	0.041 J	0.044 J	0.32 J	0.11 J
Chrysene	1 c, f	56	mg/kg	**140**	0.82	0.29 J	0.35 J	**3.1**	**1.5**
Dibenz(a,h)anthracene	0.33 b, f	0.56	mg/kg	**1.8 J**	0.030 J	0.016 J	0.043 U	0.088	0.071
Dibenzofuran	7 f	350	mg/kg	**30 J**	0.049 J	0.013 J	0.020 J	0.15 J	0.070 J
Diethylphthalate	- -	- -	mg/kg	87 U	0.40 U	0.39 U	0.43 U	0.44 U	0.44 U
Dimethylphthalate	- -	- -	mg/kg	87 U	0.40 U	0.39 U	0.43 U	0.44 U	0.44 U
Di-n-butylphthalate	- -	- -	mg/kg	87 U	0.40 U	0.39 U	0.43 U	0.44 U	0.44 U
Di-n-octylphthalate	- -	- -	mg/kg	87 U	0.40 U	0.39 U	0.43 U	0.44 U	0.44 U
Fluoranthene	100 a, f	500 b	mg/kg	**360**	1.6	0.44	0.46	5.0	2.1
Fluorene	30	500 b	mg/kg	**120**	0.10 J	0.017 J	0.024 J	0.24 J	0.083 J
Hexachlorobenzene	0.33 b, f	6	mg/kg	8.7 U	0.040 U	0.039 U	0.043 U	0.044 U	0.044 U
Hexachlorobutadiene	- -	- -	mg/kg	17 U	0.080 U	0.079 U	0.087 U	0.088 U	0.088 U
Hexachlorocyclopentadiene	- -	- -	mg/kg	87 UJ	0.40 UJ	0.39 UJ	0.43 UJ	0.44 UJ	0.44 UJ
Hexachloroethane	- -	- -	mg/kg	8.7 U	0.040 U	0.039 U	0.043 U	0.044 U	0.044 U
Indeno(1,2,3-cd)pyrene	0.5 c, f	5.6	mg/kg	**37**	0.22	0.14	0.14	**1.0**	**0.66**
Isophorone	- -	- -	mg/kg	87 U	0.40 U	0.39 U	0.43 U	0.44 U	0.44 U
Naphthalene	12 f	500 b	mg/kg	6.6 J	0.16 J	0.033 J	0.032 J	0.34 J	0.26 J
Nitrobenzene	- -	- -	mg/kg	8.7 UJ	0.040 UJ	0.039 UJ	0.043 UJ	0.044 UJ	0.044 UJ
N-Nitroso-di-n-propylamine	- -	- -	mg/kg	8.7 U	0.040 U	0.039 U	0.043 U	0.044 U	0.044 U
N-Nitrosodiphenylamine	- -	- -	mg/kg	87 U	0.40 U	0.39 U	0.43 U	0.44 U	0.44 U
Pentachlorophenol	0.8 b	6.7	mg/kg	NA	NA	NA	NA	NA	NA
Phenanthrene	100 f	500 b	mg/kg	**720**	1.1	0.24 J	0.28 J	3.0	1.2
Phenol	0.33 b	500 b	mg/kg	NA	NA	NA	NA	NA	NA
Pyrene	100 f	500 b	mg/kg	**500**	1.5 J	0.41	0.42 J	5.2	1.8
Total PAHs	- -	- -	mg/kg	2,700 J	9.4 J	3.1 J	3.8 J	33 J	15 J
Total SVOCs	- -	- -	mg/kg	2,700 J	9.7 J	3.2 J	3.9 J	34 J	15 J
Inorganics									
Cyanide, Total	27 e, f	27 h	mg/kg	1.40	0.500 U	0.500 U	0.500 U	2.90	0.500 U

See Notes on Page 13

Table 1-1

NYSEG
Wasdworth Street Former MGP Site,
Geneva, New York
Feasibility Study Report

Soil Data Summary

Notes:
All concentrations reported in milligrams per Kilogram (mg/Kg); equivalent to parts per million (ppm).
[ ] Bracketed results represent the duplicate sample.
NA = Sample not analyzed for specified constituent/no criteria available.
Shaded values indicate the result exceeded the NYSDEC Part 375-6.5 Soil Cleanup Objectives (SCOs) for Protection of Public Health - Commercial Use, December 14, 2006.
Values in **bold** font indicate the result exceeded the NYSDEC SCO for Unrestricted Use.

Lab Qualifier Notes:

Qualifier Type	Lab Qualifiers	Definition
Inorganic	B =	Indicates an estimated value between the instrument detection limit and the Reporting Limit (RL).
Inorganic	J =	Indicates an estimated value.
Inorganic	U =	The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
Organic	D =	Compound quantitated using a secondary dilution.
Organic	J =	Indicates an estimated value.
Organic	ND =	None detected.
Organic	U =	The compound was analyzed for but not detected. The associated value is the compound quantitation limit.

Table 1-2

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Groundwater Data Summary

Sample ID:	NYSDEC TOGS	MW-1	MW-1	MW-2	MW-2	MW-3	MW-3	MW-4	MW-4	MW-5	MW-5	MW-6	MW-6	MW-7	MW-8	MW-9
Date Collected:		**12/20/05**	**10/05/06**	**12/20/05**	**10/05/06**	**12/20/05**	**10/05/06**	**12/20/05**	**10/04/06**	**12/20/05**	**10/05/06**	**12/20/05**	**10/04/06**	**10/04/06**	**10/05/06**	**10/04/06**
VOCs (ug/L)																
1,1,1-Trichloroethane	5	5.0 U	1.0 U	5.0 U	1.0 U	500 U [250 U]	1.0 U [1.0 U]	5.0 U	1.0 U	5.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,2,2-Tetrachloroethane	5	1.0 U	1.0 U	1.0 U	1.0 U	100 U [50 U]	1.0 U [1.0 U]	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1,2-Trichloroethane	1	3.0 U	1.0 U	3.0 U	1.0 U	300 U [150 U]	1.0 U [1.0 U]	3.0 U	1.0 U	3.0 U	1.0 U	3.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethane	5	5.0 U	1.0 U	5.0 U	1.0 U	500 U [250 U]	1.0 U [1.0 U]	5.0 U	1.0 U	5.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,1-Dichloroethene	5	2.0 U	1.0 U	2.0 U	1.0 U	200 U [100 U]	1.0 U [1.0 U]	2.0 U	1.0 U	2.0 U	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2,4-Trichlorobenzene	5	NA	1.0 U	NA	1.0 U	NA	1.0 U [1.0 U]	NA	1.0 U	NA	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dibromo-3-chloropropane	0.04	NA	1.0 UJ	NA	1.0 UJ	NA	1.0 UJ [1.0 UJ]	NA	1.0 UJ	NA	1.0 UJ	NA	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ
1,2-Dibromoethane	5	NA	1.0 U	NA	1.0 U	NA	1.0 U [1.0 U]	NA	1.0 U	NA	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dichlorobenzene	3	NA	1.0 U	NA	1.0 U	NA	1.0 U [1.0 U]	NA	1.0 U	NA	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dichloroethane	0.6	2.0 U	1.0 U	2.0 U	1.0 U	200 U [100 U]	1.0 U [1.0 U]	2.0 U	1.0 U	2.0 U	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,2-Dichloropropane	1	1.0 U	1.0 U	1.0 U	1.0 U	100 U [50 U]	1.0 U [1.0 U]	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1,3-Dichlorobenzene	3	NA	1.0 U	NA	1.0 U	NA	1.0 U [1.0 U]	NA	1.0 U	NA	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U
1,4-Dichlorobenzene	3	NA	1.0 U	NA	1.0 U	NA	1.0 U [1.0 U]	NA	1.0 U	NA	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U
2-Butanone	50	5.0 U	5.0 U	5.0 U	5.0 U	500 U [250 U]	2.7 J [3.1 J]	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	22
2-Hexanone	50	5.0 U	5.0 U	5.0 U	5.0 U	500 U [250 U]	5.0 U [5.0 U]	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Methyl-2-Pentanone	- -	5.0 U	5.0 U	5.0 U	5.0 U	500 U [250 U]	5.0 U [5.0 U]	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Acetone	50	5.0 UJ	5.0 U	5.0 UJ	5.0 U	500 UJ [250 UJ]	6.2 [7.5]	5.0 UJ	5.0 U	5.0 UJ	5.0 U	68 J	5.0 U	5.0 U	5.0 U	3.4 J
Benzene	1	1.0 U	1.0 U	1.0 U	1.0 U	7,100 [7,000]	1,600 D [1,900 D]	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Bromodichloromethane	50	1.0 U	1.0 U	1.0 U	1.0 U	100 U [50 U]	1.0 U [1.0 U]	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Bromoform	50	4.0 U	1.0 UJ	4.0 U	1.0 UJ	400 U [200 U]	1.0 UJ [1.0 UJ]	4.0 U	1.0 UJ	4.0 U	1.0 UJ	4.0 U	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ
Bromomethane	5	5.0 U	1.0 UJ	5.0 U	1.0 UJ	500 U [250 U]	1.0 UJ [1.0 UJ]	5.0 U	1.0 UJ	5.0 U	1.0 UJ	5.0 U	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ
Carbon Disulfide	60	5.0 U	1.0 U	5.0 U	1.0 U	500 U [250 U]	1.0 U [1.0 U]	5.0 U	1.0 U	5.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Carbon Tetrachloride	5	2.0 U	1.0 U	2.0 U	1.0 U	200 U [100 U]	1.0 U [1.0 U]	2.0 U	1.0 U	2.0 U	1.0 U	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chlorobenzene	5	5.0 U	1.0 U	5.0 U	1.0 U	500 U [250 U]	0.72 J [0.89 J]	5.0 U	1.0 U	5.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chloroethane	5	5.0 U	1.0 UJ	5.0 U	1.0 UJ	500 U [250 U]	1.0 UJ [1.0 UJ]	5.0 U	1.0 UJ	5.0 U	1.0 UJ	5.0 U	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ
Chloroform	7	5.0 U	1.0 U	5.0 U	1.0 U	500 U [250 U]	1.0 U [1.0 U]	5.0 U	1.0 U	5.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Chloromethane	5	5.0 U	1.0 U	5.0 U	1.0 U	500 U [250 U]	1.0 U [1.0 U]	5.0 U	1.0 U	5.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U
cis-1,2-Dichloroethene	5	5.0 U	1.0 U	5.0 U	1.0 U	500 U [250 U]	1.0 U [1.0 U]	5.0 U	1.0 U	5.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U
cis-1,3-Dichloropropene	0.4	5.0 U	1.0 U	5.0 U	1.0 U	500 U [250 U]	1.0 U [1.0 U]	5.0 U	1.0 U	5.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Cyclohexane	- -	NA	1.0 U	NA	1.0 U	NA	3.4 [4.0]	NA	1.0 U	NA	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U
Dibromochloromethane	50	5.0 U	1.0 UJ	5.0 U	1.0 UJ	500 U [250 U]	1.0 UJ [1.0 UJ]	5.0 U	1.0 UJ	5.0 U	1.0 UJ	5.0 U	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ
Dichlorodifluoromethane	- -	NA	1.0 U	NA	1.0 U	NA	1.0 U [1.0 U]	NA	1.0 U	NA	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U
Ethylbenzene	5	4.0 U	1.0 U	4.0 U	1.0 U	680 [730]	220 D [260 D]	4.0 U	1.0 U	4.0 U	1.0 U	4.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Isopropylbenzene	- -	NA	1.0 U	NA	1.0 U	NA	6.4 [7.2]	NA	1.0 U	NA	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U
Methyl acetate	- -	NA	1.0 UJ	NA	1.0 UJ	NA	1.0 UJ [1.0 UJ]	NA	1.0 UJ	NA	1.0 UJ	NA	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ
Methyl tert-butyl ether	10	5.0 U	1.0 U	5.0 U	1.0 U	500 U [250 U]	1.0 U [1.0 U]	5.0 U	1.0 U	5.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Methylcyclohexane	- -	NA	1.0 U	NA	1.0 U	NA	3.2 [3.8]	NA	1.0 U	NA	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U
Methylene Chloride	5	3.0 U	1.0 UJ	3.0 U	1.0 UJ	300 U [150 U]	1.0 UJ [1.0 UJ]	3.0 U	1.0 UJ	3.0 U	1.0 UJ	3.0 U	1.0 UJ	1.0 UJ	1.0 UJ	1.0 UJ
Styrene	5	5.0 U	1.0 U	5.0 U	1.0 U	320 J [360]	170 D [160 D]	5.0 U	1.0 U	5.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Tetrachloroethene	5	1.0 UJ	1.0 U	1.0 UJ	1.0 U	100 UJ [50 UJ]	1.0 U [1.0 U]	1.0 UJ	1.0 U	1.0 UJ	1.0 U	1.0 UJ	1.0 U	1.0 U	1.0 U	1.0 U

See Notes on Page 4

Table 1-2

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Groundwater Data Summary

Sample ID: Date Collected:	NYSDEC TOGS	MW-1 12/20/05	MW-1 10/05/06	MW-2 12/20/05	MW-2 10/05/06	MW-3 12/20/05	MW-3 10/05/06	MW-4 12/20/05	MW-4 10/04/06	MW-5 12/20/05	MW-5 10/05/06	MW-6 12/20/05	MW-6 10/04/06	MW-7 10/04/06	MW-8 10/05/06	MW-9 10/04/06
VOCs (ug/L) (Cont'd.)																
Toluene	5	5.0 U	1.0 U	5.0 U	1.0 U	4,300 [4,300]	1,400 D [1,400 D]	5.0 U	1.0 U	5.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Total BTEX	- -	ND	ND	ND	ND	20,000 [20,000]	5,400 [6,100]	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total VOCs	- -	ND	ND	ND	ND	20,000 J [21,000]	5,600 J [6,300 J]	ND	ND	ND	ND	68 J	ND	ND	ND	25 J
trans-1,2-Dichloroethene	5	5.0 U	1.0 U	5.0 U	1.0 U	500 U [250 U]	1.0 U [1.0 U]	5.0 U	1.0 U	5.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U
trans-1,3-Dichloropropene	0.4	5.0 U	1.0 U	5.0 U	1.0 U	500 U [250 U]	1.0 U [1.0 U]	5.0 U	1.0 U	5.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Trichloroethene	5	1.0 U	1.0 U	1.0 U	1.0 U	100 U [50 U]	1.0 U [1.0 U]	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Trichlorofluoromethane	- -	NA	1.0 U	NA	1.0 U	NA	1.0 U [1.0 U]	NA	1.0 U	NA	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U
Vinyl Chloride	2	5.0 U	1.0 U	5.0 U	1.0 U	500 U [250 U]	1.0 U [1.0 U]	5.0 U	1.0 U	5.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U	1.0 U
Xylene (Total)	5	5.0 U	3.0 U	5.0 U	3.0 U	7,900 [8,100]	2,200 D [2,500 D]	5.0 U	3.0 U	5.0 U	3.0 U	5.0 U	3.0 U	3.0 U	3.0 U	3.0 U
SVOCs (ug/L)																
1,2,4-Trichlorobenzene	5	1.0 U	10 U	1.0 U	10 U	21 U [21 U]	10 U [98 U]	1.0 U	10 U	1.0 U	10 U	1.0 U	10 U	10 U	10 U	10 U
1,2-Dichlorobenzene	3	10 U	10 U	10 U	10 U	210 U [210 U]	10 U [98 U]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,3-Dichlorobenzene	3	10 U	10 U	10 U	10 U	210 U [210 U]	10 U [98 U]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,4-Dichlorobenzene	3	10 U	10 U	10 U	10 U	210 U [210 U]	10 U [98 U]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2,4,5-Trichlorophenol	1	NA	10 U	NA	10 U	NA	10 U [98 U]	NA	10 U	NA	10 U	NA	10 U	10 U	10 U	10 U
2,4,6-Trichlorophenol	1	NA	10 U	NA	10 U	NA	10 U [98 U]	NA	10 U	NA	10 U	NA	10 U	10 U	10 U	10 U
2,4-Dichlorophenol	1	NA	10 U	NA	10 U	NA	10 U [98 U]	NA	10 U	NA	10 U	NA	10 U	10 U	10 U	10 U
2,4-Dimethylphenol	1	NA	10 U	NA	10 U	NA	130 [190]	NA	10 U	NA	10 U	NA	10 U	10 U	10 U	10 U
2,4-Dinitrophenol	1	NA	48 U	NA	49 U	NA	48 U [490 U]	NA	49 U	NA	48 U	NA	49 U	50 U	49 U	51 U
2,4-Dinitrotoluene	5	2.1 U	10 U	2.1 U	10 U	42 U [41 U]	10 U [98 U]	2.1 U	10 U	2.1 U	10 U	2.0 U	10 U	10 U	10 U	10 U
2,6-Dinitrotoluene	5	2.1 U	10 U	2.1 U	10 U	42 U [41 U]	10 U [98 U]	2.1 U	10 U	2.1 U	10 U	2.0 U	10 U	10 U	10 U	10 U
2-Chloronaphthalene	10	10 U	10 U	10 U	10 U	210 U [210 U]	10 U [98 U]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Chlorophenol	1	NA	10 U	NA	10 U	NA	10 U [98 U]	NA	10 U	NA	10 U	NA	10 U	10 U	10 U	10 U
2-Methylnaphthalene	- -	10 U	10 U	10 U	10 U	290 [320]	130 [110]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Methylphenol	1	NA	10 U	NA	10 U	NA	110 [150]	NA	10 U	NA	10 U	NA	10 U	10 U	10 U	10 U
2-Nitroaniline	5	21 U	48 U	21 U	49 U	420 U [410 U]	48 U [490 U]	21 U	49 U	21 U	48 U	20 U	49 U	50 U	49 U	51 U
2-Nitrophenol	1	NA	10 U	NA	10 U	NA	10 U [98 U]	NA	10 U	NA	10 U	NA	10 U	10 U	10 U	10 U
3,3'-Dichlorobenzidine	5	21 U	19 U	21 U	20 U	420 U [410 U]	19 U [200 U]	21 U	20 U	21 U	19 U	20 U	20 U	20 U	20 U	20 U
3-Nitroaniline	5	21 U	48 U	21 U	49 U	420 U [410 U]	48 U [490 U]	21 U	49 U	21 U	48 U	20 U	49 U	50 U	49 U	51 U
4-Bromophenyl-phenylether	- -	10 U	10 U	10 U	10 U	210 U [210 U]	10 U [98 U]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chloro-3-methylphenol	1	NA	10 U	NA	10 U	NA	10 U [98 U]	NA	10 U	NA	10 U	NA	10 U	10 U	10 U	10 U
4-Chloroaniline	5	10 U	10 U	10 U	10 U	210 U [210 U]	10 U [98 U]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Chlorophenyl-phenylether	- -	10 U	10 U	10 U	10 U	210 U [210 U]	10 U [98 U]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
4-Methylphenol	1	NA	10 U	NA	10 U	NA	130 [160]	NA	10 U	NA	10 U	NA	10 U	10 U	10 U	10 U
4-Nitroaniline	5	21 U	48 U	21 U	49 U	420 U [410 U]	48 U [490 U]	21 U	49 U	21 U	48 U	20 U	49 U	50 U	49 U	51 U
4-Nitrophenol	1	NA	48 U	NA	49 U	NA	48 U [490 U]	NA	49 U	NA	48 U	NA	49 U	50 U	49 U	51 U
Acenaphthene	20	10 U	10 U	10 U	10 U	16 J [19 J]	6.0 J [6.0 J]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Acenaphthylene	- -	10 U	10 U	10 U	10 U	54 J [66 J]	50 [34 J]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Anthracene	50	10 U	10 U	10 U	10 U	210 U [11 J]	3.0 J [98 U]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U

See Notes on Page 4

Table 1-2

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Groundwater Data Summary

Sample ID: Date Collected:	NYSDEC TOGS	MW-1 12/20/05	MW-1 10/05/06	MW-2 12/20/05	MW-2 10/05/06	MW-3 12/20/05	MW-3 10/05/06	MW-4 12/20/05	MW-4 10/04/06	MW-5 12/20/05	MW-5 10/05/06	MW-6 12/20/05	MW-6 10/04/06	MW-7 10/04/06	MW-8 10/05/06	MW-9 10/04/06
SVOCs (ug/L) (Cont'd.)																
Benzo(a)anthracene	0.002	1.0 U	10 U	1.0 U	10 U	21 U [21 U]	10 U [98 U]	1.0 U	10 U	1.0 U	10 U	1.0 U	10 U	10 U	10 U	10 U
Benzo(a)pyrene	ND	1.0 U	10 U	1.0 U	10 U	21 U [21 U]	10 U [98 U]	1.0 U	10 U	1.0 U	10 U	1.0 U	10 U	10 U	10 U	10 U
Benzo(b)fluoranthene	0.002	1.0 UJ	10 U	1.0 UJ	10 U	21 UJ [21 UJ]	10 U [98 U]	1.0 UJ	10 U	1.0 UJ	10 U	1.0 UJ	10 U	10 U	10 U	10 U
Benzo(g,h,i)perylene	- -	10 U	10 U	10 U	10 U	210 U [210 U]	10 U [98 U]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Benzo(k)fluoranthene	0.002	1.0 UJ	10 U	1.0 UJ	10 U	21 UJ [21 UJ]	10 U [98 U]	1.0 UJ	10 U	1.0 UJ	10 U	1.0 UJ	10 U	10 U	10 U	10 U
bis(2-Chloroethoxy)methane	5	10 U	10 U	10 U	10 U	210 U [210 U]	10 U [98 U]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
bis(2-Chloroethyl)ether	1	1.0 UJ	10 U	1.0 UJ	10 U	21 UJ [21 UJ]	10 U [98 U]	1.0 UJ	10 U	1.0 UJ	10 U	1.0 UJ	10 U	10 U	10 U	10 U
bis(2-chloroisopropyl)ether	5	10 U	10 U	10 U	10 U	210 U [210 U]	10 U [98 U]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
bis(2-Ethylhexyl)phthalate	5	2.8 J	10 U	10 U	10 U	210 U [210 U]	10 U [98 U]	3.3 J	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Butylbenzylphthalate	50	10 U	10 U	10 U	10 U	210 U [210 U]	10 U [98 U]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbazole	- -	10 U	10 U	10 U	10 U	88 J [100 J]	20 [7.0 J]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chrysene	0.002	10 U	10 U	10 U	10 U	210 U [210 U]	10 U [98 U]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dibenz(a,h)anthracene	- -	1.0 U	10 U	1.0 U	10 U	21 U [21 U]	10 U [98 U]	1.0 U	10 U	1.0 U	10 U	1.0 U	10 U	10 U	10 U	10 U
Dibenzofuran	- -	10 U	10 U	10 U	10 U	50 J [55 J]	14 [15 J]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Diethylphthalate	50	10 U	10 U	10 U	10 U	210 U [210 U]	10 U [98 U]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Dimethylphthalate	50	10 U	10 U	10 U	10 U	210 U [210 U]	10 U [98 U]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Di-n-butylphthalate	50	10 U	10 U	10 U	10 U	210 U [210 U]	10 U [98 U]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	2.0 J
Di-n-octylphthalate	50	10 U	10 U	10 U	10 U	210 U [210 U]	10 U [98 U]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Fluoranthene	50	10 U	10 U	10 U	10 U	210 U [210 U]	1.0 J [98 U]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Fluorene	50	10 U	10 U	10 U	10 U	48 J [55 J]	15 [15 J]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorobenzene	0.04	1.0 U	10 U	1.0 U	10 U	21 U [21 U]	10 U [98 U]	1.0 U	10 U	1.0 U	10 U	1.0 U	10 U	10 U	10 U	10 U
Hexachlorobutadiene	0.5	2.1 U	10 U	2.1 U	10 U	42 U [41 U]	10 U [98 U]	2.1 U	10 U	2.1 U	10 U	2.0 U	10 U	10 U	10 U	10 U
Hexachlorocyclopentadiene	5	10 UJ	43 U	10 UJ	44 U	210 UJ [210 UJ]	43 U [440 U]	10 UJ	44 U	10 UJ	43 U	10 UJ	44 U	44 U	44 U	46 U
Hexachloroethane	5	1.0 U	10 U	1.0 U	10 U	21 U [21 U]	10 U [98 U]	1.0 U	10 U	1.0 U	10 U	1.0 U	10 U	10 U	10 U	10 U
Indeno(1,2,3-cd)pyrene	0.002	1.0 U	10 U	1.0 U	10 U	21 U [21 U]	10 U [98 U]	1.0 U	10 U	1.0 U	10 U	1.0 U	10 U	10 U	10 U	10 U
Isophorone	50	10 U	10 U	10 U	10 U	210 U [210 U]	10 U [98 U]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Naphthalene	10	10 U	10 U	10 U	10 U	3,600 [4,000]	1,200 DJ [580 J]	10 U	10 U	10 U	10 U	1.3 J	10 U	10 U	10 U	10 U
Nitrobenzene	0.4	1.0 U	10 U	1.0 U	10 U	21 U [21 U]	10 U [98 U]	1.0 U	10 U	1.0 U	10 U	1.0 U	10 U	10 U	10 U	10 U
N-Nitroso-di-n-propylamine	- -	1.0 U	10 U	1.0 U	10 U	21 U [21 U]	10 U [98 U]	1.0 U	10 U	1.0 U	10 U	1.0 U	10 U	10 U	10 U	10 U
N-Nitrosodiphenylamine	50	10 U	10 U	10 U	10 U	210 U [210 U]	10 U [98 U]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Pentachlorophenol	1	NA	48 U	NA	49 U	NA	48 U [490 U]	NA	49 U	NA	48 U	NA	49 U	50 U	49 U	51 U
Phenanthrene	50	10 U	10 U	10 U	10 U	28 J [30 J]	9.0 J [8.0 J]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Phenol	1	NA	10 U	NA	10 U	NA	38 [59 J]	NA	10 U	NA	10 U	NA	10 U	10 U	10 U	10 U
Pyrene	50	10 U	10 U	10 U	10 U	210 U [210 U]	1.0 J [98 U]	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Total PAHs	- -	ND	ND	ND	ND	4,000 J [4,500 J]	1,400 J [750 J]	ND	ND	ND	ND	1.3 J	ND	ND	ND	ND
Total SVOCs	- -	2.8 J	ND	ND	ND	4,200 J [4,700 J]	1,500 J [780 J]	3.3 J	ND	ND	ND	1.3 J	ND	ND	ND	2.0 J
Inorganics (ug/L)																
Cyanide, Total	200	140	112 J	340	197 J	600 [580]	259 J [210 J]	10.0 U	48.6 J	10.0 U	10.0 UJ	10.0 U	10.0 UJ	114 J	46.4 J	10.0 UJ

See Notes on Page 4

Table 1-2

NYSEG
Wadsworth Street Former MGP Site
Geneva New York
Feasibility Study Report

Groundwater Data Summary

Notes:

1. All concentrations reported in micrograms per liter (ug/L).
2. Samples were analyzed by Severn Trent Laboratories, Inc. (STL).
3. NYSDEC TOGS = New York State Department of Environmental Conservation Division of Water Technical and Operations Guidance Series (TOGS) No. 1.1.1. Revised March 12, 1998. Modified April 2000.
4. - - = No NYSDEC TOGS 1.1.1 Water Quality Standard or Guidance Value listed.
5. Shaded values indicate the result exceeds NYSDEC TOGS 1.1.1 Water Quality Standard or Guidance Value.
6. Field duplicate sample results are presented in brackets.
7. Results have been validated in accordance with USEPA National Functional Guidelines of October 1999.

Data Qualifiers:

D = Compound quantitated using a secondary dilution.
J = The concentration given is an approximate value.
NA = Not Analyzed.
ND = Not Detected.
U = Not detected at or above the associated reporting limit.

Table 2-1

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Potential Chemical-Specific SCGs

Regulation	Citation	Potential Standard (S) or Guidance (G)	Summary of Requirements	Applicability to the Remedial Design/Remedial Action
Federal				
Clean Water Act (CWA) - Ambient Water Quality Criteria	40 CFR Part 131; EPA 440/5-86/001 "Quality Criteria for Water - 1986", superceded by EPA-822-R-02-047 "National Recommended Water Quality Criteria: 2002"	S	Criteria for protection of aquatic life and/or human health depending on designated water use.	Applicable to the evaluation of potential impacts to groundwater from MGP-related constituents.
CWA Section 136	40 CFR 136	G	Identifies guidelines for test procedures for the analysis of pollutants.	Applicable to water monitoring associated with National Pollutant Discharge Elimination System (NPDES) permitted discharges.
CWA Section 404	33 USC 1344	S	Regulates discharges to surface water or ocean, indirect discharges to POTWs, and discharge of dredged or fill material into waters of the U.S. (including wetlands).	Potentially applicable for remedial activities involving indirect discharge to a POTW.
RCRA-Regulated Levels for Toxic Characteristics Leaching Procedure (TCLP) Constituents	40 CFR Part 261	S	These regulations specify the TCLP constituent levels for identification of hazardous wastes that exhibit the characteristic of toxicity.	Excavated material may be sampled and analyzed for TCLP constituents prior to disposal to determine if the materials are hazardous based on the characteristic of toxicity.
Universal Treatment Standards/Land Disposal Restrictions (UTS/LDRs)	40 CFR Part 268	S	Identifies hazardous wastes for which land disposal is restricted and provides a set of numerical constituent concentration criteria at which hazardous waste is restricted from land disposal (without treatment).	Applicable if waste is determined to be hazardous and for remedial alternatives involving offsite land disposal.

Table 2-1

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Potential Chemical-Specific SCGs

Regulation	Citation	Potential Standard (S) or Guidance (G)	Summary of Requirements	Applicability to the Remedial Design/Remedial Action
National Primary Drinking Water Standards	40 CFR Part 141	S	Establishes maximum contaminant levels (MCLs) which are health-based standards for public water supply systems.	These standards are potentially applicable if an action involves future use of ground water as a public supply source.
New York State				
Environmental Remediation Programs	6 NYCRR Part 375	S	Provides an outline for the development and execution of the soil remedial programs. Includes cleanup objective tables.	Applicable for site remediation.
NYSDEC Guidance on the Management of Coal Tar Waste and Coal Tar Contaminated Soils and Sediment from Former Manufactured Gas Plants ("MGPs")	TAGM 4061(2002)	G	Outlines the criteria for conditionally excluding coal tar waste and impacted soil from former MGPs which exhibit the hazardous characteristic of toxicity for benzene (D018) from the hazardous waste requirements of 6 NYCRR Parts 370 - 374 and 376 when destined for thermal treatment.	This guidance will be used as appropriate in the management of MGP-impacted soil and coal tar waste for remedial actions that include MGP-impacted soil generated during the remedial activities.
NYSDEC Ambient Water Quality Standards and Guidance Values	Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1 (6/98)	G	Provides a compilation of ambient water quality standards and guidance values for toxic and non-conventional pollutants for use in the NYSDEC programs.	These standards and guidance values are to be considered in evaluating groundwater and surface water quality.
Identification and Listing of Hazardous Wastes	6 NYCRR Part 371	S	Outlines criteria for determining if a solid waste is a hazardous waste and is subject to regulation under 6 NYCRR Parts 371-376.	Applicable for determining if soil generated during implementation of remedial activities are hazardous wastes. These regulations do not set cleanup standards, but are considered when developing remedial alternatives.

Table 2-1

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Potential Chemical-Specific SCGs

Regulation	Citation	Potential Standard (S) or Guidance (G)	Summary of Requirements	Applicability to the Remedial Design/Remedial Action
New York State Surface Water and Groundwater Quality Standards	6 NYCRR Part 703	S	Establishes quality standards for surface water and groundwater.	Applicable for assessing water quality at the site during remedial activities.

Table 2-2

NYSEG
Feasibility Study Report
Wadsworth Street Former MGP Site
Geneva, New York

Potential Action-Specific SCGs

Regulation	Citation	Potential Standard (S) or Guidance (G)	Summary of Requirements	Applicability to the Remedial Design/ Remedial Action
Federal				
Occupational Safety and Health Act (OSHA) - General Industry Standards	29 CFR Part 1910	S	These regulations specify the 8-hour time-weighted average concentration for worker exposure to various compounds. Training requirements for workers at hazardous waste operations are specified in 29 CFR 1910.120.	Proper respiratory equipment will be worn if it is not possible to maintain airborne concentrations of COC's in the breathing zone below required concentrations. Appropriate training requirements will be met for remedial workers.
OSHA - Safety and Health Standards	29 CFR Part 1926	S	These regulations specify the type of safety equipment and procedures to be followed during site remediation.	Appropriate safety equipment will be utilized on-site and appropriate procedures will be followed during remedial activities.
OSHA - Record-keeping, Reporting and Related Regulations	29 CFR Part 1904	S	These regulations outline record-keeping and reporting requirements for an employer under OSHA.	These regulations apply to the company(s) contracted to install, operate, and maintain remedial actions at hazardous waste sites.
RCRA - Preparedness and Prevention	40 CFR Part 264.30 - 264.31	S	These regulations outline requirements for safety equipment and spill control when treating, handling and/or storing hazardous wastes.	Safety and communication equipment will be utilized at the site as necessary. Local authorities will be familiarized with the site.
RCRA - Contingency Plan and Emergency Procedures	40 CFR Part 264.50 - 264.56	S	Provides requirements for outlining emergency procedures to be used following explosions, fires, etc. when storing hazardous wastes.	Emergency and contingency plans will be developed and implemented during remedial design. Copies of the plan will be kept on-site.
CWA - Discharge to Waters of the U.S., and Section 404	40 CFR Parts 403, and 230 Section 404 (b) (1); 33 USC 1344	S	Establishes site-specific pollutant limitations and performance standards which are designed to protect surface water quality. Types of discharges regulated under CWA include: indirect discharge to a POTW and discharge of dredged or fill material into U.S. waters.	Potentially applicable to remedial activities involving indirect discharge to a POTW

Table 2-2

NYSEG
Feasibility Study Report
Wadsworth Street Former MGP Site
Geneva, New York

Potential Action-Specific SCGs

Regulation	Citation	Potential Standard (S) or Guidance (G)	Summary of Requirements	Applicability to the Remedial Design/ Remedial Action
90 Day Accumulation Rule for Hazardous Waste	40 CFR Part 262.34	S	Allows generators of hazardous waste to store and treat hazardous waste at the generation site for up to 90 days in tanks, containers and containment buildings without having to obtain a RCRA hazardous waste permit.	Potentially applicable to remedial alternatives that involve the storing or treating of hazardous materials on-site.
Land Disposal Facility Notice in Deed	40 CFR Parts 264 and 265 Sections 116-119(b)(1)	S	Establishes provisions for a deed notation for closed hazardous waste disposal units, to prevent land disturbance by future owners.	The regulations are potentially applicable because closed areas may be similar to closed RCRA units.
RCRA - General Standards	40 CFR Part 264.111	S	General performance standards requiring minimization of need for further maintenance and control; minimization or elimination of post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products. Also requires decontamination or disposal of contaminated equipment, structures and soils.	Decontamination actions and facilities will be constructed for remedial activities and disassembled after completion.
Standards Applicable to Transporters of Applicable Hazardous Waste - RCRA Section 3003	40 CFR Parts 170-179, 262, and 263	S	Establishes the responsibility of offsite transporters of hazardous waste in the handling, transportation and management of the waste. Requires manifesting, recordkeeping and immediate action in the event of a discharge.	These requirements will be applicable to any company(s) contracted to transport hazardous material from the site.
United States Department of Transportation (USDOT) Rules for Transportation of Hazardous Materials	49 CFR Parts 107 and 171.1 - 172.558	S	Outlines procedures for the packaging, labeling, manifesting and transporting of hazardous materials.	These requirements will be applicable to any company(s) contracted to transport hazardous material from the site.

Table 2-2

NYSEG
Feasibility Study Report
Wadsworth Street Former MGP Site
Geneva, New York

Potential Action-Specific SCGs

Regulation	Citation	Potential Standard (S) or Guidance (G)	Summary of Requirements	Applicability to the Remedial Design/ Remedial Action
Clean Air Act-National Ambient Air Quality Standards	40 CFR Part 50	S	Establishes ambient air quality standards for protection of public health.	Remedial operations will be performed in a manner that minimizes the production of benzene and particulate matter.
USEPA-Administered Permit Program: The Hazardous Waste Permit Program	RCRA Section 3005; 40 CFR Part 270.124	S	Covers the basic permitting, application, monitoring and reporting requirements for offsite hazardous waste management facilities.	Any offsite facility accepting hazardous waste from the site must be properly permitted. Implementation of the site remedy will include consideration of these requirements.
Land Disposal Restrictions	40 CFR Part 368	S	Restricts land disposal of hazardous wastes that exceed specific criteria. Establishes Universal Treatment Standards (UTSs) to which hazardous waste must be treated prior to land disposal.	Applicable for remedial actions that generate soils that display the characteristic of hazardous waste or that are decharacterized after generation must be treated to 90% constituent concentration reduction capped at 10 times the UTS.
RCRA Subtitle C	40 U.S.C. Section 6901 et seq.; 40 CFR Part 268	S	Restricts land disposal of hazardous wastes that exceed specific criteria. Establishes UTSs to which hazardous wastes must be treated prior to land disposal.	Potentially applicable to remedial activities that include disposal of generated waste material from the site.

Table 2-2

NYSEG
Feasibility Study Report
Wadsworth Street Former MGP Site
Geneva, New York

Potential Action-Specific SCGs

Regulation	Citation	Potential Standard (S) or Guidance (G)	Summary of Requirements	Applicability to the Remedial Design/ Remedial Action
New York State				
Discharges to Public Waters	New York State Environmental Conservation Law, Section 71-3503	S	Provides that a person who deposits gas tar, or the refuse of a gas house or gas factory, or offal, refuse, or any other noxious, offensive, or poisonous substances into any public waters, or into any sewer or stream running or entering into such public waters, is guilty of a misdemeanor.	During the remedial activities, MGP-impacted materials will not be deposited into public waters or sewers.
NYSDEC's Monitoring Well Decommissioning Guidelines	NPL Site Monitoring Well Decommissioning dated May 1995	G	This guidance presents procedure for abandonment of monitoring wells at remediation sites.	This guidance is applicable for soil or groundwater alternatives that require the decommissioning of monitoring wells onsite.
Guidelines for the Control of Toxic Ambient Air Contaminants	DAR-1 (Air Guide 1)	G	Provides guidance for the control of toxic ambient air contaminants in New York State and outlines the procedures for evaluating sources of air pollution	This guidance may be applicable for soil or groundwater alternatives that result in certain air emissions.
New York Hazardous Waste Management System - General	6 NYCRR Part 370	S	Provides definitions of terms and general instructions for the Part 370 series of hazardous waste management.	Hazardous waste (besides those conditionally exempt per TAGM 4046) is to be managed according to this regulation.
Identification and Listing of Hazardous Wastes	6 NYCRR Part 371	S	Outlines criteria for determining if a solid waste is a hazardous waste and is subject to regulation under 6 NYCRR Parts 371-376.	Applicable for determining if solid waste generated during implementation of remedial activities are hazardous wastes. These regulations do not set cleanup standards, but are considered when developing remedial alternatives.
Hazardous Waste Manifest System and Related Standards for Generators, Transporters, and Facilities	6 NYCRR Part 372	S	Provides guidelines relating to the use of the manifest system and its recordkeeping requirements. It applies to generators, transporters and facilities in New York State.	This regulation will be applicable to any company(s) contracted to do treatment work at the site or to transport or manage hazardous material generated at the site.

Table 2-2

NYSEG
Feasibility Study Report
Wadsworth Street Former MGP Site
Geneva, New York

Potential Action-Specific SCGs

Regulation	Citation	Potential Standard (S) or Guidance (G)	Summary of Requirements	Applicability to the Remedial Design/ Remedial Action
New York Regulations for Transportation of Hazardous Waste	6 NYCRR Part 372.3 a-d	S	Outlines procedures for the packaging, labeling, manifesting and transporting of hazardous waste.	These requirements will be applicable to any company(s) contracted to transport hazardous material from the site.
Waste Transporter Permits	6 NYCRR Part 364	S	Governs the collection, transport and delivery of regulated waste within New York State.	Properly permitted haulers will be used if any waste materials are transported off site.
NYSDEC Technical and Administrative Guidance Memorandums (TAGMs)	NYSDEC TAGMs	G	TAGMs are NYSDEC guidance that are to be considered during the remedial process.	Appropriate TAGMs will be considered during the remedial process.
New York Regulations for Hazardous Waste Management Facilities	6 NYCRR Part 373.1.1 - 373.1.8	S	Provides requirements and procedures for obtaining a permit to operate a hazardous waste treatment, storage and disposal facility. Also lists contents and conditions of permits.	Any offsite facility accepting waste from the site must be properly permitted.
Land Disposal of a Hazardous Waste	6 NYCRR Part 376	S	Restricts land disposal of hazardous wastes that exceed specific criteria.	New York defers to USEPA for UTS/LDR regulations.
NYSDEC Guidance on the Management of Coal Tar Waste and Coal Tar Contaminated Soils and Sediment from Former Manufactured Gas Plants	TAGM 4061(2002)	G	Outlines the criteria for conditionally excluding coal tar waste and impacted soils from former MGPs which exhibit the hazardous characteristic of toxicity for benzene (D018) from the hazardous waste requirements of 6 NYCRR Parts 370 - 374 and 376 when destined for thermal treatment.	This guidance will be used as appropriate for remedial activities that require the management of MGP-impacted soil and coal tar waste generated during the implementation of remedial activities.

Table 2-2

NYSEG
Feasibility Study Report
Wadsworth Street Former MGP Site
Geneva, New York

Potential Action-Specific SCGs

Regulation	Citation	Potential Standard (S) or Guidance (G)	Summary of Requirements	Applicability to the Remedial Design/ Remedial Action
National Pollutant Discharge Elimination System (NPDES) Program Requirements, Administered Under New York State Pollution Discharge Elimination System (SPDES)	40 CFR Parts 122 Subpart B, 125, 301, 303, and 307 (Administered under 6 NYCRR 750-758)	S	Establishes permitting requirements for point source discharges; regulates discharge of water into navigable waters including the quantity and quality of discharge.	Remedial activities may involve treatment/disposal of water. If so, water generated at the site will be managed in accordance with the disposition facilities NYSDEC SPDES permit requirements.

Table 2-3

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Potential Location-Specific SCGs

Regulation	Citation	Potential Standard (S) or Guidance (G)	Summary of Requirements	Applicability to the Remedial Design/ Remedial Action
Federal				
National Environmental Policy Act Executive Orders 11988 and 11990	40 CFR 6.302; 40 CFR Part 6, Appendix A	S	Requires federal agencies, where possible, to avoid or minimize adverse impact of federal actions upon wetlands/floodplains and enhance natural values of such. Establishes the "no-net-loss" of waters/wetland area and/or function policy.	To be considered if remedial activities are conducted within a floodplain or wetlands.
Historical and Archaeological Data Preservation Act	16 USC 469a-1	S	Provides for the preservation of historical and archaeological data that might otherwise be lost as the result of alteration of the terrain.	Not applicable. The National Register of Historic Places website indicated no records present for historical sites at or adjacent to the site.
National Historic and Historical Preservation Act	16 USC 470; 36 CFR Part 65; 36 CFR Part 800	S	Requirements for the preservation of historic properties.	Not applicable. The National Register of Historic Places website indicated no records present for historical sites at or adjacent to the site.
Endangered Species Act	16 USC 1531 et seq.; 50 CFR Part 200; 50 CFR Part 402	S	Requires federal agencies to confirm that the continued existence of any endangered or threatened species and their habitat will not be jeopardized by a site action.	Not applicable as no endangered species were identified during the Fish and Wildlife Resource Impact Analysis.
Floodplains Management and Wetlands Protection	40 CFR 6 Appendix A	S	Activities taking place within floodplains and/or wetlands must be conducted to avoid adverse impacts and preserve beneficial value. Procedures for floodplain management and wetlands protection provided.	Portions of the area to be remediated are located adjacent to the floodplain. Activities located in these areas will be performed in accordance with this regulation, as applicable.
New York State				
New York State Floodplain Management Development Permits	6 NYCRR Part 500	S	Provides conditions necessitating NYSDEC permits and provides definitions and procedures for activities conducted within floodplains.	Potentially applicable to remedial activities at the site.

Table 2-3

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Potential Location-Specific SCGs

Regulation	Citation	Potential Standard (S) or Guidance (G)	Summary of Requirements	Applicability to the Remedial Design/ Remedial Action
New York State Freshwater Wetlands Act	ECL Article 24 and 71; 6 NYCRR Parts 662-665	S	Activities in wetlands areas must be conducted to preserve and protect wetlands.	Not applicable. The closest wetlands are 0.8 and 1.2 miles from the site and do not appear to be hydraulically connected.
New York State Parks, Recreation, and Historic Preservation Law	New York Executive Law Article 14;	S	Requirements for the preservation of historic properties.	Not applicable. The National Register of Historic Places website indicated no records present for historical sites in the immediate vicinity of the site.
Endangered & Threatened Species of Fish and Wildlife	6 NYCRR Part 182	S	Identifies endangered and threatened species of fish and wildlife in New York.	Not applicable as no threatened or endangered species were identified during the Fish and Wildlife Resource Impact Analysis.
Floodplain Management Criteria for State Projects	6 NYCRR Part 502	S	Establishes floodplain management practices for projects involving state-owned and state-financed facilities.	Portions of the area to be remediated are located adjacent to the floodplain. Activities located in these areas will be performed in accordance with this regulation, as applicable.
Local				
Local Building Permits	N/A	S	Local authorities may require a building permit for any permanent or semi-permanent structure, such as an on-site water treatment system building or a retaining wall.	Substantive provisions are potentially applicable to remedial activities that require construction of permanent or semi-permanent structures.

Table 4-1

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Technology Screening Evaluation for Impacted Surface Soil

General Response Action	Technology Type	Technology Process Option	Description of Option/Comments	Effectiveness	Implementability	Relative Cost	Retained for Further Analysis?
No Action	No Action	No Action	Alternative would not include any active remedial action. A No Action alternative serves as a baseline for comparison of the overall effectiveness of other remedial alternatives. Consideration of a No Action alternative is required by the NCP and USEPA.	May not achieve RAO for exposure to surface soil containing COCs.	Implementable	Low	Yes
Institutional Controls	Institutional Controls	Governmental Controls, Proprietary Controls, Enforcement and Permit Controls, Informational Devices	Institutional controls would include legal and/or administrative controls that mitigate the potential for exposure to impacted soils and/or jeopardize the integrity of a remedy. Examples of potential institutional controls include establishing land use restrictions, health and safety requirements for ground intrusive activities, and restrictions on groundwater use and/or extraction.	This option could reduce potential exposures, and may be effective when combined with other process options.	Implementable	Low	Yes
Surface Controls	Surface Controls	Maintain Existing Surface Materials	Existing surface cover consists of asphalt pavement, the City of Geneva PSB, concrete sidewalks, and vegetative cover (grass area adjacent to Wadsworth Street).	Would be effective for areas with asphalt pavement, building and concrete; would not be effective for vegetated areas.	Implementable. Resources to maintain the existing cover are readily available.	Moderate O&M Cost	Yes
In-Situ Containment/ Controls	Capping/Surface Cover	Clay/Soil Surface Cover	Placing and compacting clay material or soil material over impacted soil.	Would be effective in achieving RAO for surface soil. Removal of vegetation/topsoil to facilitate cap placement would reduce toxicity or volume of impacts. Clay/soil cap may be consistent with current and future site uses. Long-term effectiveness may require ongoing maintenance.	Implementable. Equipment and materials necessary to construct the cap are readily available.	Moderate capital and O&M costs.	Yes
		Asphalt/Concrete Surface Cover	Application of a layer of asphalt or concrete over impacted soils. Grass is the cover type that exists in the area where MGP-related COCs were observed in the surface soil. Asphalt/concrete cap may not be consistant with the future site use.	Would be effective in achieving RAO for surface soil and may reduce the mobility of chemical constituents by reducing infiltration; Removal of surface soil to facilitate cap placement would reduce toxicity or volume of impacts. Asphalt concrete cap is consistent with current and future site uses. Long-term effectiveness may require ongoing maintenance.	Implementable. Equipment and materials necessary to construct the cap are readily available.	Moderate capital and O&M costs.	Yes
		Multi-Media Surface Cover	Application of a combination of clay/soils and synthetic membrane(s) over impacted soil.	Effectiveness is diminished based on current and potential future use of the site due to maintenance concerns.	Implementable. Equipment and materials necessary to construct the cap are readily available.	High capital and O&M costs.	No

Table 4-1

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Technology Screening Evaluation for Impacted Surface Soil

General Response Action	Technology Type	Technology Process Option	Description of Option/Comments	Effectiveness	Implementability	Relative Cost	Retained for Further Analysis?
Removal	Excavation	Excavation	Physical removal of impacted soil. Typical excavation equipment would include backhoes, loaders, and/or dozers.	Proven process for effectively removing impacted soil.	Implementable. Equipment capable of excavating the soil is readily available.	High capital cost and low O&M costs.	Yes
Ex-Situ On-Site Treatment	Immobilization	Solidification/ Stabilization	Addition of material to the removed soil that limits the solubility or mobility of the constituents present. Involves treating soil to produce a stable, non-leachable material, that physically or chemically locks the constituents within the solidified matrix.	Proven process for effectively reducing mobility and toxicity of organic and select inorganic constituents. Overall effectiveness of this process would need to be evaluated during a bench-scale study. Timeline requirements associated with on-site treatment may not be feasible.	Implementable. Solidification/ stabilization materials are readily available. Space to perform treatment technology is limited.	High capital and low O&M costs.	No
	Extraction	Low Temperature Thermal Desorption	Process by which soils containing organics with boiling point temperatures less than 800^{o} Fahrenheit are excavated, conditioned, and heated; the organic compounds are desorbed from the soils into an induced airflow. The resulting gas is treated either by condensation and filtration or by thermal destruction. Treated soils are returned to the subsurface.	Proven process for effectively addressing organic constituents. The efficiency of the system and rate of removal of organic constituents would require evaluation during bench-scale and/or pilot-scale testing. Timeline requirements associated with on-site treatment may limit feasibility of process.	Implementable. Treatment facilities are available. Space to perform treatment technology is limited.	Moderate capital and low O&M costs.	No
	Thermal Destruction	Incineration	Use of a mobile incineration unit installed on-site for high temperature thermal destruction of the organic compounds present in the media. Soils are excavated and conditioned prior to incineration. Treated soils are returned to the subsurface.	Proven process for effectively addressing organic constituents. The efficiency of the system and rate of removal of organic constituents would need to be verified during bench-scale and/or pilot-scale testing. Timeline requirements associated with on-site treatment may not meet needs of property.	Not implementable due to limited number of treatment facilities. Space to perform treatment technology is limited.	High capital and low O&M costs.	No
Off-Site Treatment and/or Disposal	Recycle/ Reuse	Asphalt Concrete Batch Plant	Soil is used as a raw material in asphalt concrete paving mixtures. The impacted soil is transported to an offsite asphalt concrete facility and can replace part of the aggregate and asphalt concrete fraction. The hot-mix process melts asphalt concrete prior to mixing with aggregate. During the cold-mix process, aggregate is mixed at ambient temperature with an asphalt concrete/water emulsion. Organics and inorganics are bound in the asphalt concrete. Some organics may volatilize in the hot-mix.	Effective for treating organics and inorganics through volatilization and/or encapsulation. Thermal pretreatment may be required to prevent leaching. No long-term data available.	Potentially Implementable. Soil may require conditioning with clean soil to achieve appropriate consistency. Permitted facilities and demand are limited. Screening and disposal of off-spec. materials can be costly.	Moderate capital costs.	No

Table 4-1

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Technology Screening Evaluation for Impacted Surface Soil

General Response Action	Technology Type	Technology Process Option	Description of Option/Comments	Effectiveness	Implementability	Relative Cost	Retained for Further Analysis?
Off-Site Treatment and/or Disposal (Cont'd.)	Recycle/ Reuse (Cont'd.)	Brick/Concrete Manufacture	Soil is used as a raw material in manufacture of bricks or concrete. Heating in ovens during manufacture volatilizes organics and some inorganics. Other inorganics are bound in the product.	Effective for treating organics and inorganics through volatilization and/or vitrification. A bench-scale/pilot study may be necessary to determine effectiveness.	Potentially Implementable.	Moderate-high capital costs.	No
		Co-Burn in Utility Boiler	Soil is blended with feed coal to fire a utility boiler used to generate steam. Organics are destroyed.	Effective for treating organic constituents. Soil would be blended with coal prior to burning. Overall effectiveness of this process would need to be evaluated during a trial burn.	Permitted facilities available for burning MGP soils are limited.	Moderate capital costs.	Yes
	Extraction	Low Temperature Thermal Desorption	Process by which soils containing organics with boiling point temperatures less than 800° Fahrenheit are heated and the organic compounds are desorbed from the soils into an induced airflow. The resulting gas is treated either by condensation and filtration or by thermal destruction.	Proven process for effectively addressing organic constituents.	Implementable. Treatment facilities are available.	Moderate capital costs.	Yes
	Disposal	Solid Waste Landfill	Disposal of impacted soil in an existing permitted non-hazardous landfill.	Proven process that can effectively achieve the RAOs for non-hazardous solid waste.	Implementable	Moderate capital costs.	Yes
		RCRA Landfill	Disposal of impacted soil in an existing RCRA permitted landfill facility.	Proven process that can effectively achieve the RAOs for hazardous waste.	Potentially implementable for purifier waste, but not anticipated.	Moderate capital costs.	Yes

Note:

1. Shading indicates that technology process has not been retained for development of a remedial alternative due to overall effectiveness, implementability, and feasibility.
2. Every off-site treatment and/or disposal technology process option was retained. Selection of the appropriate process option (if warranted) will be evaluated as part of the remedial design phase of the selected Site-Wide remedy.

Table 4-2

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Technology Screening Evaluation for Impacted Subsurface Soil

General Response Action	Technology Type	Technology Process Option	Description of Option/Comments	Effectiveness	Implementability	Relative Cost	Retained for Further Analysis?
No Action	No Action	No Action	Alternative would not include any active remedial action. A No Action alternative serves as a baseline for comparison of the overall effectiveness of other remedial alternatives. Consideration of a No Action alternative is required by the NCP and USEPA.	Maintenance of the existing surface cover would not be performed. Would not achieve RAOs for subsurface soil. May not achieve RAO for continued protection against potential exposure to subsurface soil containing COCs.	Implementable	Low	Yes
Institutional Controls	Institutional Controls	Governmental Controls, Proprietary Controls, Enforcement and Permit Controls, Informational Devices	Institutional controls would include legal and/or administrative controls that mitigate the potential for exposure to impacted soils and/or jeopardize the integrity of a remedy. Examples of potential institutional controls include establishing land use restrictions, health and safety requirements for subsurface activities, and restrictions on groundwater use and/or extraction.	This option does not directly address the RAOs for reducing, to the extent practicable, migration of NAPL. This option could reduce potential exposures, and may be effective when combined with other process options.	Implementable	Low	Yes
Surface Controls	Surface Controls	Maintain Existing Surface Materials	As the site currently consists of several parcels with different owners, it may be difficult to implement this option.	This option would require a site management plan to meet the RAO for human exposure and may reduce the mobility of chemical constituents by reducing infiltration; would not reduce toxicity or volume of impacts. Long-term effectiveness requires ongoing maintenance.	Potentially implementable. Resources to maintain the existing covers are readily available.	Moderate O&M costs.	Yes
In-Situ Containment/ Controls	Capping/Surface Cover	Clay/Soil Cap	Placing and compacting clay material or soil material over impacted soil.	Effectiveness is diminished based on current and potential future use of the site due to maintenance concerns.	Implementable. Equipment and materials necessary to construct the cap are readily available.	Moderate capital and O&M costs.	No
		Asphalt/Concrete Cap	Application of a layer of asphalt or concrete over impacted soils. As the site currently consists of several parcels with different owners, it may be difficult to implement this option. However, asphalt or concrete surface covers currently exist over areas where MGP-related impacts were observed in subsurface soil (i.e., maintain existing surface cover).	May reduce the mobility of chemical constituents by reducing infiltration; would not reduce toxicity or volume of impacts. Asphalt concrete cap is consistent with current and future site uses. Long-term effectiveness requires ongoing maintenance.	Implementable. Equipment and materials necessary to construct the cap are readily available.	Moderate capital and O&M costs.	No
		Multi-Media Cap	Application of a combination of clay/soils and synthetic membrane(s) over impacted soil.	Effectiveness is diminished based on current and potential future use of the site due to maintenance concerns.	Implementable. Equipment and materials necessary to construct the cap are readily available.	High capital and O&M costs.	No

Table 4-2

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Technology Screening Evaluation for Impacted Subsurface Soil

General Response Action	Technology Type	Technology Process Option	Description of Option/Comments	Effectiveness	Implementability	Relative Cost	Retained for Further Analysis?
In-Situ Containment/ Controls (Cont'd.)	Containment	Sheetpile	Steel sheetpiles are driven into the subsurface to contain impacted soils and NAPLs. The sheetpile wall is typically keyed into a confining unit and could be permeable or impermeable to groundwater flow.	Effective for reducing the migration of COCs and NAPL. May help achieve RAOs when combined with treatment/removal technology.	Potentially Implementable. Equipment and materials necessary to install sheetpile barriers are readily available. Potential subsurface obstructions (e.g., utilities) may hinder technology use. Technology may alter groundwater patterns and affect current hydrogeologic conditions.	High capital and O&M costs.	No
		Slurry Walls	Involves excavating a trench and adding a slurry (e.g., soil/cement-bentonite mixture) to control migration of subsurface soils, groundwater and NAPL from an area. Slurry walls are typically keyed into a low permeability unit (e.g., an underlying silt/clay layer).	Effective for reducing the migration of groundwater, COCs, and NAPL. May help achieve RAOs when combined with treatment/removal technology.	Potentially Implementable. Equipment and materials required to install slurry walls are readily available. Presence of subsurface obstructions (e.g., utilities) may hinder technology use. Technology may alter groundwater patterns and affect current hydrogeologic conditions.	High capital and O&M costs.	No
In-Situ Treatment	Immobilization	Solidification/ Stabilization	Addition of material to the impacted soil that limits the solubility or mobility of the constituents present. Involves treating soil to produce a stable, non-leachable material, that physically or chemically locks the constituents within the solidified matrix.	Overall effectiveness of this process would need to be evaluated during a bench-scale treatability study. Underground structures and obstructions may limit methods of implementation (e.g., backhoe, auger, jet grouting).	Potentially implementable. Solidification/ stabilization materials are readily available. Subsurface obstructions may limit method of implementation. Technology may alter groundwater patterns and affect current hydrogeologic conditions.	Moderate capital and O&M costs.	Yes

Table 4-2

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Technology Screening Evaluation for Impacted Subsurface Soil

General Response Action	Technology Type	Technology Process Option	Description of Option/Comments	Effectiveness	Implementability	Relative Cost	Retained for Further Analysis?
In-Situ Treatment (Cont'd.)	Extraction	Dynamic Underground Stripping and Hydrous Pyrolysis/Oxidation (DUS/HPO)	Steam is injected into the subsurface to mobilize contaminants and NAPLs. The mobilized contaminants are captured and constituents are recondensed, collected, and treated. In addition, HPO can degrade contaminants in subsurface heated zones. In most cases, this technology requires long-term operation and maintenance of on-site injection, collection and/or treatment systems.	This option would require a pilot scale study to determine effectiveness. Underground structures and obstructions would need to be removed prior to implementation. Mobilization of dissolved plume a concern.	Potentially implementable. Process may result in uncontrolled NAPL migration. Limited space for vapor recovery system and treatment. Presence of underground MGP structures may hinder technology use.	High	No
	Chemical Treatment	Chemical Oxidation	Oxidizing agents are added to oxidize and reduce the mass of organic constituents. In-situ chemical oxidation involves the introduction of chemicals such as ozone, hydrogen peroxide, magnesium peroxide, sodium persulfate or potassium permanganate. Exposure to chemicals needs to be controlled through best management practices and appropriate personal protective equipment. Chemicals may react with (corrode) underground utilities. A pilot study would be required to evaluate/determine oxidant application requirements. Large amounts of oxidizing agents would be needed to oxidize NAPL.	Would require multiple treatments of chemicals to reduce constituents. May not be a cost effective means to achieve the RAOs. Time requirements may not be acceptable for site.	Potentially Implementable. Equipment and materials necessary to inject/apply oxidizing agents are readily available. May require special provisions for storage of process chemicals.	High capital and O&M costs.	No
	Biological Treatment	Biodegradation	Natural biological and physical processes that, under favorable conditions, act without human intervention to reduce the mass, volume, concentration, toxicity, and/or mobility of COCs. This process relies on long-term monitoring to demonstrate the reduction of impacts.	Less effective for heavier, more condensed PAHs; not effective for NAPLs; This process option may be effective when combined with other process options.	Implementable.	Low Capital and Moderate O&M costs.	Yes
		Enhanced Biodegradation	Addition of amendments (e.g., oxygen, nutrients) and controls to the subsurface to enhance indigenous microbial populations to improve the rate of natural degradation.	Less effective for heavier, more condensed PAHs; not effective for NAPLs.	Implementable	Low Capital and Moderate O&M costs.	No
		Biosparging	Air/oxygen injection wells are installed within the impacted regions to enhance biodegradation of constituents by increasing oxygen availability. Low-flow injection technology may be incorporated. This technology requires long-term monitoring.	Access to areas that would require injection wells for this process option to be effective is limited, therefore it is not effective as a stand-alone option. Could help to reduce toxicity, mobility, and volume of dissolved constituents when combined with other process options.	Implementable. Equipment capable of installing wells is readily available.	Low Capital and Moderate O&M costs.	No

Table 4-2

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Technology Screening Evaluation for Impacted Subsurface Soil

General Response Action	Technology Type	Technology Process Option	Description of Option/Comments	Effectiveness	Implementability	Relative Cost	Retained for Further Analysis?
Removal	Excavation	Excavation	Physical removal of impacted soil. Typical excavation equipment would include backhoes, loaders, and/or dozers. Temporary structures and extraction wells may be used to lower the groundwater to create "dry" areas to allow use of typical excavation equipment to physically remove soil.	Proven process for effectively removing impacted soil.	Implementable. Equipment capable of excavating the soil is readily available. Several underground utilities would need to be temporarily relocated to facilitate this option.	High capital cost and low O&M costs.	Yes
Ex-Situ On-Site Treatment	Immobilization	Solidification/ Stabilization	Addition of material to the removed soil that limits the solubility or mobility of the constituents present. Involves treating soil to produce a stable, non-leachable material, that physically or chemically locks the constituents within the solidified matrix.	Proven process for effectively reducing mobility and toxicity of organic and select inorganic constituents. Space to perform treatment technology does not exist.	Implementable. Solidification/ stabilization materials are readily available. Space to perform treatment technology does not exsist.	High capital and low O&M costs.	No
	Extraction	Low Temperature Thermal Desorption	Process by which soils containing organics with boiling point temperatures less than 800^o Fahrenheit are excavated, conditioned, and heated; the organic compounds are desorbed from the soils into an induced airflow. The resulting gas is treated either by condensation and filtration or by thermal destruction. Treated soils are returned to the subsurface.	Proven process for effectively addressing organic constituents. The efficiency of the system and rate of removal of organic constituents would require evaluation during bench-scale and/or pilot-scale testing. Available space and timeline requirements associated with on-site treatment may limit feasibility of process.	Implementable. Treatment facilities are available. Space to perform treatment technology does not exist.	Moderate capital and low O&M costs.	No
	Thermal Destruction	Incineration	Use of a mobile incineration unit installed on-site for high temperature thermal destruction of the organic compounds present in the media. Soils are excavated and conditioned prior to incineration. Treated soils are returned to the subsurface.	Proven process for effectively addressing organic constituents. The efficiency of the system and rate of removal of organic constituents would need to be verified during bench-scale and/or pilot-scale testing. Available space and timeline requirements associated with on-site treatment may limit feasibility of process.	Not implementable due to limited number of treatment facilities. Space to perform treatment technology does not exsist.	High capital and low O&M costs.	No

Table 4-2

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Technology Screening Evaluation for Impacted Subsurface Soil

General Response Action	Technology Type	Technology Process Option	Description of Option/Comments	Effectiveness	Implementability	Relative Cost	Retained for Further Analysis?
Off-Site Treatment and/or Disposal	Recycle/ Reuse	Asphalt Concrete Batch Plant	Soil is used as a raw material in asphalt concrete paving mixtures. The impacted soil is transported to an offsite asphalt concrete facility and can replace part of the aggregate and asphalt concrete fraction. The hot-mix process melts asphalt concrete prior to mixing with aggregate. During the cold-mix process, aggregate is mixed at ambient temperature with an asphalt concrete/water emulsion. Organics and inorganics are bound in the asphalt concrete. Some organics may volatilize in the hot-mix.	Effective for treating organics and inorganics through volatilization and/or encapsulation. Thermal pretreatment may be required to prevent leaching. No long-term data available.	Potentially Implementable. Soil may require conditioning with clean soil to achieve appropriate consistency. Permitted facilities and demand are limited. Screening and disposal of off-spec. materials can be costly.	Moderate capital costs.	No
		Brick/Concrete Manufacture	Soil is used as a raw material in manufacture of bricks or concrete. Heating in ovens during manufacture volatilizes organics and some inorganics. Other inorganics are bound in the product.	Effective for treating organics and inorganics through volatilization and/or vitrification. A bench-scale/pilot study may be necessary to determine effectiveness.	Potentially Implementable.	Moderate-high capital costs.	No
		Co-Burn in Utility Boiler	Soil is blended with feed coal to fire a utility boiler used to generate steam. Organics are destroyed.	Effective for treating organic constituents. Soil would be blended with coal prior to burning. Overall effectiveness of this process would need to be evaluated during a trial burn.	Permitted facilities available for burning MGP soils are limited.	Moderate capital costs.	Yes
	Extraction	Low Temperature Thermal Desorption	Process by which soils containing organics with boiling point temperatures less than 800^{o} Fahrenheit are heated and the organic compounds are desorbed from the soils into an induced airflow. The resulting gas is treated either by condensation and filtration or by thermal destruction.	Proven process for effectively addressing organic constituents.	Implementable. Treatment facilities are available.	Moderate capital costs.	Yes
	Disposal	Solid Waste Landfill	Disposal of impacted soil in an existing permitted non-hazardous landfill.	Proven process that can effectively achieve the RAOs for non-hazardous solid waste.	Implementable	Moderate capital costs.	Yes
		RCRA Landfill	Disposal of impacted soil in an existing RCRA permitted landfill facility.	Proven process that can effectively achieve the RAOs for hazardous waste.	Potentially implementable for purifier waste, but not anticipated.	Moderate capital costs.	Yes

Notes:
1. Shading indicates that technology process has not been retained for development of a remedial alternative due to overall effectiveness, implementability, and feasibility.
2. Every off-site treatment and/or disposal technology process option was retained. Selection of the appropriate process option (if warranted) will be evaluated as part of the remedial design phase of the selected Site-Wide remedy.

Table 4-3

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Technology Screening Evaluation for Impacted Groundwater

General Response Action	Technology Type	Technology Process Option	Description	Effectiveness	Implementability	Relative Cost	Retained for Further Analysis?
No Action	No Action	No Action	Alternative would not include any active remedial action. A No Action alternative serves as a baseline for comparison of the overall effectiveness of other remedial alternatives. Consideration of a No Action alternative is required by the NCP and USEPA.	Would not achieve the RAOs for groundwater in an acceptable time frame.	Implementable	Low	Yes
Institutional Controls	Institutional Controls	Governmental Controls, Proprietary Controls, Enforcement and Permit Controls, Informational Devices	Institutional controls would include legal and/or administrative controls that mitigate the potential for exposure to impacted materials and/or jeopardize the integrity of a remedy. Examples of potential institutional controls include establishing land use restrictions, health and safety requirements for subsurface activities, and restrictions on groundwater use and/or extraction.	May be effective for reducing the potential for human exposure. This option would not meet the RAO for restoring, to the extent practicable, the quality of groundwater to NYS standards. This option may be effective when combined with other process options.	Implementable	Low	Yes
In-Situ Treatment	Biological Treatment	Monitored Natural Attenuation (MNA)	Natural biological, chemical and physical processes that under favorable conditions, act without human intervention to reduce the mass, volume, concentration, toxicity and mobility of chemical constituents. This process relies on long-term monitoring to demonstrate the reduction of impacts caused by chemical constituents.	Would need to evaluate whether groundwater at the site contains naturally-occurring fate and transport processes that contribute to naturally attenuating concentrations of constituents including advection hydrodynamic dispersion, dilution, hydrophobic sorption, and natural in-situ biodegradation. Could achieve RAOs over extended period of time.	Easily implemented. Would require monitoring to demonstrate reduction of impacts.	Low Capital and O&M costs.	Yes
		Oxygen Enhancement	Addition of amendments (e.g., nutrients, oxygen) to the subsurface to enhance indigenous microbial populations to improve the rate of natural biodegradation.	Could achieve RAOs over extended period of time. May require large addition of amendments depending on natural oxygen demand of soil and groundwater. Preliminary study would need to be conducted to evaluate indigenous microbial populations.	Implementable. Would require monitoring to demonstrate reduction of COCs.	Low Capital and O&M costs.	Yes
		Biosparging	Air/oxygen injection wells are installed within the dissolved plume to enhance biodegradation of constituents by increasing oxygen availability. Low-flow injection technology may be incorporated. This technology requires long-term monitoring.	Access to areas that would require injection wells and an equipment shed for this process option is limited. Could help to reduce toxicity, mobility, and volume of dissolved constituents when combined with other process options.	Potentially Implementable. Equipment capable of installing wells is readily available.	Moderate Capital and O&M costs.	No

Table 4-3

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Technology Screening Evaluation for Impacted Groundwater

General Response Action	Technology Type	Technology Process Option	Description	Effectiveness	Implementability	Relative Cost	Retained for Further Analysis?
In-Situ Treatment (Cont'd.)	Chemical Treatment	Chemical Oxidation	Oxidizing agents are added to oxidize and reduce the mass of organic constituents. *In-situ* chemical oxidation involves the introduction of chemicals such as ozone, hydrogen peroxide, magnesium peroxide, sodium persulfate, or potassium permanganate. A bench scale treatability study would be required to evaluate/estimate the amount of oxidizing agent. Large amounts of oxidizing agents are needed to oxidize NAPL.	Would require long-term treatment to reduce constituents unless combined with source removal technology. May not be a cost effective means to achieve the RAOs. Access to areas that would require injection wells for this process option is limited.	Potentially implementable. Equipment and materials necessary to inject/apply oxidizing agents are readily available. May require special provisions for storage of process chemicals.	High Capital and O&M costs.	No
In-Situ Containment/ Controls	Hydraulic Control	Groundwater Extraction Using Recovery Wells	Provide hydraulic control across dissolved plume by pumping and treating groundwater and NAPL from wells and/or drains. Monitoring wells are also used to determine whether required hydraulic controls have been obtained. Typically requires extensive design/testing to determine required hydraulic gradients and feasibility of achieving those gradients.	Proven process for effectively containing dissolved groundwater plume. Groundwater impacts appear to be localized in one area. Would require pumping and treating large quantities of water over long periods of time and may affect hydrogelogic conditions.	Not implementable. Materials and equipment required to install extraction wells are readily available. Access for well installation and space to perform water treatment is limited.	High Capital and O&M costs.	No
		Low Permeability Cap	Application of a layer of asphalt or concrete over impacted soils. As the site currently consists of several parcels with different owners, it may be difficult to implement this option. However, asphalt or concrete surface covers currently exist over the mojority of the site.	May reduce the mobility of chemical constituents by reducing infiltration; would not reduce toxicity or volume of impacts. Asphalt concrete cap is consistent with current and future site uses. Long-term effectiveness requires ongoing maintenance.	Potentially Implementable. Equipment and materials necessary to construct the cap are readily available.	Moderate Capital and O&M costs.	No
		Slurry Walls	Involves excavating a trench and adding a slurry (e.g., soil/cement-bentonite mixture) to control subsurface groundwater and NAPL flow into or out of an area (e.g., mitigate the potential for NAPL migration). Slurry walls are typically keyed into a low permeability unit (e.g., an underlying silt/clay layer).	Effective for reducing the migration of chemical constituents.	Implementable. Equipment, materials and remedial contractors readily available.	High Capital and Moderate O&M costs.	Yes
Removal	Groundwater and/or NAPL Extraction	Pump and Treatment using Vertical Wells	Vertical wells are installed to recover groundwater and/or NAPL for treatment/disposal.	Effective, but inefficient for recovery/treatment of dissolved plume and NAPL. Would require pumping and treating large quantities of water over long periods of time. Implementation of this process could achieve the RAOs over a long period of time. Groundwater impacts appear to be localized in one area.	Not implementable. Space to perform water treatment technology is limited.	Moderate Capital and High O&M costs.	No

Table 4-3

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Technology Screening Evaluation for Impacted Groundwater

General Response Action	Technology Type	Technology Process Option	Description	Effectiveness	Implementability	Relative Cost	Retained for Further Analysis?
Removal (Cont'd.)	Groundwater and/or NAPL Extraction (Cont'd.)	Pump and Treatment using Horizontal Wells	Horizontal wells are utilized to replace a series of conventional vertical wells.	Effective for recovering groundwater; however, not effective for NAPL recovery at this location. Subsurface obstructions may inhibit use of this technology.	Not implementable. Space to perform water treatment is limited.	Moderate Capital and High O&M costs.	No
		Collection Trenches	A zone of higher permeability material is installed within the desired capture area with a perforated collection laterally placed along the base to direct groundwater to a collection area for treatment and/or disposal.	Potentially effective for recovering NAPL for treatment/disposal. However, recoverable quantitites of NAPL have not been observed and NAPL observed does not appear to be mobile.	Not implementable. Space to perform water treatment is limited.	Moderate Capital and High O&M costs.	No
		Passive NAPL Removal	NAPL is passively collected in vertical wells and removed.	Potentially effective for recovering NAPL for treatment/disposal. However, recoverable quantitites of NAPL have not been observed and NAPL observed does not appear to be mobile.	Implementable. Space to place the vertical wells is limited.	Low Capital and O&M costs.	No
		Dynamic Underground Stripping and Hydrous Pyrolysis/Oxidation (DUS/HPO)	Steam is injected into the subsurface to mobilize contaminants and NAPLs. The mobilized contaminants are captured and constituents are recondensed, collected and treated. In addition, HPO can degrade contaminants in subsurface heated zones. In most cases, this technology requires long-term operation and maintenance of on-site injection, collection, and/or treatment systems.	This option would require a pilot scale study to determine effectiveness. May affect current hydrogeologic conditions. Currently, groundwater impacts appear to be localized to one area.	Potentially implementable. Limited space for vapor recovery system and treatment. Presence of subsurface obstructions may hinder/impede technology use.	High	No
Ex-Situ On-Site Treatment	Chemical Treatment	UV/Oxidation	Extraction of groundwater and treatment using oxidation by subjecting groundwater to ultraviolet light and ozone.	Proven process for effectively treating organic compounds. Use of this process may effectively achieve the RAOs. A bench-scale treatability study may be required to evaluate the efficiency of this process and to make project-specific adjustments to the process. May require special provisions for the storage of process chemicals.	Not implementable. Space to perform water treatment is limited.	High capital and O&M costs.	No

Table 4-3

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Technology Screening Evaluation for Impacted Groundwater

General Response Action	Technology Type	Technology Process Option	Description	Effectiveness	Implementability	Relative Cost	Retained for Further Analysis?
Ex-Situ On-Site Treatment (Cont'd.)	Chemical Treatment (Cont'd.)	Chemical Oxidation	Extraction of groundwater and treatment using oxidizing agents. Oxidizing agents are injected into the groundwater treatment train to oxidize and reduce the mass of dissolved organic constituents. Chemical oxidation involves the introduction of chemicals such as ozone, hydrogen peroxide, magnesium peroxide, sodium persulfate or potassium permanganate. Large amounts of oxidizing agents are needed to oxidize NAPL. Exposure to chemicals needs to be controlled through best management practices and appropriate personal protective equipment.	A bench-scale treatability study may be required to evaluate the efficiency of this process and to make project-specific adjustments to the process. May require special provisions for the storage of process chemicals.	Not implementable. Space to perform water treatment is limited. May require special provisions for storage of process chemicals.	High capital and high O&M costs.	No
	Physical Treatment	Carbon Adsorption	Extraction of groundwater and treatment using carbon adsorption. Process by which organic constituents are absorbed to the carbon as groundwater is passed through the carbon.	Effective at removing organic constituents. Use of this treatment process may effectively achieve the RAOs when combined with groundwater extraction.	Implementable. Space to perform water treatment is limited.	High capital and O&M costs.	Yes
		Filtration	Extraction of groundwater and treatment using filtration. Process in which the groundwater is passed through a granular media to removed suspended solids by interception, straining, flocculation, and sedimentation activity within the filter.	Effective pre-treatment process to reduce suspended solids. Use of this process along with other processes that address organic constituents could effective pretreatment process.	Implementable. Disposal of solid wastes will be required.	Low capital and moderate O&M costs.	Yes
		Precipitation/ Coagulation/ Flocculation	Process which transforms dissolved constituents into insoluable solids by adding agents to facilitate subsequent removal from the liquid phase by sedimentation/filtration.	Effective pre-treatment process to reduce disolved-phase COCs and suspended solids. Could be an effective pretreatment process.	Implementable.	Moderate capital cost.	Yes
Disposal	Groundwater Disposal	Discharge to a local Publicly Owned Treatment Works (POTW)	Treated or untreated water is discharged to a sanitary sewer and treated at a local POTW facility as part of an active remediation.	Proven process for effectively disposing of groundwater. Typically requires the least amount of pretreatment because the discharged water will be subjected to additional treatment at the POTW.	Implementable. Equipment and materials necessary to extract, pretreat (if necessary), and discharge the water to the sewer system are readily available. Discharges to the sewer will require a POTW-issued discharge permit. Space to perform water treatment is limited.	High capital and O&M costs.	Yes

Table 4-3

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Technology Screening Evaluation for Impacted Groundwater

General Response Action	Technology Type	Technology Process Option	Description	Effectiveness	Implementability	Relative Cost	Retained for Further Analysis?
Disposal (Cont'd.)	Groundwater Disposal (Cont'd.)	Discharge to a privately owned treatment facility.	Treated or untreated water is collected and transported to a privately owned treatment facility as part of an active remediation.	Proven process for effectively disposing of groundwater. Typically requires the least amount of pretreatment because the discharged water will be subjected to additional treatment at the disposal facility.	Implementable. Equipment and materials to pretreat the water at the site are readily available on a commercial basis. Facilities capable of transporting and disposing of the groundwater are available. Treatment would be required prior to discharge. Space to perform water treatment is limited.	High capital and O&M costs.	Yes

Notes:

1. Shading indicates that technology process has not been retained for development of a remedial alternative due to overall effectiveness, implementability, and feasibility.
2. Both disposal technology process option was retained. Selection of the appropriate process option (if warranted) will be evaluated as part of the remedial design phase of the selected Site-Wide remedy.
2. Ex-situ on-site treatment technology process options wer retained in the event pretreatment of groundwater generated as part of an active remediation (e.g., dewatering to facilitate excavation) is required prior to disposal. Selection of the appropriate process option (if warranted) will be evaluated as part of the remedial design phase of the selected Site-Wide remedy.

Table 5-1

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Remedial Alternative II - IC/EC with Enhanced NA

Item #	Description	Quantity	Unit	Unit Price	Amount
CAPITAL COSTS					
1	Institutional Controls	1	ea	$50,000	$50,000
2	Engineering Controls	900	LF	$140	$126,000
3	Pre-Design Investigation	1	ea	$25,000	$25,000
4	Laboratory Analysis	1	ea	$20,000	$20,000
5	Oxygen Enhancement Wells	80	LF	$250	$20,000
6	Stainless Steel Canisters	4	ea	$500	$2,000
7	Waste Disposal	4	drum	$500	$2,000
				Subtotal Capital Cost	$245,000
				Engineering (15%)	$36,750
				Contingency (25%)	$61,250
				Total Capital Cost	$343,000
OPERATION AND MAINTENANCE (O&M) COSTS					
8	Groundwater Monitoring/Enhancement System	1	LS	$30,000	$30,000
9	Verification of IC/ECs and Notifications to NYSDEC	1	LS	$10,000	$10,000
				Subtotal O&M Costs	$40,000
				Contingency (25%)	$10,000
				Total O&M Costs	$50,000
				Present Worth Factor (30 years at 7%)	12.41
				Present Worth O&M Cost	$620,500
				Total Estimated Cost	$963,500
				Rounded to	$960,000

General Notes:

1. This estimate has been prepared for the purposes of comparing potential remedial alternatives. The information in this cost estimate is based on the available information regarding the site investigation and the anticipated scope of the remedial alternative. Changes in the cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedial alternative. This cost estimate is expected to be within -30% to +50% of the actual project cost. Utilization of this cost estimate information beyond the stated purpose is not recommended. ARCADIS is not licensed to provide financial or legal consulting services; as such, this cost estimate information is not intended to be utilized for complying with financial reporting requirements associated with liability reserves.
2. This cost estimate was based on 2008 dollars and ARCADIS's past experience and vendor quotes.
3. Present worth is estimated based on a 7% beginning-of-year discount rate (adjusted for inflation) in accordance with OSWER Directive 9355.3-20 "Revisions to OMB Circular A-94 on Guidelines and Discount Rates for Benefit-Cost Analysis" (USEPA, 1993). It is assumed that "year zero" is 2008.
4. Costs do not include legal fees, permitting, obtaining offsite access, negotiations or agency oversight.

Table 5-1

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Remedial Alternative II - IC/EC with Enhanced NA

Notes:

1. Institutional Controls cost estimate includes administrative costs associated with implementing controls to minimize the potential for human exposure to remaining impacted subsurface soil. Such institutional controls may include governmental controls, proprietary controls, enforcement tools, permit controls and/or informational devices. This cost estimate also includes all labor and materials necessary to institute deed restrictions for the site to prevent potential future use of site groundwater.
2. Engineering Controls cost estimate includes costs to install approximately 900 linear feet of 6-foot high visually appealing fence to limit access to NYSEG property that is not currently paved.
3. Pre-design investigation cost estimate includes all labor, equipment, travel, subsistence and materials necessary to conduct a groundwater investigation to evaluate the role of natural attenuation and the necessity and selection of amendments to enhance the microbial community.
4. Laboratory analysis cost estimate includes all labor, equipment and materials necessary to submit up to 6 groundwater samples to an analytical laboratory for analysis for chemical constituents of concern (BTEX compounds and PAHs) and natural attenuation indicator parameters (i.e., total biomass, PAH-degrading indicator compounds, geochemical parameters). Cost assumes standard analytical turnaround time. No costs have been included for data validation.
5. Oxygen enhancement wells cost estimate includes all labor, equipment and materials necessary to install and develop four 4-inch-diameter, 20-foot deep PVC wells for the introduction of an oxygen-releasing compound to the groundwater.
6. Stainless steel canisters cost estimate includes all labor, equipment and materials necessary to purchase and install stainless steel canisters and oxygen-releasing compound for the first year. Cost assumes amendments will be replenished on a semi-annual basis during the first year of oxygen enhancement.
7. Waste disposal cost estimate includes all labor, equipment and materials necessary to characterize and dispose waste material generated during the groundwater monitoring activities. Cost assumes that the waste material would be disposed of as a non-hazardous waste at an appropriate treatment/disposal facility. Cost assumes one drum of liquid and other miscellaneous material would be generated annually.
8. Groundwater monitoring cost estimate includes: all labor, equipment, travel, subsistence and materials necessary to conduct semi-annual groundwater and NAPL monitoring for years 1 and 2, then annually through year 30. Groundwater monitoring will consist of collecting groundwater samples from six existing monitoring wells (MW-2, MW-3, MW-5, MW-6, MW-7, and MW-9) using low-flow sampling methods. In addition, this estimate includes all labor, equipment, and materials necessary to maintain the monitoring and oxygen enhancement wells, introduce oxygen-releasing compounds or other microbial amendments on a semi-annual basis, and dispose of any waste generated. This cost estimate also includes all labor, equipment and materials necessary to prepare an annual report summarizing the results of the groundwater and NAPL monitoring activities and the observed trends from oxygen enhancement.
9. Verification of IC/ECs and notifications to NYSDEC include verifying the status of controls and preparing/submitting annual notification to the NYSDEC to demonstrate that the controls are being maintained and remain effective.

Table 5-2

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Remedial Alternative III - IC with Enhanced NA, Installation of Surface Cover, and Removal of Subsurface Structure at SB-14A

Item #	Description	Quantity	Unit	Unit Price	Amount
CAPITAL COSTS					
1	Institutional Controls	1	ea	$50,000	$50,000
2	Pre-Design Investigation	1	ea	$100,000	$100,000
3	Laboratory Analysis	1	ea	$20,000	$20,000
4	Oxygen Enhancement Wells	80	LF	$200	$16,000
5	Stainless Steel Canisters	4	ea	$500	$2,000
6	Waste Disposal	4	drum	$500	$2,000
7	Mobilization/Demobilization	1	LS	$30,000	$30,000
8	Decontamination Pad	1	LS	$10,000	$10,000
9	Temporary Fencing/Barriers	500	LF	$25	$12,500
10	Soil Staging Area	1	LS	$10,000	$10,000
11	Dust/Vapor/Odor Control	3	Week	$3,000	$9,000
12	Surface Soil Excavation and Handling	100	CY	$35	$3,500
13	Subsurface Structure Removal	1	LS	$20,000	$20,000
14	Water Management	1	LS	$25,000	$25,000
15	Select Fill	760	CY	$30	$22,800
16	Crushed Stone Subbase w/ fabric	16,500	SF	$1.25	$20,625
17	Bituminous Asphalt Base Course	16,500	SF	$1.50	$24,750
18	Bituminous Asphalt Top Course	16,500	SF	$1.25	$20,625
19	Waste Characterization	2	ea	$1,000	$2,485
20	Soil Transportation and Disposal	410	Ton	$100	$41,000
21	Debris Transportation and Disposal	25	Ton	$75	$1,875
22	Site Restoration/Surface Cover Replacement	1	LS	$25,000	$25,000
				Subtotal Capital Cost	$469,160
				Engineering (15%)	$70,374
				Contingency (25%)	$117,290
				Total Capital Cost	$656,824
OPERATION AND MAINTENANCE (O&M) COSTS					
23	Groundwater Monitoring/Enhancement System	1	LS	$30,000	$30,000
24	Verification of IC/ECs and Notifications to NYSDEC	1	LS	$10,000	$10,000
				Subtotal O&M Costs	$40,000
				Contingency (25%)	$10,000
				Total O&M Costs	$50,000
				Present Worth Factor (30 years at 7%)	12.41
				Present Worth O&M Cost	$620,500
				Total Estimated Cost	$1,277,324
				Rounded to	$1,300,000

Table 5-2

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Remedial Alternative III - IC with Enhanced NA, Installation of Surface Cover, and Removal of

General Notes:

1. This estimate has been prepared for the purposes of comparing potential remedial alternatives. The information in this cost estimate is based on the available information regarding the site investigation and the anticipated scope of the remedial alternative. Changes in the cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedial alternative. This cost estimate is expected to be within -30% to +50% of the actual project cost. Utilization of this cost estimate information beyond the stated purpose is not recommended. ARCADIS is not licensed to provide financial or legal consulting services; as such, this cost estimate information is not intended to be utilized for complying with financial reporting requirements associated with liability reserves.
2. This cost estimate was based on 2008 dollars and ARCADIS's past experience and vendor quotes.
3. Present worth is estimated based on a 7% beginning-of-year discount rate (adjusted for inflation) in accordance with OSWER Directive 9355.3-20 "Revisions to OMB Circular A-94 on Guidelines and Discount Rates for Benefit-Cost Analysis" (USEPA, 1993). It is assumed that "year zero" is 2008.
4. Costs do not include legal fees, permitting, obtaining off-site access, negotiations or agency oversight.

Notes:

1. Institutional Controls cost estimate includes administrative costs associated with implementing controls to minimize the potential for human exposure to remaining impacted subsurface soil. Such institutional controls may include governmental controls, proprietary controls, enforcement tools, permit controls and/or informational devices. This cost estimate also includes all labor and materials necessary to institute deed restrictions for the site to prevent potential future use of site groundwater.
2. Pre-design investigation cost estimate includes all labor, equipment, travel, subsistence and materials necessary to 1) conduct a groundwater investigation to evaluate the role of natural attenuation and the necessity and selection of amendments to enhance the microbial community and 2) conduct a subsurface investigation to confirm the proposed limits of excavation for the removal of the subsurface structure and MGP-related impacts observed at SB-14A.
3. Laboratory analysis cost estimate includes all labor, equipment and materials necessary to submit up to 6 groundwater samples to an analytical laboratory for analysis for chemical constituents of concern (BTEX compounds and PAHs) and natural attenuation indicator parameters (i.e., total biomass, PAH-degrading indicator compounds, geochemical parameters). Cost assumes standard analytical turnaround time. No costs have been included for data validation.
4. Oxygen enhancement wells cost estimate includes all labor, equipment and materials necessary to install and develop four 4-inch-diameter, 20-foot deep PVC wells for the introduction of an oxygen-releasing compound to the groundwater.
5. Stainless steel canisters cost estimate includes all labor, equipment and materials necessary to purchase and install stainless steel canisters and oxygen-releasing compound for the first year. Cost assumes amendments will be replenished on a semi-annual basis during the first year of oxygen enhancement.
6. Waste disposal cost estimate includes all labor, equipment and materials necessary to characterize and dispose waste material generated during the groundwater monitoring activities. Cost assumes that the waste material would be disposed of as a non-hazardous waste at an appropriate treatment/disposal facility. Cost assumes one drum of liquid and other miscellaneous material would be generated during the groundwater monitoring event.
7. Mobilization/demobilization cost includes mobilization and demobilization of all labor, equipment and materials necessary to conduct removal activities, install an asphalt surface cover and perform in-situ soil stabilization of NAPL-impacted soil within and beneath Gas Holder #1. This cost estimate also includes labor, equipment and materials necessary to locate, identify and mark out underground utilities at the site. Equipment to be mobilized includes, but not limited to, excavators (with buckets and hoe ram), dump trucks and a drill rig.

Table 5-2

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Remedial Alternative III - IC with Enhanced NA, Installation of Surface Cover, and Removal of

8. Decontamination pad cost estimate includes labor, equipment and materials necessary to construct and remove a 30-foot by 15-foot decontamination pad and appurtenances.
9. Temporary fencing/barrier cost estimate includes labor, equipment and materials necessary to install, relocate (as necessary) and remove temporary fencing and jersey barriers (within roadways) around the working area.
10. Soil staging area cost estimate includes labor, equipment and materials necessary to construct a material staging, mixing, and dewatering area consisting of a 12-inch gravel fill layer and geomembrane liner.
11. Dust/vapor/odor control cost estimate includes labor, equipment and materials necessary monitor dust/vapor/odor emission during intrusive site activities. Cost estimate includes application of vapor/odor suppressing foam, water mist, or other supression techniques, as necessary.
12. Surface soil excavation and handling cost estimate includes labor, equipment and materials necessary to excavate, stage and subsequently load aproximately 2-inches of surface soil (vegetative cover) to facilitate asphalt surface cover installation into trucks for off-site disposal. The actual volume of surface soil to be excavated will be determined during remedial design.
13. Subsurface structure removal cost estimate includes labor, equipment and materials necessary to remove subsurface structure observed at soil boring SB-14A. Cost estimate includes cost to remove and dispose of contents of structure (assumed 1,500 gallons of liquid to be disposed of as nonhazardous liquid waste), decontaminate structure, demolish structure (assumed exterior dimensions of 10 ft x 10 ft x 3 ft) and process material to a diameter of 8 inches or less and excavate surrounding soil to a depth of 10 feet bgs (approximately 160 CY, including 15 CY of concrete). Cost estimate assumes excavation will be benched/sloped and also includes cost to stage and subsequently load into trucks for off-site disposition. Actual volumes will be determined during remedial design and/or during implementation.
14. Water management cost estimate includes labor, equipment and materials necessary to collect, handle and dispose of liquids from within the excavation area. Cost assumes use of localized sumps and rental of a 21,000 gallon storage tank, with subsequent discharge of less than 50,000 gallons to a POTF as nonhazardous liquid waste.
15. Select fill cost estimate includes labor, equipment and materials necessary to import, place and compact in-place quantity of select fill to backfill the soil excavation area at SB-14A (160 CY) and to increase grade for area receiving the bituminous asphalt surface cover approximately 12 inches (600 CY). Cost estimate assumes that no excavated soil will be reused as general fill at the site.
16. Crushed stone subbase with fabric cost estimate includes labor, equipment and materials necessary to install a geotextile fabric and an approximately 8-inch thick compacted layer of crushed stone to serve as a subbase for the bituminous asphalt top and base courses. The calculated asphalt surface cover area includes area of NYSEG property not currently covered in concrete or asphalt.
17. Bituminous asphalt base course cost estimate includes labor, equipment and materials necessary to install a 2.5-inch compacted layer of bituminous asphalt base course over the subbase.
18. Bituminous asphalt top course cost estimate includes labor, equipment and materials necessary to install a 1.5-inch compacted layer of bituminous asphalt top course over the base course.
19. Waste characterization cost estimate includes the analysis of soil samples obtained once per every 100 cubic yards of excavated material destined for off-site treatment/disposal as well as material to be used as backfill. The actual sampling frequency will be determined by generator, receiving disposal facility, and based on heterogeneity of materials.
20. Soil transportation and disposal cost estimate includes transporting stabilized material to an off-site facility for thermal treatment and disposal. The weight of material was based on an assumed 1.65 tons per cubic yard of soil destined for off-site treatment/disposal.

Table 5-2

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Remedial Alternative III - IC with Enhanced NA, Installation of Surface Cover, and Removal of

21. Debris transportation and disposal cost estimate includes transporting debris generated during implementation of the remedial activities to a non-hazardous off-site disposal facility. The weight of material was based on an assumed 1.65 tons per cubic yard of debris destined for off-site disposal. Anticipated debris would include concrete, stone or brick from the subsurface structure at SB-14A. Structure is assumed to be approximately 10 feet by 10 feet by 3 feet tall, with 1-foot thick walls.

22. Site restoration/surface cover replacement cost estimate includes all labor, equipment and materials necessary to replace the existing surface cover material in the disturbed areas. This includes vegetated areas, sidewalks, curbs and bituminous pavement.

23. Groundwater monitoring/enhancement system cost estimate includes: all labor, equipment, travel, subsistence and materials necessary to conduct semi-annual groundwater and NAPL monitoring for years 1 and 2, then annually through year 30. Groundwater monitoring will consist of collecting groundwater samples from six existing monitoring wells (MW-2, MW-3, MW-5, MW-6, MW-7, and MW-9) using low-flow sampling methods. In addition, this estimate includes all labor, equipment, and materials necessary to maintain the monitoring and oxygen enhancement wells, introduce oxygen-releasing compounds or other microbial amendments on a semi-annual basis, and dispose of any waste generated. This cost estimate also includes all labor, equipment and materials necessary to prepare an annual report summarizing the results of the groundwater and NAPL monitoring activities and the observed trends from oxygen enhancement.

24. Verification of IC/ECs and notifications to NYSDEC include verifying the status of controls and preparing/submitting annual notification to the NYSDEC to demonstrate that the controls are being maintained and remain effective.

Table 5-3

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Remedial Alternative IV A - IC with Enhanced NA, Installation of Surface Cover, Removal of Subsurface Structure at SB-14A and ISS of Gas Holder 1

Item #	Description	Quantity	Unit	Unit Price	Amount
CAPITAL COSTS					
1	Institutional Controls	1	ea	$50,000	$50,000
2	Pre-Design Investigation	1	ea	$120,000	$120,000
3	Laboratory Analysis	1	ea	$20,000	$20,000
4	Oxygen Enhancement Wells	80	LF	$250	$20,000
5	Stainless Steel Canisters	4	ea	$500	$2,000
6	Waste Disposal	4	drum	$500	$2,000
7	Mobilization/Demobilization	1	LS	$200,000	$200,000
8	Decontamination Pad	1	LS	$30,000	$30,000
9	Temporary Fencing/Barriers	1,000	LF	$25	$25,000
10	Soil Staging Area	1	LS	$15,000	$15,000
11	Dust/Vapor/Odor Control	18	Week	$3,000	$54,000
12	Pre-Excavation	650	CY	$40	$26,000
13	ISS/Jet Grouting	2,510	CY	$535	$1,342,850
14	Surface Soil Excavation and Handling	100	CY	$35	$3,500
15	Subsurface Structure Removal	1	LS	$20,000	$20,000
16	Spoils Handling	1,880	CY	$30	$56,400
17	Water Management	1	LS	$50,000	$50,000
18	Select Fill	1,440	CY	$30	$43,200
19	Crushed Stone Subbase w/ fabric	21,400	SF	$1.25	$26,750
20	Bituminous Asphalt Base Course	21,400	SF	$1.50	$32,100
21	Bituminous Asphalt Top Course	21,400	SF	$1.25	$26,750
22	Waste Characterization	28	ea	$1,000	$27,879
23	Soil Transportation and Disposal	4,600	Ton	$100	$460,000
24	Debris Transportation and Disposal	25	Ton	$75	$1,875
25	Site Restoration/Surface Cover Replacement	1	LS	$50,000	$50,000
				Subtotal Capital Cost	$2,705,304
				Engineering (15%)	$405,796
				Contingency (25%)	$676,326
				Total Capital Cost	$3,787,425
OPERATION AND MAINTENANCE (O&M) COSTS					
26	Groundwater Monitoring/Enhancement System	1	LS	$30,000	$30,000
27	Verification of IC/ECs and Notifications to NYSDEC	1	LS	$10,000	$10,000
				Subtotal O&M Costs	$40,000
				Contingency (25%)	$10,000
				Total O&M Costs	$50,000
				Present Worth Factor (30 years at 7%)	12.41
				Present Worth O&M Cost	$620,500
				Total Estimated Cost	$4,407,925
				Rounded to	$4,400,000

Table 5-3

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Remedial Alternative IV A - IC with Enhanced NA, Installation of Surface Cover, Removal of Subsurface Structure at SB-14A and ISS of Gas Holder 1

General Notes:

1. This estimate has been prepared for the purposes of comparing potential remedial alternatives. The information in this cost estimate is based on the available information regarding the site investigation and the anticipated scope of the remedial alternative. Changes in the cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedial alternative. This cost estimate is expected to be within -30% to +50% of the actual project cost. Utilization of this cost estimate information beyond the stated purpose is not recommended. ARCADIS is not licensed to provide financial or legal consulting services; as such, this cost estimate information is not intended to be utilized for complying with financial reporting requirements associated with liability reserves.
2. This cost estimate was based on 2008 dollars and ARCADIS's past experience and vendor quotes.
3. Present worth is estimated based on a 7% beginning-of-year discount rate (adjusted for inflation) in accordance with OSWER Directive 9355.3-20 "Revisions to OMB Circular A-94 on Guidelines and Discount Rates for Benefit-Cost Analysis" (USEPA, 1993). It is assumed that "year zero" is 2008.
4. Costs do not include legal fees, permitting, obtaining off-site access, negotiations or agency oversight.

Notes:

1. Institutional Controls cost estimate includes administrative costs associated with implementing controls to minimize the potential for human exposure to remaining impacted subsurface soil. Such institutional controls may include governmental controls, proprietary controls, enforcement tools, permit controls and/or informational devices. This cost estimate also includes all labor and materials necessary to institute deed restrictions for the site to prevent potential future use of site groundwater.
2. Pre-design investigation cost estimate includes all labor, equipment, travel, subsistence and materials necessary to 1) conduct a groundwater investigation to evaluate the role of natural attenuation and the necessity and selection of amendments to enhance the microbial community, 2) conduct a subsurface investigation to confirm the proposed limits of excavation for the removal of the subsurface structure and MGP-related impacts observed at SB-14A and proposed limits of in-situ stabilization and 3) conduct an in-situ stabilization bench-scale treatability study.
3. Laboratory analysis cost estimate includes all labor, equipment and materials necessary to submit up to 6 groundwater samples to an analytical laboratory for analysis for chemical constituents of concern (BTEX compounds and PAHs) and natural attenuation indicator parameters (i.e., total biomass, PAH-degrading indicator compounds, geochemical parameters). Cost assumes standard analytical turnaround time. No costs have been included for data validation.
4. Oxygen enhancement wells cost estimate includes all labor, equipment and materials necessary to install and develop four 4-inch-diameter, 20-foot deep PVC wells for the introduction of an oxygen-releasing compound to the groundwater.
5. Stainless steel canisters cost estimate includes all labor, equipment and materials necessary to purchase and install stainless steel canisters and oxygen-releasing compound for the first year. Cost assumes amendments will be replenished on a semi-annual basis during the first year of oxygen enhancement.
6. Waste disposal cost estimate includes all labor, equipment and materials necessary to characterize and dispose waste material generated during the groundwater monitoring activities. Cost assumes that the waste material would be disposed of as a non-hazardous waste at an appropriate treatment/disposal facility. Cost assumes one drum of liquid and other miscellaneous material would be generated annually.

Remedial Alternative IV A - IC with Enhanced NA, Installation of Surface Cover, Removal of Subsurface Structure at SB-14A and ISS of Gas Holder 1

7. Mobilization/demobilization cost includes mobilization and demobilization of all labor, equipment and materials necessary to conduct removal activities, install an asphalt surface cover and perform in-situ soil stabilization of NAPL-impacted soil within and beneath Gas Holder #1. This cost estimate also includes labor, equipment and materials necessary to locate, identify and mark out underground utilities at the site. Equipment to be mobilized includes, but not limited to, excavators (with buckets and hoe ram), dump trucks, drill rig, grout mix plant, grout pumps and jet grout drill rig.

8. Decontamination pad cost estimate includes labor, equipment and materials necessary to construct and remove a 60-foot by 30-foot decontamination pad and appurtenances.

9. Temporary fencing/barrier cost estimate includes labor, equipment and materials necessary to install, relocate (as necessary) and remove temporary fencing and jersey barriers (within roadways) around the working area.

10. Soil staging area cost estimate includes labor, equipment and materials necessary to construct a material staging, mixing, and dewatering area consisting of a 12-inch gravel fill layer and geomembrane liner.

11. Dust/vapor/odor control cost estimate includes labor, equipment and materials necessary monitor dust/vapor/odor emission during intrusive site activities. Cost estimate includes application of vapor/odor suppressing foam, water mist, or other supression techniques, as necessary.

12. Pre-Excavation cost estimate includes labor, equipment and materials necessary to pre-excavate soils to a depth of 6 feet within Holder #1 to locate utilities and within a 3-foot wide by 50-foot long trench around the 24-inch sanitary sewer line located at an approximate depth of 10 feet within the holder. Cost estimate includes cost for saw cutting asphalt and concrete sidewalks.

13. ISS/jet-grouting cost estimate includes labor, equipment and materials necessary to perform jet-grouting to facilitate ISS around subsurface utilities within and beneath Holder #1 to a target depth of 24 feet bgs. Cost estimate assumes 2 million gallons of water would be available from hydrant.

14. Surface soil excavation and handling cost estimate includes labor, equipment and materials necessary to excavate, stage and subsequently load aproximately 2-inches of surface soil (vegetative cover) to facilitate asphalt surface cover installation into trucks for off-site disposal. The actual volume of surface soil to be excavated will be determined during remedial design.

15. Subsurface structure removal cost estimate includes labor, equipment and materials necessary to remove subsurface structure observed at soil boring SB-14A. Cost estimate includes cost to remove and dispose of contents of structure (assumed 1,500 gallons of liquid to be disposed of as nonhazardous liquid waste), decontaminate structure, demolish structure (assumed exterior dimensions of 10 ft x 10 ft x 3 ft) and process material to a diameter of 8 -inches or less and excavate surrounding soil to a depth of 10 feet bgs (approximately 160 CY, including 15 CY of concrete). Cost estimate assumes the excavation will be benched/sloped and also includes cost to stage and subsequently load into trucks for off-site disposal. Actual volumes will be determined during remedial design and/or during implementation.

16. Spoils handling cost estimate includes labor, equipment and materials necessary to manage ISS spoils (i.e., excess material generated during ISS treatment). Soil volume was assumed to be 75 percent of the jet-grouting volume.

17. Water management cost estimate includes labor, equipment and materials necessary to collect, handle and dispose of liquids from within the excavation area. Cost assumes localized sumps and rental of a 21,000 gallon storage tank, with subsequent discharge of less than 100,000 gallons to a POTF as nonhazardous.

18. Select fill cost estimate includes labor, equipment and materials necessary to import, place and compact in-place quantity of select fill to backfill the soil excavation area at SB-14A (160 CY), to increase grade for area receiving the bituminous asphalt surface cover approximately 12-inches (600 CY) and to backfill the preexcavation area at Gas Holder 1(680 CY). Cost estimate assumes that no excavated soil will be reused as general fill at the site.

Table 5-3

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Remedial Alternative IV A - IC with Enhanced NA, Installation of Surface Cover, Removal of Subsurface Structure at SB-14A and ISS of Gas Holder 1

19. Crushed stone subbase with fabric cost estimate includes labor, equipment and materials necessary to install a geotextile fabric and an approximately 8-inch thick compacted layer of crushed stone to serve as a subbase for the bituminous asphalt top and base courses. The calculated asphalt surface cover area includes area of NYSEG property not currently covered in concrete or asphalt and disturbed areas in Railroad Place.
20. Bituminous asphalt base course cost estimate includes labor, equipment and materials necessary to install a 2.5-inch compacted layer of bituminous asphalt base course over the subbase.
21. Bituminous asphalt top course cost estimate includes labor, equipment and materials necessary to install a 1.5-inch compacted layer of bituminous asphalt top course over the base course.
22. Waste characterization cost estimate includes the analysis of soil samples obtained once per every 100 cubic yards of excavated material destined for off-site treatment/disposal. The actual sampling frequency will be determined by generator, receiving disposal facility and heterogeneity of waste materials.
23. Soil transportation and disposal cost estimate includes transporting stabilized material to an off-site facility for thermal treatment and disposal. This cost estimate also includes all labor, equipment and materials necessary to transport and dispose of ISS spoils as non-hazardous waste at a permitted disposal facility.
24. Debris transportation and disposal cost estimate includes transporting debris generated during implementation of the remedial activities to a non-hazardous off-site disposal facility. The weight of material was based on an assumed 1.65 tons per cubic yard of debris destined for off-site disposal. Anticipated debris would include concrete, stone or brick from the subsurface structure at SB-14A. Structure is assumed to be approximately 10 feet by 10 feet by 3 feet tall, with 1-foot thick walls.
25. Site restoration/surface cover replacement cost estimate includes all labor, equipment and materials necessary to replace the existing surface cover material. This includes vegetated areas, sidewalks, curbs and bituminous pavement. This also includes reparation of damages to the roadway caused by jet grouting.
26. Groundwater monitoring/enhancement system cost estimate includes: all labor, equipment, travel, subsistence and materials necessary to conduct semi-annual groundwater and NAPL monitoring for years 1 and 2, then annually through year 30. Groundwater monitoring will consist of collecting groundwater samples from six existing monitoring wells (MW-2, MW-3, MW-5, MW-6, MW-7, and MW-9) using low-flow sampling methods. In addition, this estimate includes all labor, equipment, and materials necessary to maintain the monitoring and oxygen enhancement wells, introduce oxygen-releasing compounds or other microbial amendments on a semi-annual basis, and dispose of any waste generated. This cost estimate also includes all labor, equipment and materials necessary to prepare an annual report summarizing the results of the groundwater and NAPL monitoring activities and the observed trends from oxygen enhancement.
27. Verification of IC/ECs and notifications to NYSDEC include verifying the status of controls and preparing/submitting annual notification to the NYSDEC to demonstrate that the controls are being maintained and remain effective.

Table 5-4

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Remedial Alternative IV B - IC with Enhanced NA, Installation of Surface Cover, Removal of Subsurface Structure at SB-14A and Gas Holder 1

Item #	Description	Quantity	Unit	Unit Price	Amount
CAPITAL COSTS					
1	Institutional Controls	1	ea	$50,000	$50,000
2	Pre-Design Investigation	1	ea	$120,000	$120,000
3	Laboratory Analysis	1	ea	$20,000	$20,000
4	Oxygen Enhancement Wells	80	LF	$250	$20,000
5	Stainless Steel Canisters	4	ea	$500	$2,000
6	Waste Disposal	4	drum	$500	$2,000
7	Mobilization/Demobilization	1	LS	$150,000	$150,000
8	Decontamination Pad	1	LS	$30,000	$30,000
9	Temporary Fencing/Barriers	1,500	LF	$25	$37,500
10	Soil Staging Area	1	LS	$15,000	$15,000
11	Utility Relocation	1	LS	$400,000	$400,000
12	Dust/Vapor/Odor Control	24	Week	$3,000	$72,000
13	Pre-Excavation	880	CY	$40	$35,200
14	Excavation Support	13,190	SF	$65	$857,350
15	Water Management	1	LS	$100,000	$100,000
16	Surface Soil Excavation and Handling	100	CY	$35	$3,500
17	Subsurface Structure Removal	1	LS	$20,000	$20,000
18	Soil Excavation and Handling	2,560	CY	$40	$102,400
19	Select Fill	4,040	CY	$30	$121,200
20	Crushed Stone Subbase w/ fabric	21,400	SF	$1.25	$26,750
21	Bituminous Asphalt Base Course	21,400	SF	$1.50	$32,100
22	Bituminous Asphalt Top Course	21,400	SF	$1.25	$26,750
23	Waste Characterization	26	ea	$1,000	$25,600
24	Soil Transportation and Disposal	6,900	Ton	$100	$690,000
25	Debris Transportation and Disposal	650	Ton	$75	$48,750
26	Site Restoration/Surface Cover Replacement	1	LS	$50,000	$50,000
				Subtotal Capital Cost	$3,058,100
				Engineering (15%)	$458,715
				Contingency (25%)	$764,525
				Total Capital Cost	$4,281,340
OPERATION AND MAINTENANCE (O&M) COSTS					
27	Groundwater Monitoring/Enhancement System	1	LS	$30,000	$30,000
28	Verification of IC/ECs and Notifications to NYSDEC	1	LS	$10,000	$10,000
				Subtotal O&M Costs	$40,000
				Contingency (25%)	$10,000
				Total O&M Costs	$50,000
				Present Worth Factor (30 years at 7%)	12.41
				Present Worth O&M Cost	$620,500
				Total Estimated Cost	$4,901,840
				Rounded to	$4,900,000

Table 5-4

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Remedial Alternative IV B - IC with Enhanced NA, Installation of Surface Cover, Removal of Subsurface Structure at SB-14A and Gas Holder 1

General Notes:

1. This estimate has been prepared for the purposes of comparing potential remedial alternatives. The information in this cost estimate is based on the available information regarding the site investigation and the anticipated scope of the remedial alternative. Changes in the cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedial alternative. This cost estimate is expected to be within -30% to +50% of the actual project cost. Utilization of this cost estimate information beyond the stated purpose is not recommended. ARCADIS is not licensed to provide financial or legal consulting services; as such, this cost estimate information is not intended to be utilized for complying with financial reporting requirements associated with liability reserves.
2. This cost estimate was based on 2008 dollars and ARCADIS's past experience and vendor quotes.
3. Present worth is estimated based on a 7% beginning-of-year discount rate (adjusted for inflation) in accordance with OSWER Directive 9355.3-20 "Revisions to OMB Circular A-94 on Guidelines and Discount Rates for Benefit-Cost Analysis" (USEPA, 1993). It is assumed that "year zero" is 2008.
4. Costs do not include legal fees, permitting, obtaining off-site access, negotiations or agency oversight.

Notes:

1. Institutional Controls cost estimate includes administrative costs associated with implementing controls to minimize the potential for human exposure to remaining impacted subsurface soil. Such institutional controls may include governmental controls, proprietary controls, enforcement tools, permit controls and/or informational devices. This cost estimate also includes all labor and materials necessary to institute deed restrictions for the site to prevent potential future use of site groundwater.
2. Pre-design investigation cost estimate includes all labor, equipment, travel, subsistence and materials necessary to 1) conduct a groundwater investigation to evaluate the role of natural attenuation and the necessity and selection of amendments to enhance the microbial community, 2) conduct a subsurface investigation to confirm the proposed limits of excavation for the removal of the subsurface structure and MGP-related impacts observed at SB-14A and proposed limits of excavation for the removal of Gas Holder #1 and MGP-impacted soil within and beneath the holder.
3. Laboratory analysis cost estimate includes all labor, equipment and materials necessary to submit up to 6 groundwater samples to an analytical laboratory for analysis for chemical constituents of concern (BTEX compounds and PAHs) and natural attenuation indicator parameters (i.e., total biomass, PAH-degrading indicator compounds, geochemical parameters). Cost assumes standard analytical turnaround time. No costs have been included for data validation.
4. Oxygen enhancement wells cost estimate includes all labor, equipment and materials necessary to install and develop four 4-inch-diameter, 20-foot deep PVC wells for the introduction of an oxygen-releasing compound to the groundwater.
5. Stainless steel canisters cost estimate includes all labor, equipment and materials necessary to purchase and install stainless steel canisters and oxygen-releasing compound for the first year. Cost assumes amendments will be replenished on a semi-annual basis during the first year of oxygen enhancement.
6. Waste disposal cost estimate includes all labor, equipment and materials necessary to characterize and dispose waste material generated during the groundwater monitoring activities. Cost assumes that the waste material would be disposed of as a non-hazardous waste at an appropriate treatment/disposal facility. Cost assumes one drum of liquid and other miscellaneous material would be generated annually.

Remedial Alternative IV B - IC with Enhanced NA, Installation of Surface Cover, Removal of Subsurface Structure at SB-14A and Gas Holder 1

7. Mobilization/demobilization cost includes mobilization and demobilization of all labor, equipment and materials necessary to conduct removal activities and install an asphalt surface cover. This cost estimate also includes labor, equipment and materials necessary to locate, identify and mark out underground utilities at the site. Equipment to be mobilized includes, but not limited to, excavators (with buckets and hoe ram), loaders, dump trucks, drill rig and a crane mounted vibratory hammer (to install sheetpile).

8. Decontamination pad cost estimate includes labor, equipment and materials necessary to construct and remove a 60-foot by 30-foot decontamination pad and appurtenances.
9. Temporary fencing/barrier cost estimate includes labor, equipment and materials necessary to install, relocate (as necessary) and remove temporary fencing and jersey barriers (within roadways) around the work area and any open excavation greater than 5 feet bgs.
10. Soil staging area cost estimate includes labor, equipment and materials necessary to construct a material staging, mixing, and dewatering area consisting of a 12-inch gravel fill layer and geomembrane liner.
11. Utility relocation cost estimate includes labor, equipment and materials necessary to relocate subsurface utilities to facilitate removal of Gas Holder #1, consisting of an 8-inch natural gas supply line, 2-inch natural gas service line, 8-inch water main and 24-inch sanitary sewer pipe.
12. Dust/vapor/odor control cost estimate includes labor, equipment and materials necessary monitor dust/vapor/odor emission during intrusive site activities. Cost estimate includes application of vapor/odor suppressing foam, water mist, or other suppression techniques, as necessary.
13. Pre-Excavation cost estimate includes labor, equipment and materials necessary to pre-excavate soils to a depth of 6 feet around and within Holder #1 to locate utilities and a 3-foot wide by 50-foot long trench around the 24-inch sanitary sewer line located at an approximate depth of 10 feet within the holder. Cost estimate includes cost for saw cutting asphalt and concrete sidewalks.
14. Excavation support cost estimate includes labor, equipment and materials necessary to install, remove and decontaminate excavation support at Gas Holder #1 excavation area. Cost estimate assumes that cantilever sheetpiling with an embedment depth at 1.5 times the maximum excavation depth of 24 feet (total sheeting depth [~60 feet] = excavation depth + embedment depth) will be used. The actual sheetpiling depth and excavation support will be determined during excavation design.
15. Water management cost estimate includes labor, equipment and materials necessary to collect, handle and dispose of liquids from within the excavation areas for two months. Cost assumes localized sumps, well points and rental and operation of a temporary treatment system with subsequent discharge of less than 500,000 gallons to the local POTW.
16. Surface soil excavation and handling cost estimate includes labor, equipment and materials necessary to excavate, stage and subsequently load approximately 2-inches of surface soil (vegetative cover) to facilitate asphalt surface cover installation into trucks for off-site disposal. The actual volume of surface soil to be excavated will be determined during remedial design.
17. Subsurface structure removal cost estimate includes labor, equipment and materials necessary to remove subsurface structure observed at soil boring SB-14A. Cost estimate includes cost to remove and dispose of contents of structure (assumed 1,500 gallons of liquid to be disposed of as nonhazardous liquid waste), decontaminate structure, demolish structure (assumed exterior dimensions of 10 ft x 10 ft x 3 ft) and process material to a diameter of 8 -inches or less and excavate surrounding soil to a depth of 10 feet bgs (approximately 160 CY, including 15 CY of concrete). Cost estimate assumes excavation will be benched/sloped and also includes cost to stage and subsequently load into trucks for off-site disposal. Actual volumes will be determined during remedial design and/or during implementation.

Table 5-4

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Remedial Alternative IV B - IC with Enhanced NA, Installation of Surface Cover, Removal of Subsurface Structure at SB-14A and Gas Holder 1

18. Soil excavation and handling cost estimate includes labor, equipment and materials necessary to remove Gas Holder 1, stage and subsequently load excavated material into trucks for off-site disposal. Cost estimate is based on in-place volume and assumes excavation to a depth of 24 feet bgs and includes a premium for removal of Gas Holder 1 foundation.
19. Select fill cost estimate includes labor, equipment and materials necessary to import, place and compact in-place quantity of select fill to backfill the soil excavation area at SB-14A (160 CY), to increase grade for area receiving the bituminous asphalt surface cover approximately 12-inches (600 CY) and, to backfill the Gas Holder 1 excavation to 1 feet below road elevation (3,280 CY). Cost estimate assumes that no excavated soil will be reused as general fill at the site.
20. Crushed stone subbase with fabric cost estimate includes labor, equipment and materials necessary to install a geotextile fabric and an approximately 8-inch thick compacted layer of crushed stone to serve as a subbase for the bituminous asphalt top and base courses. The calculated asphalt surface cover area includes area of NYSEG property not currently covered in concrete or asphalt and disturbed areas in Railroad Place.
21. Bituminous asphalt base course cost estimate includes labor, equipment and materials necessary to install a 2.5-inch compacted layer of bituminous asphalt base course over the subbase.
22. Bituminous asphalt top course cost estimate includes labor, equipment and materials necessary to install a 1.5-inch compacted layer of bituminous asphalt top course over the base course.
23. Waste characterization cost estimate includes the analysis of soil samples obtained once per every 100 cubic yards of excavated material destined for off-site treatment/disposal. The actual sampling frequency will be determined by generator, receiving disposal facility and heterogeneity of waste materials.
24. Soil transportation and disposal cost estimate includes transporting stabilized material to an off-site facility for thermal treatment and disposal. The weight of material was based on an assumed 1.65 tons per cubic yard of soil destined for off-site treatment/disposal.
25. Debris transportation and disposal cost estimate includes transporting debris generated during implementation of the remedial activities to a non-hazardous off-site disposal facility. The weight of material was based on an assumed 1.65 tons per cubic yard of debris destined for off-site disposal. Anticipated debris would include concrete, stone or brick from the subsurface structure at SB-14A. Structure is assumed to be approximately 10 feet by 10 feet by 3 feet tall, with 1-foot thick walls. Additional debris would include concrete, stone or brick from Gas Holder #1 (60 feet in diameter by 20 feet high with 4-foot thick walls and a 1-foot thick floor).
26. Site restoration/surface cover replacement cost estimate includes all labor, equipment and materials necessary to replace the existing surface cover material. This includes vegetated areas, sidewalks, curbs and bituminous pavement.
27. Groundwater monitoring/enhancement system cost estimate includes: all labor, equipment, travel, subsistence and materials necessary to conduct semi-annual groundwater and NAPL monitoring for years 1 and 2, then annually through year 30. Groundwater monitoring will consist of collecting groundwater samples from six existing monitoring wells (MW-2, MW-3, MW-5, MW-6, MW-7, and MW-9) using low-flow sampling methods. In addition, this estimate includes all labor, equipment, and materials necessary to maintain the monitoring and oxygen enhancement wells, introduce oxygen-releasing compounds or other microbial amendments on a semi-annual basis, and dispose of any waste generated. This cost estimate also includes all labor, equipment and materials necessary to prepare an annual report summarizing the results of the groundwater and NAPL monitoring activities and the observed trends from oxygen enhancement.
28. Verification of IC/ECs and notifications to NYSDEC include verifying the status of controls and preparing/submitting annual notification to the NYSDEC to demonstrate that the controls are being maintained and remain effective.

Table 5-5

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Remedial Alternative IV C - IC with Enhanced NA, Installation of Surface Cover, Removal of Subsurface Structure at SB-14A and Containment of Gas Holder 1

Item #	Description	Quantity	Unit	Unit Price	Amount
CAPITAL COSTS					
1	Institutional Controls	1	ea	$50,000	$50,000
2	Pre-Design Investigation	1	ea	$170,000	$170,000
3	Laboratory Analysis	1	ea	$20,000	$20,000
4	Oxygen Enhancement Wells	80	LF	$250	$20,000
5	Stainless Steel Canisters	4	ea	$500	$2,000
6	Waste Disposal	4	drum	$500	$2,000
7	Mobilization/Demobilization	1	LS	$200,000	$200,000
8	Decontamination Pad	1	LS	$30,000	$30,000
9	Temporary Fencing/Barriers	1,250	LF	$25	$31,250
10	Soil Staging Area	1	LS	$10,000	$10,000
11	Dust/Vapor/Odor Control	12	Week	$3,000	$36,000
12	Pre-Trenching	126	CY	$50	$6,300
13	Install/Remove Guidewall	220	LF	$500	$109,900
14	Install Circular Barrier Wall	18,700	SF	$45	$841,500
15	Jet-Grouting	445	CY	$550	$244,658
16	Surface Soil Excavation and Handling	100	CY	$35	$3,500
17	Subsurface Structure Removal	1	LS	$20,000	$20,000
18	Water Management	1	LS	$25,000	$25,000
19	Select Fill	886	CY	$30	$26,580
20	Crushed Stone Subbase w/ fabric	21,400	SF	$1.25	$26,750
21	Bituminous Asphalt Base Course	21,400	SF	$1.50	$32,100
22	Bituminous Asphalt Top Course	21,400	SF	$1.25	$26,750
23	Waste Characterization	9	ea	$1,000	$9,091
24	Soil Transportation and Disposal	1,500	Ton	$100	$150,000
25	Debris Transportation and Disposal	25	Ton	$75	$1,875
26	Site Restoration/Surface Cover Replacement	1	LS	$40,000	$40,000
				Subtotal Capital Cost	$2,135,254
				Engineering (15%)	$320,288
				Contingency (25%)	$533,814
				Total Capital Cost	$2,989,356
OPERATION AND MAINTENANCE (O&M) COSTS					
27	Groundwater Monitoring/Enhancement System	1	LS	$30,000	$30,000
28	Verification of IC/ECs and Notifications to NYSDEC	1	LS	$10,000	$10,000
				Subtotal O&M Costs	$40,000
				Contingency (25%)	$10,000
				Total O&M Costs	$50,000
				Present Worth Factor (30 years at 7%)	12.41
				Present Worth O&M Cost	$620,500
				Total Estimated Cost	$3,609,856
				Rounded to	$3,600,000

Table 5-5

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Remedial Alternative IV C - IC with Enhanced NA, Installation of Surface Cover, Removal of Subsurface Structure at SB-14A and Containment of Gas Holder 1

General Notes:

1. This estimate has been prepared for the purposes of comparing potential remedial alternatives. The information in this cost estimate is based on the available information regarding the site investigation and the anticipated scope of the remedial alternative. Changes in the cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedial alternative. This cost estimate is expected to be within -30% to +50% of the actual project cost. Utilization of this cost estimate information beyond the stated purpose is not recommended. ARCADIS is not licensed to provide financial or legal consulting services; as such, this cost estimate information is not intended to be utilized for complying with financial reporting requirements associated with liability reserves.
2. This cost estimate was based on 2008 dollars and ARCADIS's past experience and vendor quotes.
3. Present worth is estimated based on a 7% beginning-of-year discount rate (adjusted for inflation) in accordance with OSWER Directive 9355.3-20 "Revisions to OMB Circular A-94 on Guidelines and Discount Rates for Benefit-Cost Analysis" (USEPA, 1993). It is assumed that "year zero" is 2008.
4. Costs do not include legal fees, permitting, obtaining off-site access, negotiations or agency oversight.

Notes:

1. Institutional Controls cost estimate includes administrative costs associated with implementing controls to minimize the potential for human exposure to remaining impacted subsurface soil. Such institutional controls may include governmental controls, proprietary controls, enforcement tools, permit controls and/or informational devices. This cost estimate also includes all labor and materials necessary to institute deed restrictions for the site to prevent potential future use of site groundwater.
2. Pre-design investigation cost estimate includes all labor, equipment, travel, subsistence and materials necessary to 1) conduct a groundwater investigation to evaluate the role of natural attenuation and the necessity and selection of amendments to enhance the microbial community and 2) conduct a subsurface investigation to a) confirm the proposed limits of excavation for the removal of the subsurface structure and MGP-related impacts observed at SB-14A and b) collect geotechnical data at the proposed location of a circular barrier wall around Gas Holder #1.
3. Laboratory analysis cost estimate includes all labor, equipment and materials necessary to submit up to 6 groundwater samples to an analytical laboratory for analysis for chemical constituents of concern (BTEX compounds and PAHs) and natural attenuation indicator parameters (i.e., total biomass, PAH-degrading indicator compounds, geochemical parameters). Cost assumes standard analytical turnaround time. No costs have been included for data validation.
4. Oxygen enhancement wells cost estimate includes all labor, equipment and materials necessary to install and develop four 4-inch-diameter, 20-foot deep PVC wellsfor the introduction of an oxygen-releasing compound to the groundwater.
5. Stainless steel canisters cost estimate includes all labor, equipment and materials necessary to purchase and install stainless steel canisters and oxygen-releasing compound for the first year. Cost assumes amendments will be replenished on a semi-annual basis during the first year of oxygen enhancement.
6. Waste disposal cost estimate includes all labor, equipment and materials necessary to characterize and dispose waste material generated during the groundwater monitoring activities. Cost assumes that the waste material would be disposed of as a non-hazardous waste at an appropriate treatment/disposal facility. Cost assumes one drum of liquid and other miscellaneous material would be generated annually.

Table 5-5

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Remedial Alternative IV C - IC with Enhanced NA, Installation of Surface Cover, Removal of Subsurface Structure at SB-14A and Containment of Gas Holder 1

7. Mobilization/demobilization cost estimate includes mobilization and demobilization of labor, equipment and materials necessary to conduct removal activities, install a circular barrier wall and install an asphalt surface cover. This cost estimate also includes labor, equipment and materials necessary to locate, identify and mark out underground utilities at the site. Equipment to be mobilized includes, but not limited to, an excavator (with buckets and hoe ram), dump trucks, drill rig, slurry mix tank system, crane mounted clam shell excavator, and tanks to store slurry and potable water (for slurry).

8. Decontamination pad cost estimate includes labor, equipment and materials necessary to construct and remove a 60-foot by 30-foot decontamination pad and appurtenances.

9. Temporary fencing/barrier cost estimate includes labor, equipment and materials necessary to install, relocate (as necessary) and remove temporary fencing and jersey barriers (within roadways) around the work area and any open excavations greater than 5 feet bgs.

10. Soil staging area cost estimate includes labor, equipment and materials necessary to construct a material staging, mixing, and dewatering area consisting of a 12-inch gravel fill layer and geomembrane liner.

    Dust/vapor/odor control cost estimate includes labor, equipment and materials necessary monitor dust/vapor/odor emission during intrusive site activities. Cost estimate includes application of vapor/odor suppressing foam, water mist, or other supression techniques, as necessary.

11. Pre-trenching cost estimate includes labor, equipment and materials necessary to trencharound the outer diameter of the barrier wall (~70 to 66 feet) to facilitate installation of the guide wall. Cost assumes soil removal to an average depth of 8 feet (top of silt layer or to top of utilities) using trench boxes or other shoring methods. Cost estimate includes cost for saw cutting asphalt and concrete sidewalks.

12. Install/remove guidewall cost estimate includes labor, equipment and materials necessary to install a guidewall inside the trench to guide the clam shell excavator during installation of the barrier wall. This cost includes saw cutting the asphalt and sidewalks to facilitate forming and installation of guide wall.

13. Install circular barrier wall cost estimate includes labor, equipment and materials necessary to install a soil-cement-bentonite circular barrier wall around Gas Holder #1 for cut off. Cost assumes wall will be installed using a clam shell excavator. Other required equipment includes a crane, mixing plant and water tanks. Cost assumes wall will be 85 feet deep and 2 feet thick with an outer diameter of 70 feet.

14. Jet-grouting cost estimate includes labor, equipment and materials necessary to perform jet-grouting around subsurface utilities within and adjacent to Gas Holder #1. Cost assumes two jet grouting columns will be installed on either side of each utility (where it crosses the 2-foot thick barrier wall) with a total of 20 3-foot-diameter, 85-foot deep columns. Cost estimate assumes 1 million gallons of water would be available from hydrant.

15. Surface soil excavation and handling cost estimate includes labor, equipment and materials necessary to excavate, stage and subsequently load aproximately 2-inches of surface soil (vegetative cover) to facilitate asphalt surface cover installation into trucks for off-site disposal. The actual volume of surface soil to be excavated will be determined during remedial design.

16. Subsurface structure removal cost estimate includes labor, equipment and materials necessary to remove subsurface structure observed at soil boring SB-14A. Cost estimate includes cost to remove and dispose of contents of structure (assumed 1,500 gallons of liquid to be disposed of as nonhazardous liquid waste), decontaminate structure, demolish structure (assumed exterior dimensions of 10 ft x 10 ft x 3 ft) and process material to a diameter of 8 -inches or less and excavate surrounding soil to a depth of 10 feet bgs (approximately 160 CY, including 15 CY of concrete). Cost estimate assumes excavation will be benched/sloped and also includes cost to stage and subsequently load into trucks for off-site disposal. Actual volumes will be determined during remedial design and/or during implementation.

Table 5-5

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Remedial Alternative IV C - IC with Enhanced NA, Installation of Surface Cover, Removal of Subsurface Structure at SB-14A and Containment of Gas Holder 1

17. Water management cost estimate includes labor, equipment and materials necessary to collect, handle and dispose of liquids from within the excavation area. Cost assumes localized sumps and rental of a 21,000 gallon storage tank, with subsequent discharge of less than 50,000 gallons to a POTF as nonhazardous.

18. Select fill cost estimate includes labor, equipment and materials necessary to import, place and compact in-place quantity of select fill to backfill the soil excavation area at SB-14A (160 CY), to increase grade for area receiving the bituminous asphalt surface cover approximately 12-inches (600 CY) and to backfill the preexcavation volume (126 CY). Cost estimate assumes that no excavated soil will be reused as general fill at the site.

19. Crushed stone subbase with fabric cost estimate includes labor, equipment and materials necessary to install a geotextile fabric and an approximately 8-inch thick compacted layer of crushed stone to serve as a subbase for the bituminous asphalt top and base courses. The calculated asphalt surface cover area includes area of NYSEG property not currently covered in concrete or asphalt and disturbed areas in Railroad Place.

20. Bituminous asphalt base course cost estimate includes labor, equipment and materials necessary to install a 2.5-inch compacted layer of bituminous asphalt base course over the subbase.

21. Bituminous asphalt top course cost estimate includes labor, equipment and materials necessary to install a 1.5-inch compacted layer of bituminous asphalt top course over the base course.

22. Waste characterization cost estimate includes the analysis of soil samples obtained once per every 100 cubic yards of excavated material destined for off-site treatment/disposal as well as material to be used as backfill. The actual sampling frequency will be determined by generator, receiving disposal facility, and based on heterogeneity of materials.

23. Soil transportation and disposal cost estimate includes transporting stabilized material to an off-site facility for thermal treatment and disposal. The weight of material was based on an assumed 1.65 tons per cubic yard of soil destined for off-site treatment/disposal.

24. Debris transportation and disposal cost estimate includes transporting debris generated during implementation of the remedial activities to a non-hazardous off-site disposal facility. The weight of material was based on an assumed 1.65 tons per cubic yard of debris destined for off-site disposal. Anticipated debris would include concrete, stone or brick from the subsurface structure at SB-14A. Structure is assumed to be approximately 10 feet by 10 feet by 3 feet tall, with 1-foot thick walls.

25. Site restoration/surface cover replacement cost estimate includes all labor, equipment and materials necessary to replace the existing surface cover material in the disturbed areas. This includes vegetated areas, sidewalks, curbs and bituminous pavement.

26. Groundwater monitoring/enhancement system cost estimate includes: all labor, equipment, travel, subsistence and materials necessary to conduct semi-annual groundwater and NAPL monitoring for years 1 and 2, then annually through year 30. Groundwater monitoring will consist of collecting groundwater samples from six existing monitoring wells (MW-2, MW-3, MW-5, MW-6, MW-7, and MW-9) using low-flow sampling methods. In addition, this estimate includes all labor, equipment, and materials necessary to maintain the monitoring and oxygen enhancement wells, introduce oxygen-releasing compounds or other microbial amendments on a semi-annual basis, and dispose of any waste generated. This cost estimate also includes all labor, equipment and materials necessary to prepare an annual report summarizing the results of the groundwater and NAPL monitoring activities and the observed trends from oxygen enhancement.

27. Verification of IC/ECs and notifications to NYSDEC include verifying the status of controls and preparing/submitting annual notification to the NYSDEC to demonstrate that the controls are being maintained and remain effective.

Table 5-6

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Remedial Alternative V - IC with Enhanced NA and Removal of Soil Containing MGP-Related COCs Greater than Part 375 SCOs for Unrestricted Use

Item #	Description	Quantity	Unit	Unit Price	Amount
CAPITAL COSTS					
1	Institutional Controls	1	ea	$50,000	$50,000
2	Pre-design Investigation	1	LS	$120,000	$120,000
3	Laboratory Analysis	1	ea	$20,000	$20,000
4	Oxygen Enhancement Wells	80	LF	$250	$20,000
5	Stainless Steel Canisters	4	ea	$500	$2,000
6	Waste Disposal	4	drum	$500	$2,000
7	Mobilization/Demobilization	1	LS	$150,000	$150,000
8	Decontamination Pad	1	LS	$100,000	$100,000
9	Temporary Fencing/Barriers	2,000	LF	$25	$50,000
10	Soil Staging Area	1	LS	$100,000	$100,000
11	Utility Relocation	1	LS	$600,000	$600,000
12	Dust/Vapor/Odor Control	30	Week	$3,000	$90,000
13	Pre-Excavation	880	CY	$40	$35,200
14	Water Management	1	LS	$150,000	$150,000
15	Surface Soil Excavation and Handling	100	CY	$35	$3,500
16	Subsurface Structure Removal	1	LS	$20,000	$20,000
17	Soil Excavation and Handling	7,900	CY	$45	$355,500
18	Select fill	8,660	CY	$30	$259,800
19	Crushed Stone Subbase w/ fabric	24,600	SF	$1.25	$30,750
20	Bituminous Asphalt Base Course	24,600	SF	$1.50	$36,900
21	Bituminous Asphalt Top Course	24,600	SF	$1.25	$30,750
22	Waste Characterization	79	ea	$1,000	$79,000
23	Soil Transportation and Disposal	16,790	Ton	$100	$1,679,000
24	Debris Transportation and Disposal	1,224	Ton	$75	$91,823
25	PSB Demolition	10,000	SF	$20	$200,000
26	PSB Soil Characterization	1	LS	$50,000	$50,000
27	PSB Soil Removal	2,500	CY	$35	$87,500
28	PSB Soil Backfill	2,500	CY	$30	$75,000
29	Land Purchase	1	LS	$200,000	$200,000
30	PSB Reconstruction	10,000	SF	$200	$2,000,000
31	Site Restoration/Surface Cover Replacement	1	LS	$40,000	$40,000
				Subtotal Capital Cost	$6,728,723
				Engineering (15%)	$1,009,308
				Contingency (25%)	$1,682,181
				Total Capital Cost	$9,420,212
OPERATION AND MAINTENANCE (O&M) COSTS					
32	Groundwater Monitoring/Enhancement System	1	LS	$30,000	$30,000
33	Verification of IC/ECs and Notifications to NYSDEC	1	LS	$10,000	$10,000
				Subtotal O&M Costs	$40,000
				Contingency (25%)	$10,000
				Total O&M Costs	$50,000
				Present Worth Factor (2 years at 7%)	1.81
				Present Worth O&M Cost	$90,500
				Total Estimated Cost	$9,510,712
				Rounded to	$9,500,000

Table 5-6

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Remedial Alternative V - IC with Enhanced NA and Removal of Soil Containing MGP-Related COCs Greater than Part 375 SCOs for Unrestricted Use

General Notes:

1. This estimate has been prepared for the purposes of comparing potential remedial alternatives. The information in this cost estimate is based on the available information regarding the site investigation and the anticipated scope of the remedial alternative. Changes in the cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedial alternative. This cost estimate is expected to be within -30% to +50% of the actual project cost. Utilization of this cost estimate information beyond the stated purpose is not recommended. ARCADIS is not licensed to provide financial or legal consulting services; as such, this cost estimate information is not intended to be utilized for complying with financial reporting requirements associated with liability reserves.
2. This cost estimate was based on 2008 dollars and ARCADIS's past experience and vendor quotes.
3. Present worth is estimated based on a 7% beginning-of-year discount rate (adjusted for inflation) in accordance with OSWER Directive 9355.3-20 "Revisions to OMB Circular A-94 on Guidelines and Discount Rates for Benefit-Cost Analysis" (USEPA, 1993). It is assumed that "year zero" is 2008.
4. Costs do not include legal fees, permitting, obtaining off-site access, negotiations or agency oversight.
5. The limits of this cost estimate address MGP-related impacts presented in the RI Report (ARCADIS, January 2008) and removal actions do not extend beneath the city of Geneva Public Safety Building.

Notes:

1. Institutional controls cost estimate includes administrative costs associated with implementing controls to minimize the potential for human exposure to remaining impacted subsurface soil. Such institutional controls may include governmental controls, proprietary controls, enforcement tools, permit controls and/or informational devices. This cost estimate also includes all labor and materials necessary to institute deed restrictions for the site to prevent potential future use of site groundwater.
2. Pre-design investigation cost estimate includes all labor, equipment, travel, subsistence and materials necessary to 1) conduct a groundwater investigation to evaluate the role of natural attenuation and the necessity and selection of amendments to enhance the microbial community, 2) conduct a subsurface investigation to confirm the proposed limits of excavation for the removal of the subsurface structures (e.g., SB-14A, Gas Holder 1, Lime House and Purifier House foundation walls), 3) collect design information.
3. Laboratory analysis cost estimate includes all labor, equipment and materials necessary to submit up to 6 groundwater samples to an analytical laboratory for analysis for chemical constituents of concern (BTEX compounds and PAHs) and natural attenuation indicator parameters (i.e., total biomass, PAH-degrading indicator compounds, geochemical parameters). Cost assumes standard analytical turnaround time. No costs have been included for data validation.
4. Oxygen enhancement wells cost estimate includes all labor, equipment and materials necessary to install and develop four 4-inch-diameter, 20-foot deep PVC wells for the introduction of an oxygen-releasing compound to the groundwater.
5. Stainless steel canisters cost estimate includes all labor, equipment and materials necessary to purchase and install stainless steel canisters and oxygen-releasing compound for the first year. Cost assumes amendments will be replenished on a semi-annual basis during the first year of oxygen enhancement.
6. Waste disposal cost estimate includes all labor, equipment and materials necessary to characterize and dispose waste material generated during the groundwater monitoring activities. Cost assumes that the waste material would be disposed of as a non-hazardous waste at an appropriate treatment/disposal facility. Cost assumes one drum of liquid and other miscellaneous material would be generated annually.
7. Mobilization/demobilization cost includes mobilization and demobilization of all labor, equipment and materials necessary to conduct removal activities and install an asphalt surface cover. This cost estimate also includes labor, equipment and materials necessary to locate, identify and mark out underground utilities at the site. Equipment to be mobilized includes, but not limited to, excavators (with buckets and hoe ram), loaders, dump trucks, drill rig and a crane mounted vibratory hammer (to install sheetpile, H-piles).
8. Decontamination pad cost estimate includes labor, equipment and materials necessary to construct and remove a 100-foot by 50-foot decontamination pad and appurtenances.
9. Temporary fencing/barrier cost estimate includes labor, equipment and materials necessary to install, relocate (as necessary) and remove temporary fencing and jersey barriers (within roadways) around the working area.

Table 5-6

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Remedial Alternative V - IC with Enhanced NA and Removal of Soil Containing MGP-Related COCs Greater than Part 375 SCOs for Unrestricted Use

10. Soil staging area cost estimate includes labor, equipment and materials to construct a material staging, mixing, and dewatering area consisting of a 12-inch gravel fill layer and geomembrane liner.
11. Utility relocation cost estimate includes labor, equipment and materials necessary to relocate subsurface utilities to facilitate removal of Gas Holder #1, consisting of an 8-inch natural gas supply line, 2-inch natural gas service line, 8-inch water main and 24-inch sanitary sewer pipe.
12. Dust/vapor/odor control cost estimate includes labor, equipment and materials necessary monitor dust/vapor/odor emission during intrusive site activities. Cost estimate includes application of vapor/odor suppressing foam, water mist, or other supression techniques, as necessary.
13. Pre-Excavation cost estimate includes labor, equipment and materials necessary to pre-excavate soils to a depth of 6 feet around and within Holder #1 to locate utilities and a 3-foot wide by 50-foot long trench around the 24-inch sanitary sewer line located at an approximate depth of 10 feet within the holder. Cost estimate includes cost for saw cutting asphalt and concrete sidewalks.
14. Water management cost estimate includes labor, equipment and materials necessary to collect, handle and dispose of liquids from within the excavation areas for 3 months. Cost assumes localized sumps, well points and rental and operation of a temporary treatment system with subsequent discharge of less than 1,000,000 gallons to the local POTW.
15. Surface soil excavation and handling cost estimate includes labor, equipment and materials necessary to excavate, stage and subsequently load aproximately 2-inches of surface soil (vegetative cover) to facilitate asphalt surface cover installation into trucks for off-site disposal. The actual volume of surface soil to be excavated will be determined during remedial design.
16. Subsurface structure removal cost estimate includes labor, equipment and materials necessary to remove subsurface structure observed at soil boring SB-14A. Cost estimate includes cost to remove and dispose of contents of structure (assumed 1,500 gallons of liquid to be disposed of as nonhazardous liquid waste), decontaminate structure, demolish structure (assumed exterior dimensions of 10 ft x 10 ft x 3 ft) and process material to a diameter of 8 -inches or less and excavate surrounding soil to a depth of 10 feet bgs (approximately 160 CY, including 15 CY of concrete). Cost estimate assumes excavation will be benched/sloped and also includes cost to stage and subsequently load into trucks for off-site disposal. Actual volumes will be determined during remedial design and/or during implementation.
17. Soil excavation and handling cost estimate includes labor, equipment and materials necessary to excavate soil containing constituents greater than unrestricted use SCOs and transfer material to a staging area and subsequently load or direct load into trucks for off-site disposal. Cost estimate is based on in-place soil volume and includes a premium for removal of historic foundations (e.g., Gas Holder 1, Lime House, Purifier House).
18. Select fill cost estimate includes labor, equipment and materials necessary to import, place and compact in-place quantity of select fill to backfill the soil excavation area at SB-14A (160 CY), to increase grade for area receiving the bituminous asphalt surface cover approximately 12-inches (600 CY) and, to backfill the remaining excavations (7,900 CY). Cost estimate assumes that no excavated soil will be reused as general fill at the site.
19. Crushed stone subbase with fabric cost estimate includes labor, equipment and materials necessary to install a geotextile fabric and an approximately 8-inch thick compacted layer of crushed stone to serve as a subbase for the bituminous asphalt top and base courses. The calculated asphalt surface cover area includes area of NYSEG property not currently covered in concrete or asphalt and disturbed areas in Railroad Place.
20. Bituminous asphalt base course cost estimate includes labor, equipment and materials necessary to install a 2.5-inch compacted layer of bituminous asphalt base course over the subbase.
21. Bituminous asphalt top course cost estimate includes labor, equipment and materials necessary to install a 1.5-inch compacted layer of bituminous asphalt top course over the base course.
22. Waste characterization cost estimate includes the analysis of soil samples obtained once per every 100 cubic yards of excavated material destined for off-site treatment/disposal. The actual sampling frequency will be determined by generator, receiving disposal facility, and based on heterogeneity of waste materials.
23. Soil transportation and disposal cost estimate includes transporting stabilized material to an off-site facility for thermal treatment and disposal. The weight of material was based on an assumed 1.65 tons per cubic yard of soil destined for off-site treatment/disposal.

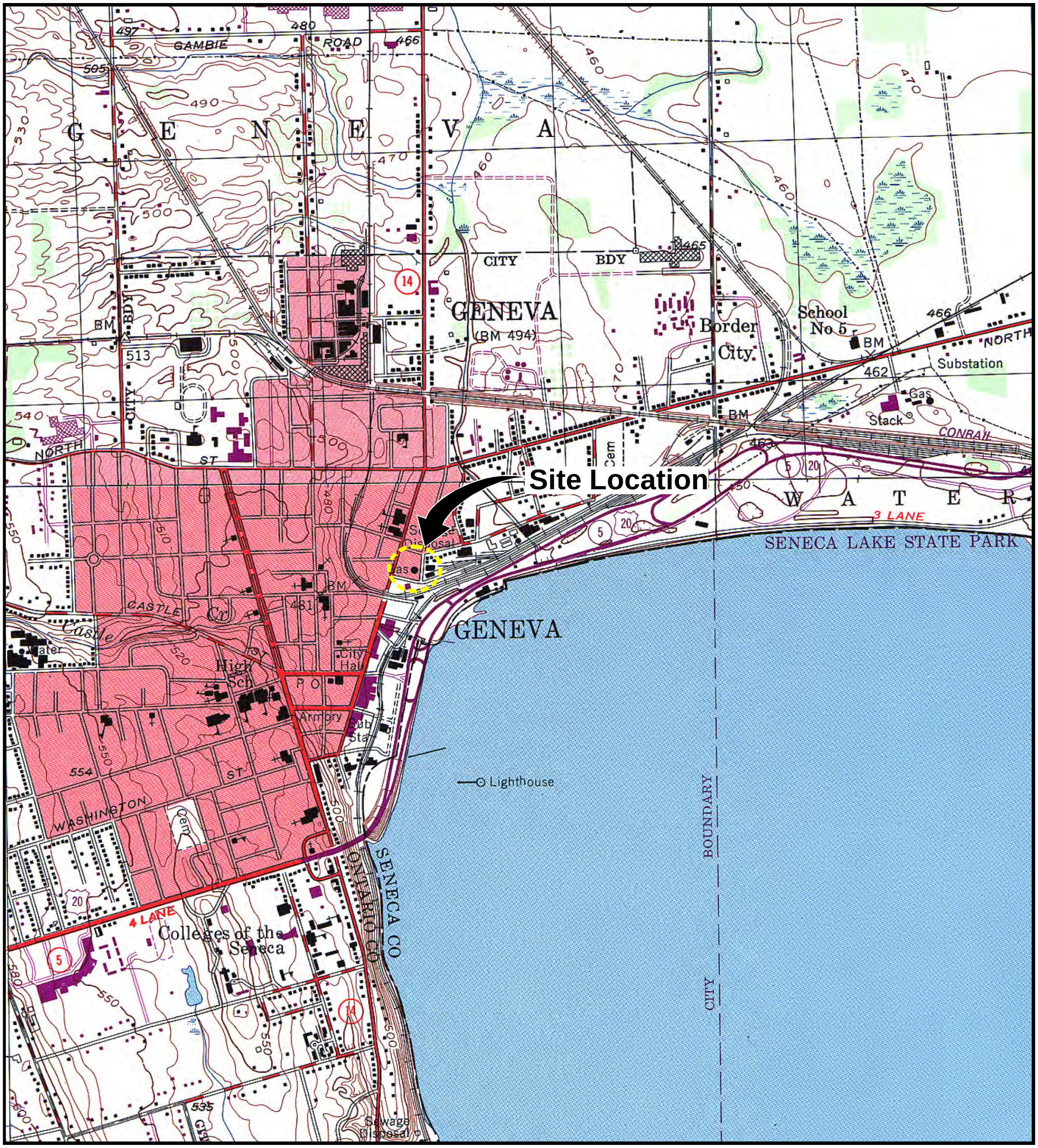
Table 5-6

NYSEG
Wadsworth Street Former MGP Site
Geneva, New York
Feasibility Study Report

Remedial Alternative V - IC with Enhanced NA and Removal of Soil Containing MGP-Related COCs Greater than Part 375 SCOs for Unrestricted Use

24. Debris transportation and disposal cost estimate includes transporting debris generated during implementation of the remedial activities to a non-hazardous off-site disposal facility. The weight of material was based on an assumed 1.65 tons per cubic yard of debris destined for off-site disposal. Anticipated debris would include concrete, stone or brick from the subsurface structure at SB-14A. Structure is assumed to be approximately 10 feet by 10 feet by 3 feet tall, with 1-foot thick walls. Additional debris would include concrete, stone or brick from Gas Holder #1 (60 feet in diameter by 20 feet high with 4-foot thick walls and a 1-foot thick floor) and from the Lime House and Purifier House foundation walls and floor (95 feet by 2 feet by 4 feet tall, with 1-foot thick walls, and two sections of floor 20 feet by 25 feet by 1-foot thick).
25. Building demolition costs for the PSB to be demolished to the slab and include transportation and disposal of generated demolition debris.
26. The PSB Soil characterization will include characterization of the subsurface soil beneath the PSB structure.
27. Soil excavation and handling cost estimate includes labor, equipment and materials necessary to excavate, stage and subsequently load aproximately 10 ft of sub-surface soil into trucks for off-site disposal. The actual volume of surface soil to be excavated will be determined during remedial design.
28. Select fill cost estimate includes labor, equipment and materials necessary to import, place and compact in-place quantity of select fill to backfill the soil excavation area beneat the PSB.
29. Land purchase is a lump sum cost to purchase a suitable piece of property for the reconstrcution of the PSB
30. PSB Reconstruction cost includes a anticipated cost per square foot to rebuild the existing structure.
31. Site restoration/surface cover replacement cost estimate includes all labor, equipment and materials necessary to replace the existing surface cover material in the disturbed areas. This includes vegetated areas, sidewalks, curbs and bituminous pavement.
32. Groundwater monitoring/enhancement system cost estimate includes: all labor, equipment, travel, subsistence and materials necessary to conduct semi-annual groundwater and NAPL monitoring for years 1 and 2. Groundwater monitoring will consist of collecting groundwater samples from six existing monitoring wells (MW-2, MW-3, MW-5, MW-6, MW-7, and MW-9) using low-flow sampling methods. In addition, this estimate includes all labor, equipment, and materials necessary to maintain the monitoring and oxygen enhancement wells, introduce oxygen-releasing compounds or other microbial amendments on a semi-annual basis, and dispose of any waste generated. This cost estimate also includes all labor, equipment and materials necessary to prepare an annual report summarizing the results of the groundwater and NAPL monitoring activities and the observed trends from oxygen enhancement.
33. Verification of IC/ECs and notifications to NYSDEC include verifying the status of controls and preparing/submitting annual notification to the NYSDEC to demonstrate that the controls are being maintained and remain effective.

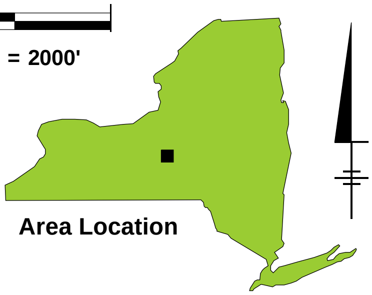
Figures



REFERENCE: BASE MAP USGS 7.5 MIN. QUAD., GENEVA S. & GENEVA N., NY, 1953, PHOTOREVISED 1978.

2000' 0 2000'

Approximate Scale: 1" = 2000'



Area Location

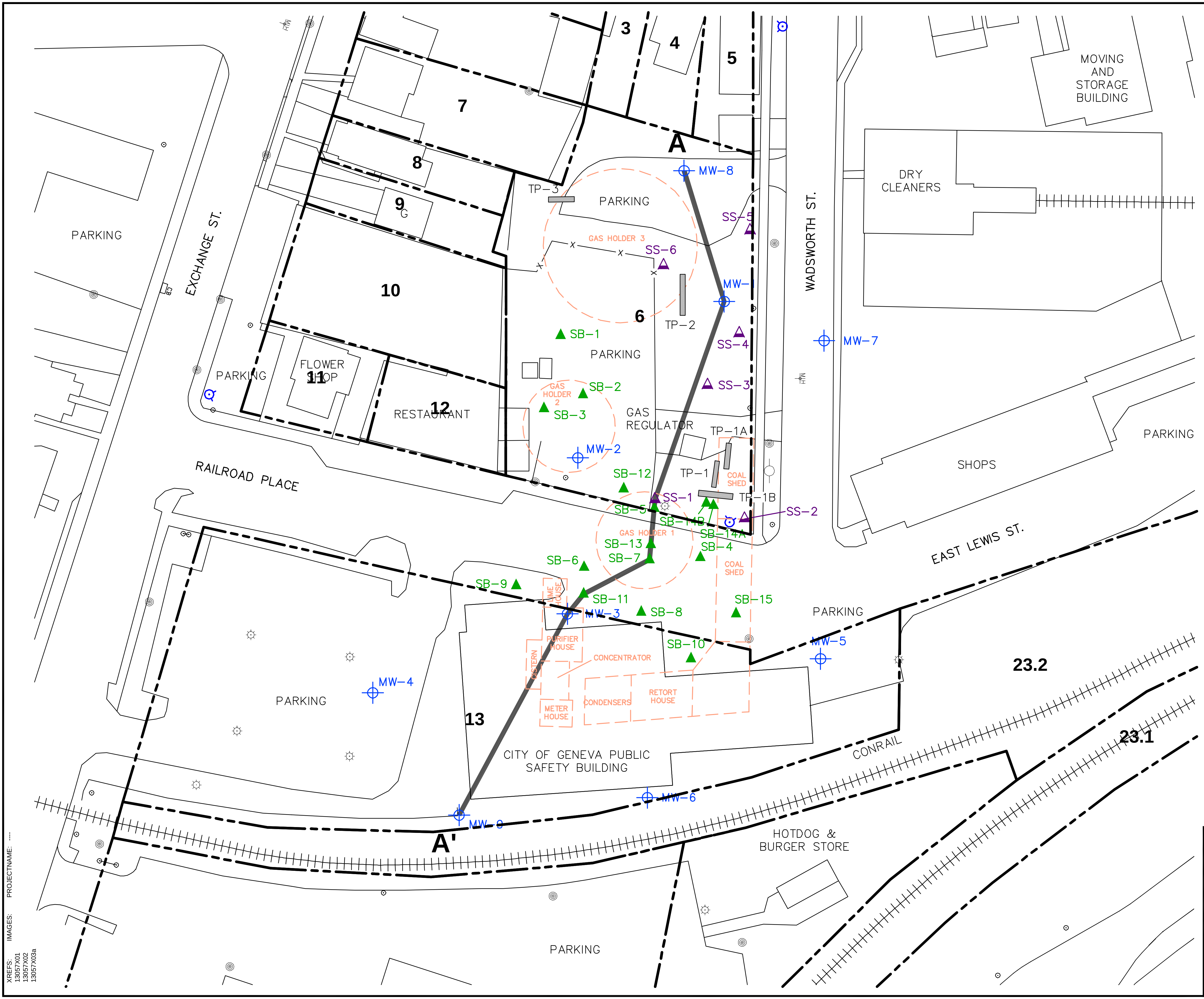
NEW YORK STATE ELECTRIC AND GAS
GENEVA (WADSWORTH ST.) FORMER MGP SITE
FEASIBILITY STUDY

SITE LOCATION MAP

ARCADIS

FIGURE
1

06/24/08 SYR-141-DJH
B0013057/0001/00001/CDR/13057n01.cdr



LEGEND:

⊕	MONITORING WELL LOCATION
▲	SOIL BORING LOCATION
△	SURFACE SOIL LOCATION
▬	TEST PIT LOCATION
—x—	FENCE
┼┼┼┼	RAILROAD
—·—·—	PROPERTY BOUNDARY
—○—	UTILITY POLE W/ GUY
◎	POWER POLE
☼	LIGHT POLE
○ ○○	POST, SIGN
⊙	HYDRANT
– – –	FORMER MGP STRUCTURE
MH	MANHOLE
A ▬ A'	LINE OF CROSS SECTION

NOTE:

1. BASE MAP BASED ON SURVEYS COMPLETED BY NYSEG ON DECEMBER 14, 2005 AND OCTOBER 2006. ELEVATIONS IN REFERENCE TO NGVD 1929, HORIZONTAL DATUM IS NAD 83 STATEPLANE, NEW YORK CENTRAL.
2. ALL LOCATIONS ARE APPROXIMATE.
3. PROPERTY BOUNDARIES WERE DIGITIZED FROM CITY OF GENEVA, ONTARIO COUNTY, NEW YORK TAX MAP [104.35], DATED MAY 1, 2008.

0 60' 120'
GRAPHIC SCALE

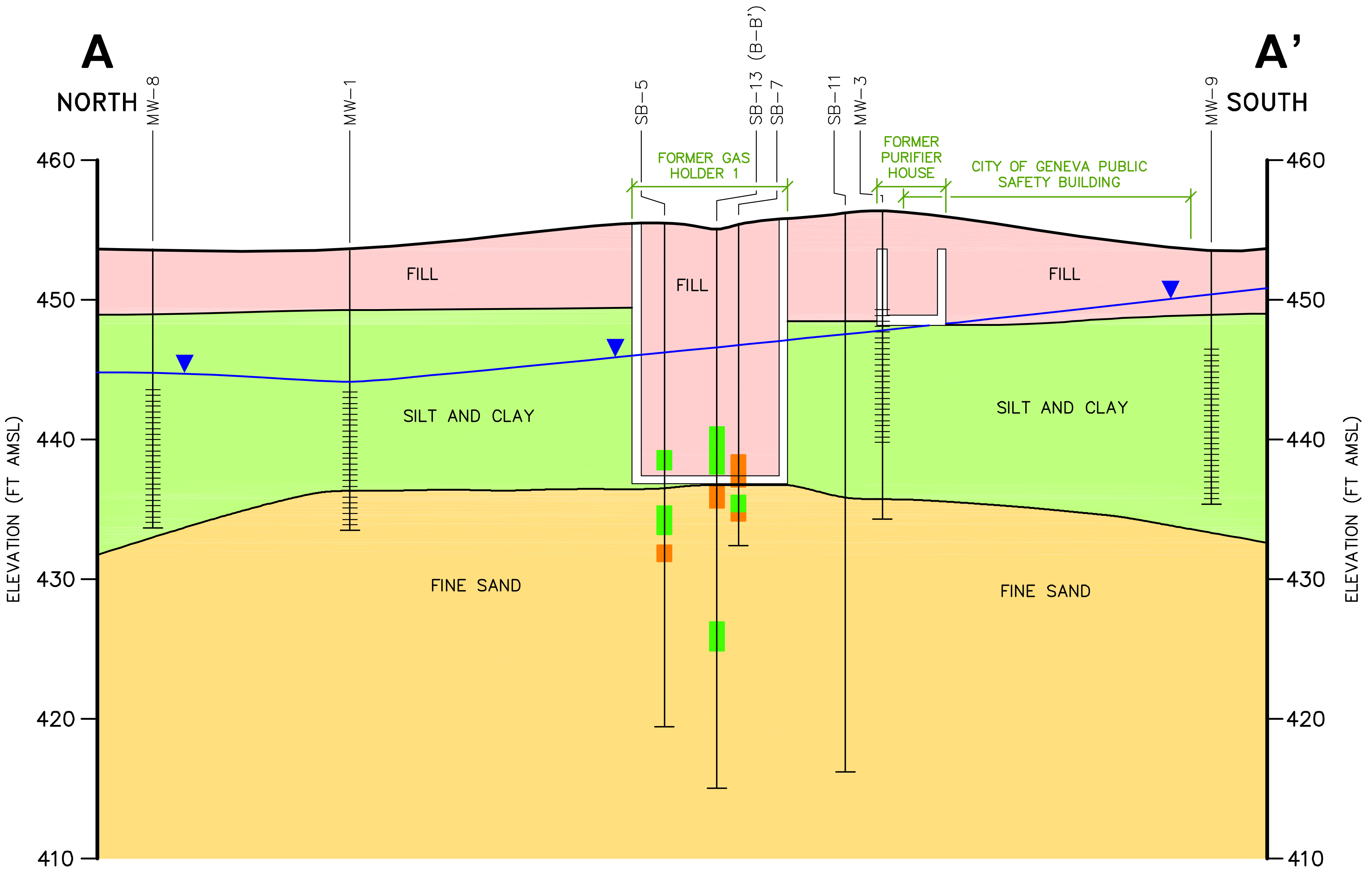
NEW YORK STATE ELECTRIC AND GAS
GENEVA (WADSWORTH ST.) FORMER MGP SITE
FEASIBILITY STUDY

INVESTIGATION LOCATIONS

ARCADIS

FIGURE
2

CITY:Syracuse DIV/GROUP:Env-141 DB:AMS RCA AMS LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
\\corp2\archive\CadArchive\ARC-OLD\syrdwg\2008\2008\qrc\B0013057\0000\00001\DWG\13057B09.DWG LAYOUT: 2 SAVED: 7/2/2008 7:17 AM ACADVER: 17.0S (LMS TECH) PAGESETUP: ----PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 2/3/2010 2:52 PM BY: POSENAUER, LISA
XREFS: 13057X01 13057X02 13057X03a IMAGES: PROJECTNAME: ----



LEGEND:

MW-9 WELL OR BORING ID

GROUND SURFACE

APPROXIMATE WATER TABLE

LITHOLOGIC CONTACT (DASHED WHERE INFERRED)

SCREEN

BOTTOM OF BORING

🟩 SHEEN

🟧 NAPL

🟥 FILL

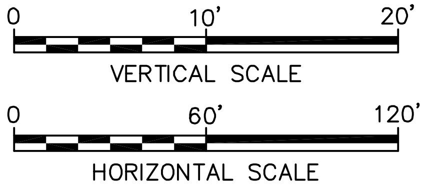
🟩 SILT AND CLAY

🟨 FINE SAND

NOTE:

1. ELEVATIONS IN REFERENCE TO NGVD 1929, HORIZONTAL DATUM IS NAD 83 STATEPLANE, NEW YORK CENTRAL.
2. ALL LOCATIONS ARE APPROXIMATE.

VERTICAL EXAGGERATION = 6X

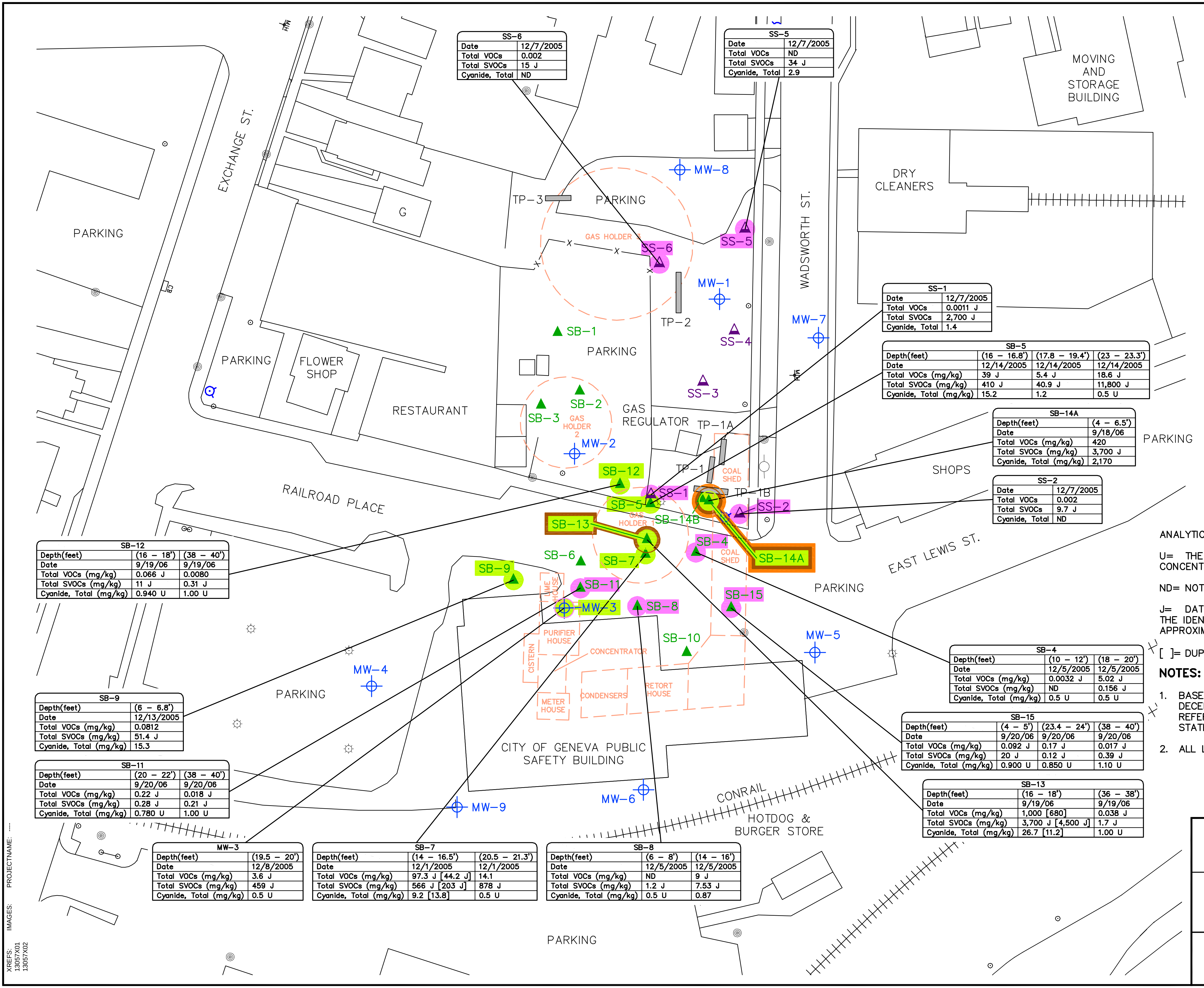


NEW YORK STATE ELECTRIC AND GAS
GENEVA (WADSWORTH ST.) FORMER MGP SITE
FEASIBILITY STUDY

CROSS SECTION A - A'

ARCADIS

FIGURE
3



SS–6	
Date	12/7/2005
Total VOCs	0.002
Total SVOCs	15 J
Cyanide, Total	ND

SS–5	
Date	12/7/2005
Total VOCs	ND
Total SVOCs	34 J
Cyanide, Total	2.9

SS–1	
Date	12/7/2005
Total VOCs	0.0011 J
Total SVOCs	2,700 J
Cyanide, Total	1.4

SB–5			
Depth(feet)	(16 – 16.8')	(17.8 – 19.4')	(23 – 23.3')
Date	12/14/2005	12/14/2005	12/14/2005
Total VOCs (mg/kg)	39 J	5.4 J	18.6 J
Total SVOCs (mg/kg)	410 J	40.9 J	11,800 J
Cyanide, Total (mg/kg)	15.2	1.2	0.5 U

SB–14A	
Depth(feet)	(4 – 6.5')
Date	9/18/06
Total VOCs (mg/kg)	420
Total SVOCs (mg/kg)	3,700 J
Cyanide, Total (mg/kg)	2,170

SS–2	
Date	12/7/2005
Total VOCs	0.002
Total SVOCs	9.7 J
Cyanide, Total	ND

SB–12		
Depth(feet)	(16 – 18')	(38 – 40')
Date	9/19/06	9/19/06
Total VOCs (mg/kg)	0.066 J	0.0080
Total SVOCs (mg/kg)	11 J	0.31 J
Cyanide, Total (mg/kg)	0.940 U	1.00 U

SB–9	
Depth(feet)	(6 – 6.8')
Date	12/13/2005
Total VOCs (mg/kg)	0.0812
Total SVOCs (mg/kg)	51.4 J
Cyanide, Total (mg/kg)	15.3

SB–11		
Depth(feet)	(20 – 22')	(38 – 40')
Date	9/20/06	9/20/06
Total VOCs (mg/kg)	0.22 J	0.018 J
Total SVOCs (mg/kg)	0.28 J	0.21 J
Cyanide, Total (mg/kg)	0.780 U	1.00 U

MW–3	
Depth(feet)	(19.5 – 20')
Date	12/8/2005
Total VOCs (mg/kg)	3.6 J
Total SVOCs (mg/kg)	459 J
Cyanide, Total (mg/kg)	0.5 U

SB–7		
Depth(feet)	(14 – 16.5')	(20.5 – 21.3')
Date	12/1/2005	12/1/2005
Total VOCs (mg/kg)	97.3 J [44.2 J]	14.1
Total SVOCs (mg/kg)	566 J [203 J]	878 J
Cyanide, Total (mg/kg)	9.2 [13.8]	0.5 U

SB–8		
Depth(feet)	(6 – 8')	(14 – 16')
Date	12/5/2005	12/5/2005
Total VOCs (mg/kg)	ND	9 J
Total SVOCs (mg/kg)	1.2 J	7.53 J
Cyanide, Total (mg/kg)	0.5 U	0.87

SB–4		
Depth(feet)	(10 – 12')	(18 – 20')
Date	12/5/2005	12/5/2005
Total VOCs (mg/kg)	0.0032 J	5.02 J
Total SVOCs (mg/kg)	ND	0.156 J
Cyanide, Total (mg/kg)	0.5 U	0.5 U

SB–15			
Depth(feet)	(4 – 5')	(23.4 – 24')	(38 – 40')
Date	9/20/06	9/20/06	9/20/06
Total VOCs (mg/kg)	0.092 J	0.17 J	0.017 J
Total SVOCs (mg/kg)	20 J	0.12 J	0.39 J
Cyanide, Total (mg/kg)	0.900 U	0.850 U	1.10 U

SB–13		
Depth(feet)	(16 – 18')	(36 – 38')
Date	9/19/06	9/19/06
Total VOCs (mg/kg)	1,000 [680]	0.038 J
Total SVOCs (mg/kg)	3,700 J [4,500 J]	1.7 J
Cyanide, Total (mg/kg)	26.7 [11.2]	1.00 U

LEGEND:

⊕	MONITORING WELL LOCATION
▲	SOIL BORING LOCATION
▬	TEST PIT LOCATION
—x—	FENCE
┼┼┼┼┼	RAILROAD
—○—	UTILITY POLE W/ GUY
◎	POWER POLE
☼	LIGHT POLE
⊙ ⊙⊙	POST, SIGN
⊙	HYDRANT
– – –	FORMER MGP STRUCTURE
MH	MANHOLE
△	SURFACE SOIL SAMPLING LOCATION
🟪	SOIL SAMPLE ONLY EXCEEDED PART 375 RESTRICTED USE SCOs (COMMERCIAL) FOR ONE OR MORE CONTAMINANTS
🟩	SUBSURFACE SOIL SAMPLE EXCEEDED PART 375 RESTRICTED USE SCOs (COMMERCIAL) FOR ONE OR MORE SVOCs
🟫	SUBSURFACE SOIL SAMPLE EXCEEDED PART 375 RESTRICTED USE SCOs (COMMERCIAL) FOR ONE OR MORE VOCs
🟧	SUBSURFACE SOIL SAMPLE EXCEEDED PART 375 RESTRICTED USE SCOs (COMMERCIAL) FOR TOTAL CYANIDE

ANALYTICAL NOTES:

U= THE COMPOUND WAS NOT DETECTED AT THE INDICATED CONCENTRATION.

ND= NOT DETECTED.

J= DATA INDICATE THE PRESENCE OF A COMPOUND THAT MEETS THE IDENTIFICATION CRITERIA. THE CONCENTRATION GIVEN IS AN APPROXIMATE VALUE.

[ ]= DUPLICATE SAMPLE.

NOTES:

1. BASE MAP BASED ON SURVEYS COMPLETED BY NYSEG ON DECEMBER 14, 2005 AND OCTOBER 2006. ELEVATIONS IN REFERENCE TO NGVD 1929, HORIZONTAL DATUM IS NAD 83 STATEPLANE, NEW YORK CENTRAL.
2. ALL LOCATIONS ARE APPROXIMATE.

0 60' 120'

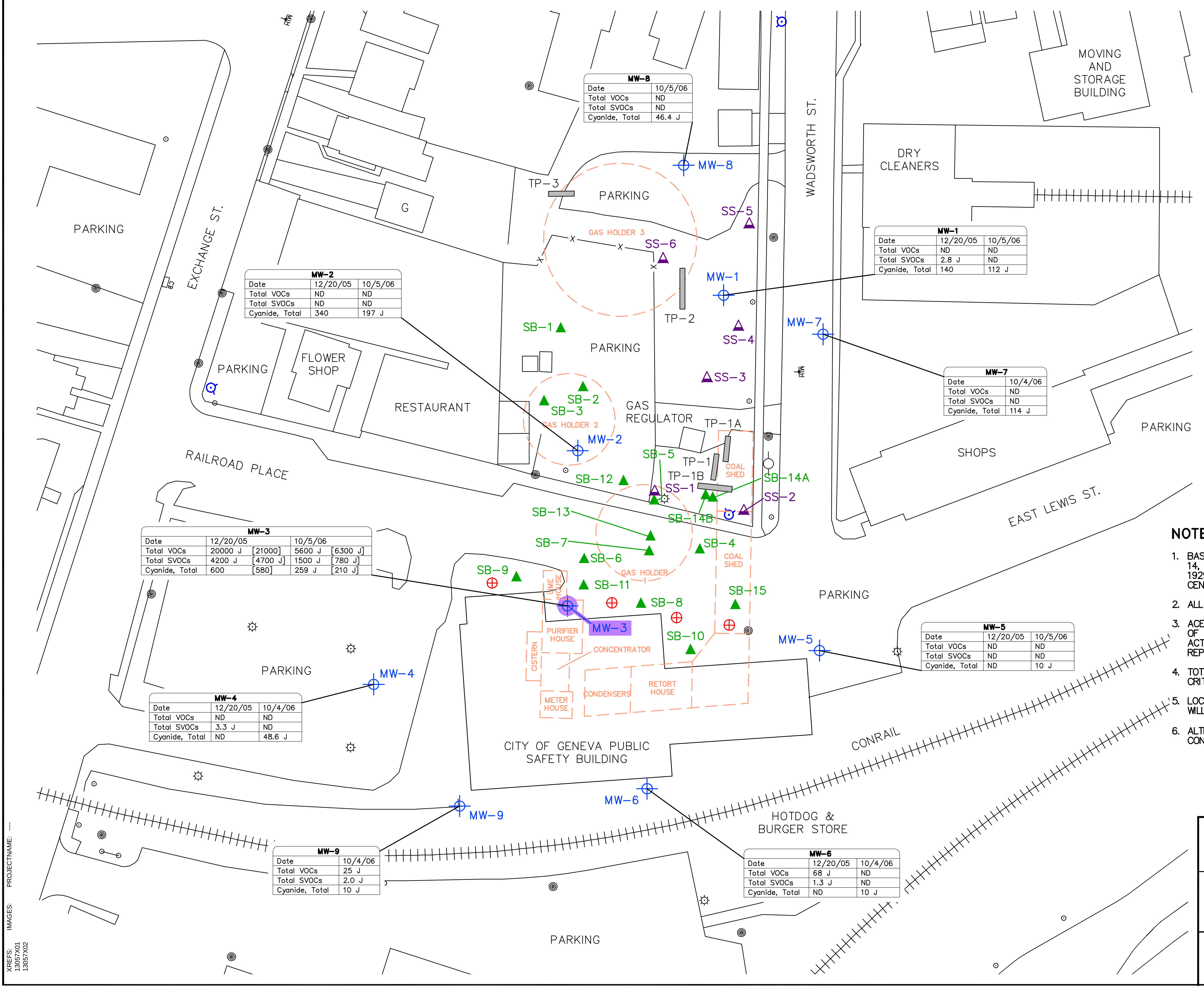
GRAPHIC SCALE

NEW YORK STATE ELECTRIC AND GAS
GENEVA (WADSWORTH ST.) FORMER MGP SITE
FEASIBILITY STUDY

SOIL ANALYTICAL RESULTS

ARCADIS

FIGURE
4



MW–8		
Date	10/5/06	
Total VOCs	ND	
Total SVOCs	ND	
Cyanide, Total	46.4 J	

MW–2		
Date	12/20/05	10/5/06
Total VOCs	ND	ND
Total SVOCs	ND	ND
Cyanide, Total	340	197 J

MW–1		
Date	12/20/05	10/5/06
Total VOCs	ND	ND
Total SVOCs	2.8 J	ND
Cyanide, Total	140	112 J

MW–7	
Date	10/4/06
Total VOCs	ND
Total SVOCs	ND
Cyanide, Total	114 J

MW–3				
Date	12/20/05		10/5/06	
Total VOCs	20000 J	[21000]	5600 J	[6300 J]
Total SVOCs	4200 J	[4700 J]	1500 J	[780 J]
Cyanide, Total	600	[580]	259 J	[210 J]

MW–5		
Date	12/20/05	10/5/06
Total VOCs	ND	ND
Total SVOCs	ND	ND
Cyanide, Total	ND	10 J

MW–4		
Date	12/20/05	10/4/06
Total VOCs	ND	ND
Total SVOCs	3.3 J	ND
Cyanide, Total	ND	48.6 J

MW–9	
Date	10/4/06
Total VOCs	25 J
Total SVOCs	2.0 J
Cyanide, Total	10 J

MW–6		
Date	12/20/05	10/4/06
Total VOCs	68 J	ND
Total SVOCs	1.3 J	ND
Cyanide, Total	ND	10 J

LEGEND:

⌖	MONITORING WELL LOCATION
▲	SOIL BORING LOCATION
△	SURFACE SOIL LOCATION
⊕	PROPOSED OXYGEN ENHANCEMENT WELLS
▬	TEST PIT LOCATION
—x—	FENCE
┼┼┼┼┼┼┼	RAILROAD
–○–	UTILITY POLE W/ GUY
◎	POWER POLE
☼	LIGHT POLE
○ ○○	POST, SIGN
☉	HYDRANT
– – –	FORMER MGP STRUCTURE
⌗	MANHOLE
🟪	GROUNDWATER SAMPLE EXCEEDS THE NYSDEC CLASS GA GROUNDWATER STANDARD OR GUIDANCE VALUE (TOGS 1,1,1,) FOR ONE OR MORE VOC/SVOC CONSTITUENTS AND/OR TOTAL CYANIDE.

ANALYTICAL NOTES:

UNITS GIVEN IN ug/L

ND = NOT DETECTED.

J = THE CONCENTRATION GIVEN IS AN APPROXIMATE VALUE.

[ ] = DUPLICATE SAMPLING RESULTS.

NOTE:

1. BASE MAP BASED ON SURVEYS COMPLETED BY NYSEG ON DECEMBER 14, 2005 AND OCTOBER 2006. ELEVATIONS IN REFERENCE TO NGVD 1929, HORIZONTAL DATUM IS NAD 83 STATEPLANE, NEW YORK CENTRAL.
2. ALL LOCATIONS ARE APPROXIMATE.
3. ACETONE WAS DETECTED AT MW–6 ABOVE TOGS 1.1.1 GUIDANCE VALUE OF 50 ppb, HOWEVER, ACETONE IS NOT ATTRIBUTED TO MGP–RELATED ACTIVITIES AND IS NOT BEING EVALUATED AS PART OF THIS FS REPORT.
4. TOTAL CYANIDE WAS DETECTED AT CONCENTRATIONS ABOVE TOGS 1.1.1 CRITERIA AT MW–2 IN DECEMBER 2005.
5. LOCATION OF OXYGEN ENHANCEMENT WELLS ARE APPROXIMATE AND WILL BE DETERMINED DURING A PRE–DESIGN INVESTIGATION.
6. ALTERNATIVE II INCLUDES INSTITUTIONAL CONTROLS/ENGINEERING CONTROLS WITH ENHANCED NATURAL ATTENUATION.

0 60' 120'

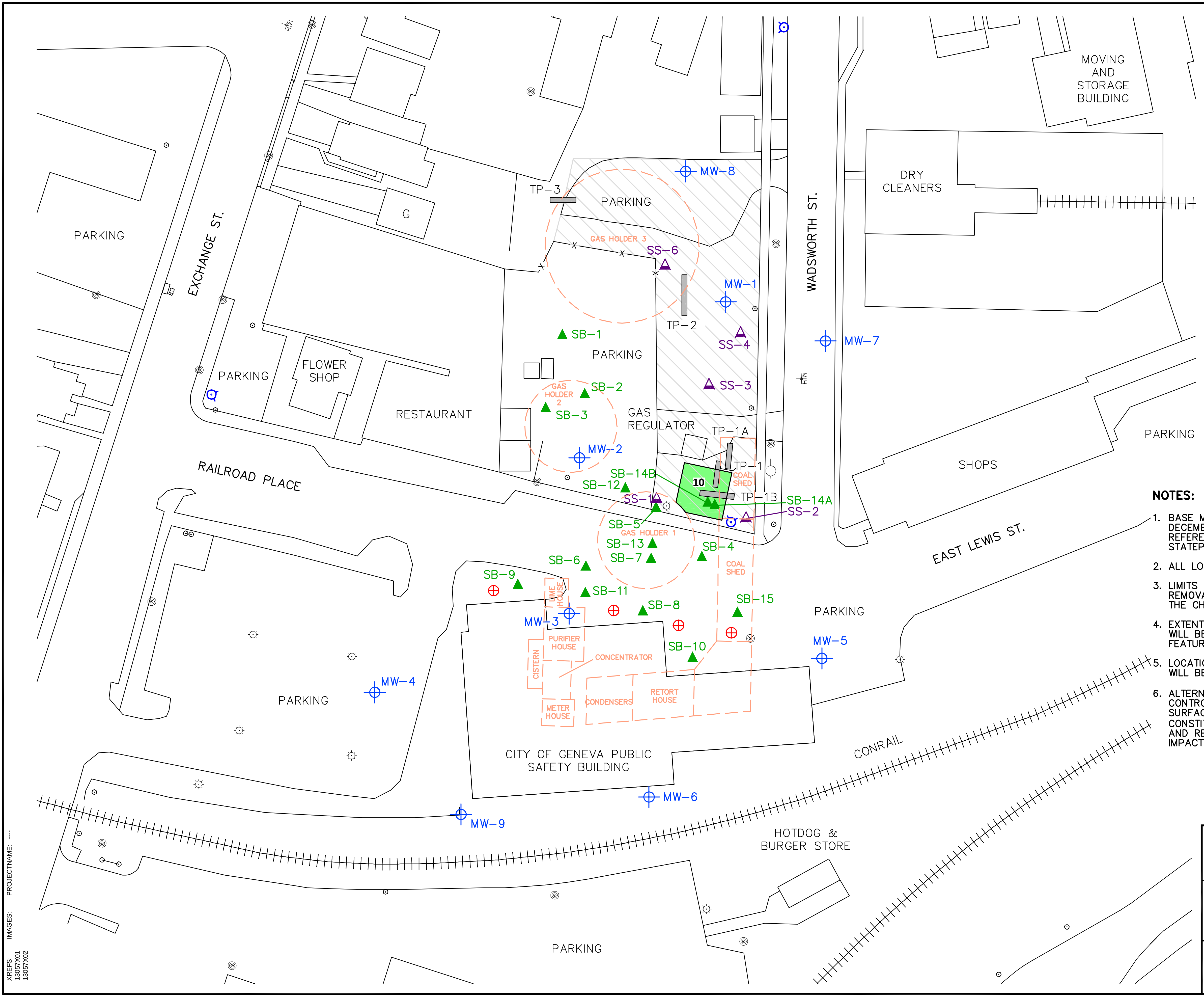
GRAPHIC SCALE

NEW YORK STATE ELECTRIC AND GAS
GENEVA (WADSWORTH ST.) FORMER MGP SITE
FEASIBILITY STUDY

SITE-WIDE REMEDIAL ALTERNATIVE II

ARCADIS

FIGURE
5



LEGEND:

⌖	MONITORING WELL LOCATION
▲	SOIL BORING LOCATION
△	SURFACE SOIL LOCATION
⊕	PROPOSED OXYGEN ENHANCEMENT WELLS
▬	TEST PIT LOCATION
10	SOIL REMOVAL AREA (DEPTH IN FEET)
—x—	FENCE
┼┼┼┼┼┼	RAILROAD
—○—	UTILITY POLE W/ GUY
◎	POWER POLE
☼	LIGHT POLE
⊙ ⊙⊙	POST, SIGN
⊙	HYDRANT
— — —	FORMER MGP STRUCTURE
▨	PROPOSED EXTENT OF ASPHALT SURFACE COVER
MH	MANHOLE

NOTES:

1. BASE MAP BASED ON SURVEYS COMPLETED BY NYSEG ON DECEMBER 14, 2005 AND OCTOBER 2006. ELEVATIONS IN REFERENCE TO NGVD 1929, HORIZONTAL DATUM IS NAD 83 STATEPLANE, NEW YORK CENTRAL.
2. ALL LOCATIONS ARE APPROXIMATE.
3. LIMITS OF SOIL REMOVAL AREAS ARE APPROXIMATE. ACTUAL REMOVAL LIMITS WILL BE DETERMINED AS PART OF THE DESIGN OF THE CHOSEN REMEDY FOR THE SITE.
4. EXTENT AND ELEVATIONS OF PROPOSED ASPHALT SURFACE COVER WILL BE DETERMINED DURING DESIGN PHASE BASED ON EXISTING FEATURES AND SITE CONSTRAINTS.
5. LOCATION OF OXYGEN ENHANCEMENT WELLS ARE APPROXIMATE AND WILL BE DETERMINED DURING A PRE–DESIGN INVESTIGATION.
6. ALTERNATIVE III INCLUDES INSTITUTIONAL CONTROLS/ENGINEERING CONTROLS WITH ENHANCED NATURAL ATTENUATION, ASPHALT SURFACE COVER OVER SURFACE SOIL CONTAINING CHEMICAL CONSTITUENTS GREATER THAN PART 375 UNRESTRICTED USE SCO's, AND REMOVAL OF SUBSURFACE STRUCTURE AND MGP–RELATED IMPACTS AT SB–14A.

0 60' 120'

GRAPHIC SCALE

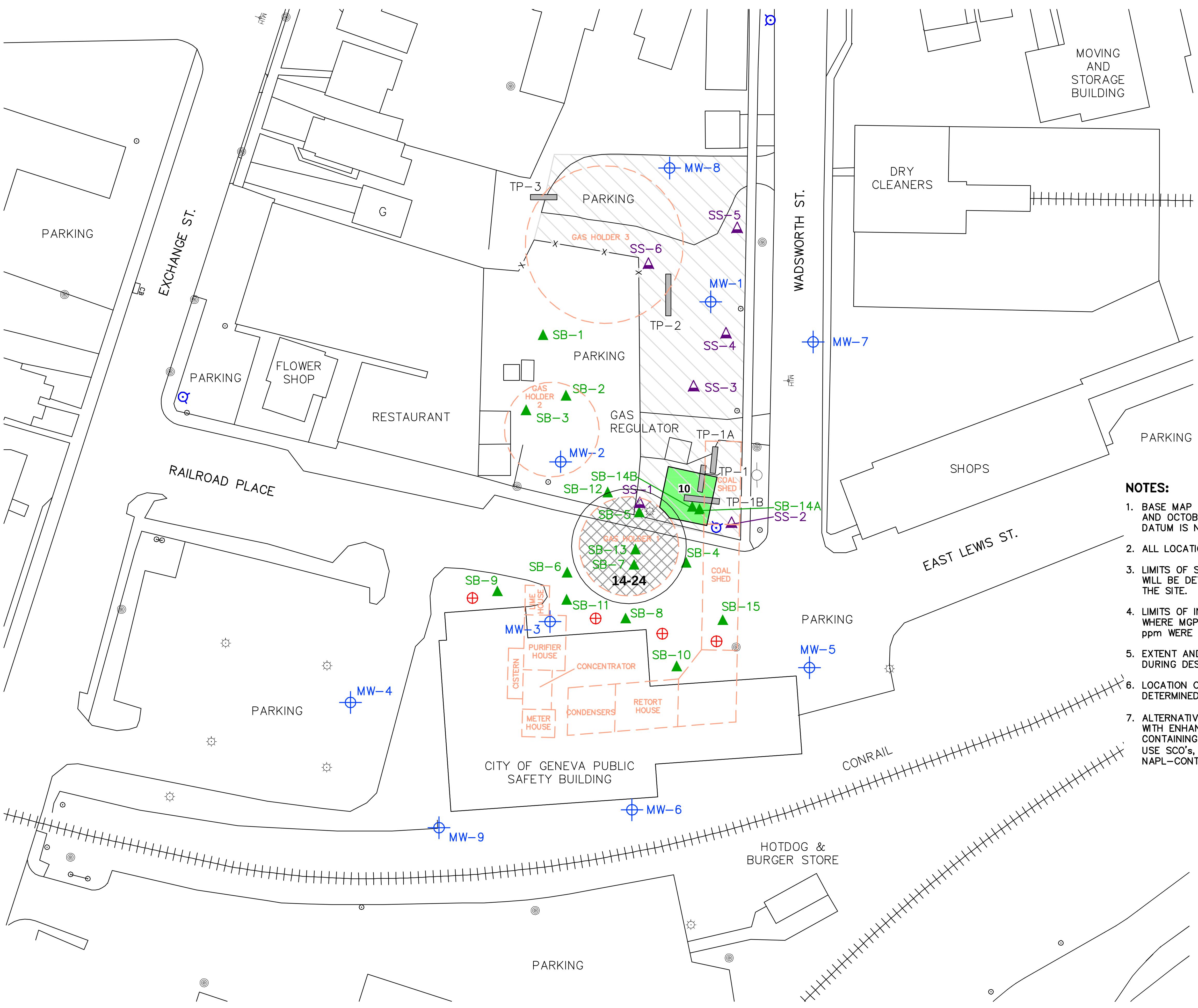
NEW YORK STATE ELECTRIC AND GAS
GENEVA (WADSWORTH ST.) FORMER MGP SITE
FEASIBILITY STUDY

SITE-WIDE REMEDIAL ALTERNATIVE III

ARCADIS

FIGURE
6

CITY:Syracuse GROUP: ENV-141 DB: AMS PGL PM: A. FALZARANO LYR: ON=*;OFF=REF, (FRZ LAYOUT: 6SAVED: 7/15/2008 1:41 PM ACADVER: 17.0S (LMS TECH) PAGESETUP: ----PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 2/1/2010 2:38 PM BY: POSENAUER, LISA
\\corp2archive\CadArchive\ARC-OLD\syrdwg\2008\2008qtr3\B0013057\0001\00001\DWG\13057B04.DWG
XREFS: 13057X01 13057X02 IMAGES: PROJECTNAME: ----



LEGEND:

⊕ MONITORING WELL LOCATION
▲ SOIL BORING LOCATION
△ SURFACE SOIL LOCATION
⊕ PROPOSED OXYGEN ENHANCEMENT WELLS
▬ TEST PIT LOCATION
🟩 10 SOIL REMOVAL AREA (DEPTH IN FEET)
▨ 14-24 LIMITS OF IN–SITU STABILIZATION (TARGET DEPTH IN FEET)
—x— FENCE
┼┼┼┼ RAILROAD
UTILITY POLE W/ GUY
POWER POLE
LIGHT POLE
POST, SIGN
HYDRANT
– – – FORMER MGP STRUCTURE
▨ PROPOSED EXTENT OF ASPHALT SURFACE COVER
MANHOLE

NOTES:

1. BASE MAP BASED ON SURVEYS COMPLETED BY NYSEG ON DECEMBER 14, 2005 AND OCTOBER 2006. ELEVATIONS IN REFERENCE TO NGVD 1929, HORIZONTAL DATUM IS NAD 83 STATEPLANE, NEW YORK CENTRAL.
2. ALL LOCATIONS ARE APPROXIMATE.
3. LIMITS OF SOIL REMOVAL AREAS ARE APPROXIMATE. ACTUAL REMOVAL LIMITS WILL BE DETERMINED AS PART OF THE DESIGN OF THE CHOSEN REMEDY FOR THE SITE.
4. LIMITS OF IN–SITU STABILIZATION WERE SELECTED TO ENCOMPASS THE AREAS WHERE MGP NAPL–CONTAINING SOILS WERE OBSERVED OR WHERE PAHs >500 ppm WERE DETECTED.
5. EXTENT AND ELEVATION OF PROPOSED SURFACE COVER WILL BE DETERMINED DURING DESIGN PHASE BASED ON EXISTING FEATURES AND SITE CONSTRAINTS.
6. LOCATION OF OXYGEN ENHANCEMENT WELLS ARE APPROXIMATE AND WILL BE DETERMINED DURING A PRE–DESIGN INVESTIGATION.
7. ALTERNATIVE IVA INCLUDES INSTITUTIONAL CONTROLS/ENGINEERING CONTROLS WITH ENHANCED NATURAL ATTENUATION, SURFACE COVER OVER SURFACE SOIL CONTAINING CHEMICAL CONSTITUENTS GREATER THAN PART 375 UNRESTRICTED USE SCO's, AND (GAS HOLDER 1) IN–SITU STABILIZATION OF MGP NAPL–CONTAINING SOIL AND SOIL CONTAINING PAHs >500 ppm.

0 60' 120'
GRAPHIC SCALE

NEW YORK STATE ELECTRIC AND GAS
GENEVA (WADSWORTH ST.) FORMER MGP SITE
FEASIBILITY STUDY

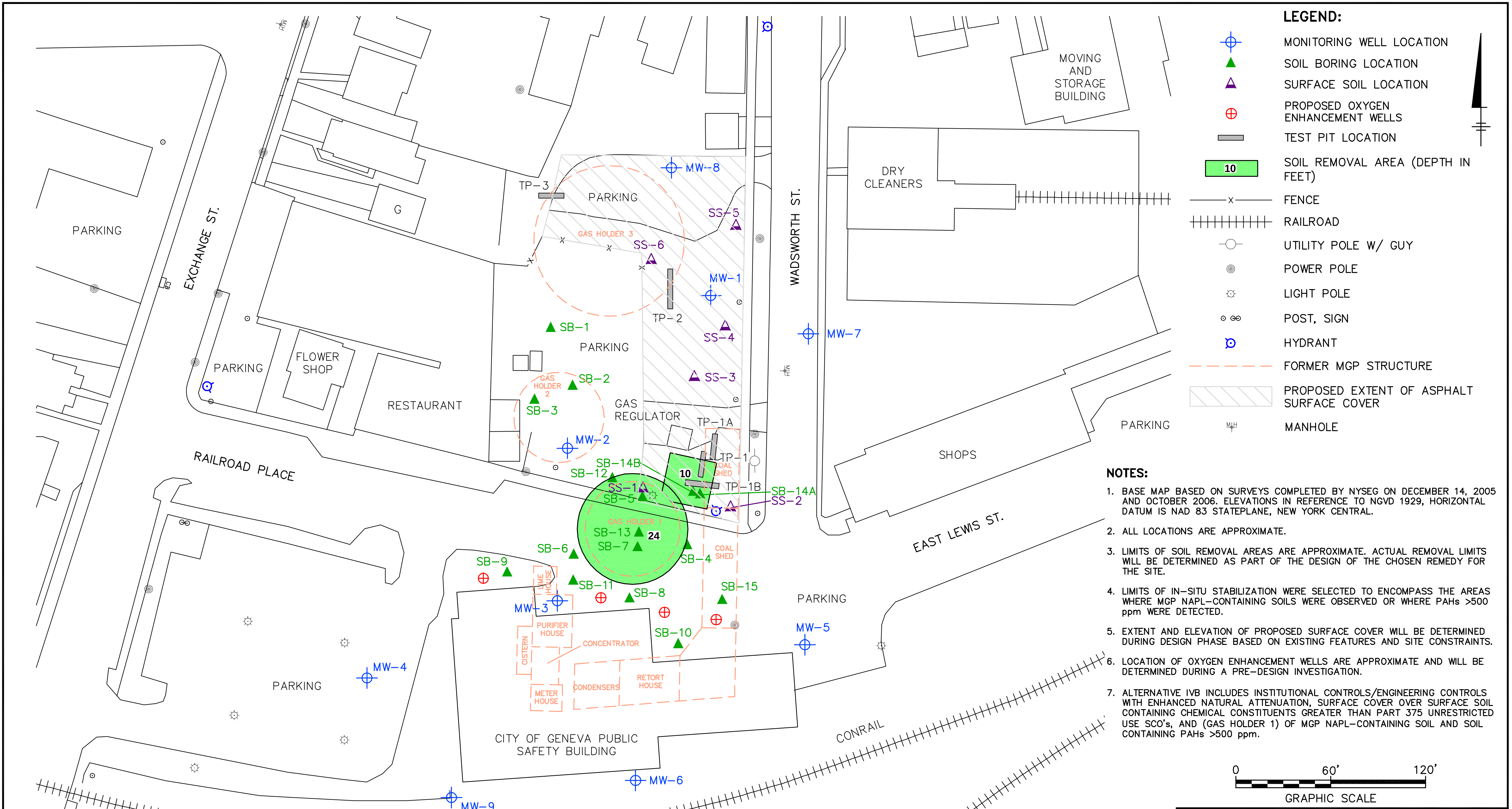
SITE-WIDE REMEDIAL ALTERNATIVE IVA

ARCADIS

FIGURE
7A

CITY:Syracuse GROUP: ENV-141 DB: AMS PGL PM: A. FALZARANO LYR: ON=*;OFF=REF, (FRZ
\\corp2archive\CadArchive\ARC-OLD\syrdwg\2008\2008qtr3\B0013057\0001\00001\DWG\13057B05.DWG LAYOUT: 7A SAVED: 7/30/2008 12:31 PM ACADVER: 17.0S (LMS TECH) PAGESETUP: ----PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 2/1/2010 2:38 PM BY: POSENAUER, LISA
XREFS: 13057X01 13057X02 IMAGES: PROJECTNAME: ----

CITY:Syracuse GROUP: ENV-141 DB: AMS PGL PM: A. FALZARANO LYR: ON=*;OFF=REF, (FRZ
\\corp2archive\CadArchive\ARC-OLD\syrdwg\2008\2008qtr3\B0013057\0001\00001\DWG\13057B10.DWG LAYOUT: 7BSAVED: 7/30/2008 12:31 PM ACADVER: 17.0S (LMS TECH) PAGESETUP: ----PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 2/1/2010 2:39 PM BY: POSENAUER, LISA
XREFS: 13057X01 13057X02 IMAGES: PROJECTNAME: ----



LEGEND:

⌖	MONITORING WELL LOCATION
▲	SOIL BORING LOCATION
△	SURFACE SOIL LOCATION
⊕	PROPOSED OXYGEN ENHANCEMENT WELLS
▬	TEST PIT LOCATION
🟩 10	SOIL REMOVAL AREA (DEPTH IN FEET)
—x—	FENCE
┼┼┼┼	RAILROAD
○	UTILITY POLE W/ GUY
◎	POWER POLE
☼	LIGHT POLE
⊙ ⊙⊙	POST, SIGN
⊙	HYDRANT
– – –	FORMER MGP STRUCTURE
▨	PROPOSED EXTENT OF ASPHALT SURFACE COVER
MH	MANHOLE

NOTES:

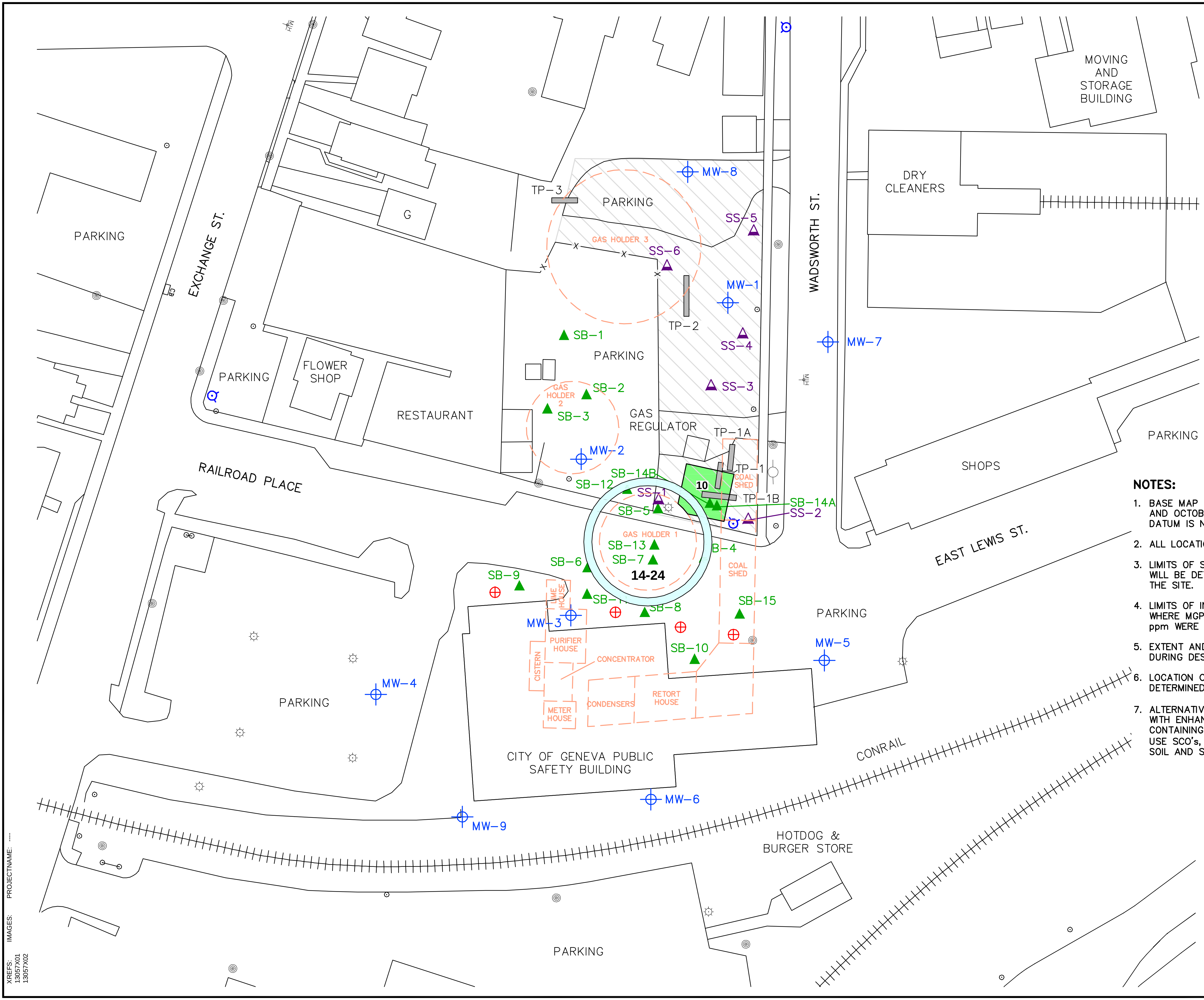
1. BASE MAP BASED ON SURVEYS COMPLETED BY NYSEG ON DECEMBER 14, 2005 AND OCTOBER 2006. ELEVATIONS IN REFERENCE TO NGVD 1929, HORIZONTAL DATUM IS NAD 83 STATEPLANE, NEW YORK CENTRAL.
2. ALL LOCATIONS ARE APPROXIMATE.
3. LIMITS OF SOIL REMOVAL AREAS ARE APPROXIMATE. ACTUAL REMOVAL LIMITS WILL BE DETERMINED AS PART OF THE DESIGN OF THE CHOSEN REMEDY FOR THE SITE.
4. LIMITS OF IN–SITU STABILIZATION WERE SELECTED TO ENCOMPASS THE AREAS WHERE MGP NAPL–CONTAINING SOILS WERE OBSERVED OR WHERE PAHs >500 ppm WERE DETECTED.
5. EXTENT AND ELEVATION OF PROPOSED SURFACE COVER WILL BE DETERMINED DURING DESIGN PHASE BASED ON EXISTING FEATURES AND SITE CONSTRAINTS.
6. LOCATION OF OXYGEN ENHANCEMENT WELLS ARE APPROXIMATE AND WILL BE DETERMINED DURING A PRE–DESIGN INVESTIGATION.
7. ALTERNATIVE IVB INCLUDES INSTITUTIONAL CONTROLS/ENGINEERING CONTROLS WITH ENHANCED NATURAL ATTENUATION, SURFACE COVER OVER SURFACE SOIL CONTAINING CHEMICAL CONSTITUENTS GREATER THAN PART 375 UNRESTRICTED USE SCO's, AND (GAS HOLDER 1) OF MGP NAPL–CONTAINING SOIL AND SOIL CONTAINING PAHs >500 ppm.

NEW YORK STATE ELECTRIC AND GAS
GENEVA (WADSWORTH ST.) FORMER MGP SITE
FEASIBILITY STUDY

SITE-WIDE REMEDIAL ALTERNATIVE IVB

ARCADIS

FIGURE
7B



LEGEND:

⌖	MONITORING WELL LOCATION
▲	SOIL BORING LOCATION
△	SURFACE SOIL LOCATION
⊕	PROPOSED OXYGEN ENHANCEMENT WELLS
▬	TEST PIT LOCATION
🟩 10	SOIL REMOVAL AREA (DEPTH IN FEET)
▭	CONTAINMENT BARRIER
—x—	FENCE
┼┼┼┼┼┼┼┼	RAILROAD
-○-	UTILITY POLE W/ GUY
◎	POWER POLE
☼	LIGHT POLE
⊙ ⊙⊙	POST, SIGN
⊙	HYDRANT
— — —	FORMER MGP STRUCTURE
▨	PROPOSED EXTENT OF ASPHALT SURFACE COVER
M H	MANHOLE

NOTES:

1. BASE MAP BASED ON SURVEYS COMPLETED BY NYSEG ON DECEMBER 14, 2005 AND OCTOBER 2006. ELEVATIONS IN REFERENCE TO NGVD 1929, HORIZONTAL DATUM IS NAD 83 STATEPLANE, NEW YORK CENTRAL.
2. ALL LOCATIONS ARE APPROXIMATE.
3. LIMITS OF SOIL REMOVAL AREAS ARE APPROXIMATE. ACTUAL REMOVAL LIMITS WILL BE DETERMINED AS PART OF THE DESIGN OF THE CHOSEN REMEDY FOR THE SITE.
4. LIMITS OF IN−SITU STABILIZATION WERE SELECTED TO ENCOMPASS THE AREAS WHERE MGP NAPL−CONTAINING SOILS WERE OBSERVED OR WHERE PAHs >500 ppm WERE DETECTED.
5. EXTENT AND ELEVATION OF PROPOSED SURFACE COVER WILL BE DETERMINED DURING DESIGN PHASE BASED ON EXISTING FEATURES AND SITE CONSTRAINTS.
6. LOCATION OF OXYGEN ENHANCEMENT WELLS ARE APPROXIMATE AND WILL BE DETERMINED DURING A PRE−DESIGN INVESTIGATION.
7. ALTERNATIVE IVC INCLUDES INSTITUTIONAL CONTROLS/ENGINEERING CONTROLS WITH ENHANCED NATURAL ATTENUATION, SURFACE COVER OVER SURFACE SOIL CONTAINING CHEMICAL CONSTITUENTS GREATER THAN PART 375 UNRESTRICTED USE SCO's, AND (GAS HOLDER 1) CONTAINMENT OF MGP NAPL−CONTAINING SOIL AND SOIL CONTAINING PAHs >500 ppm.

0 60' 120'

GRAPHIC SCALE

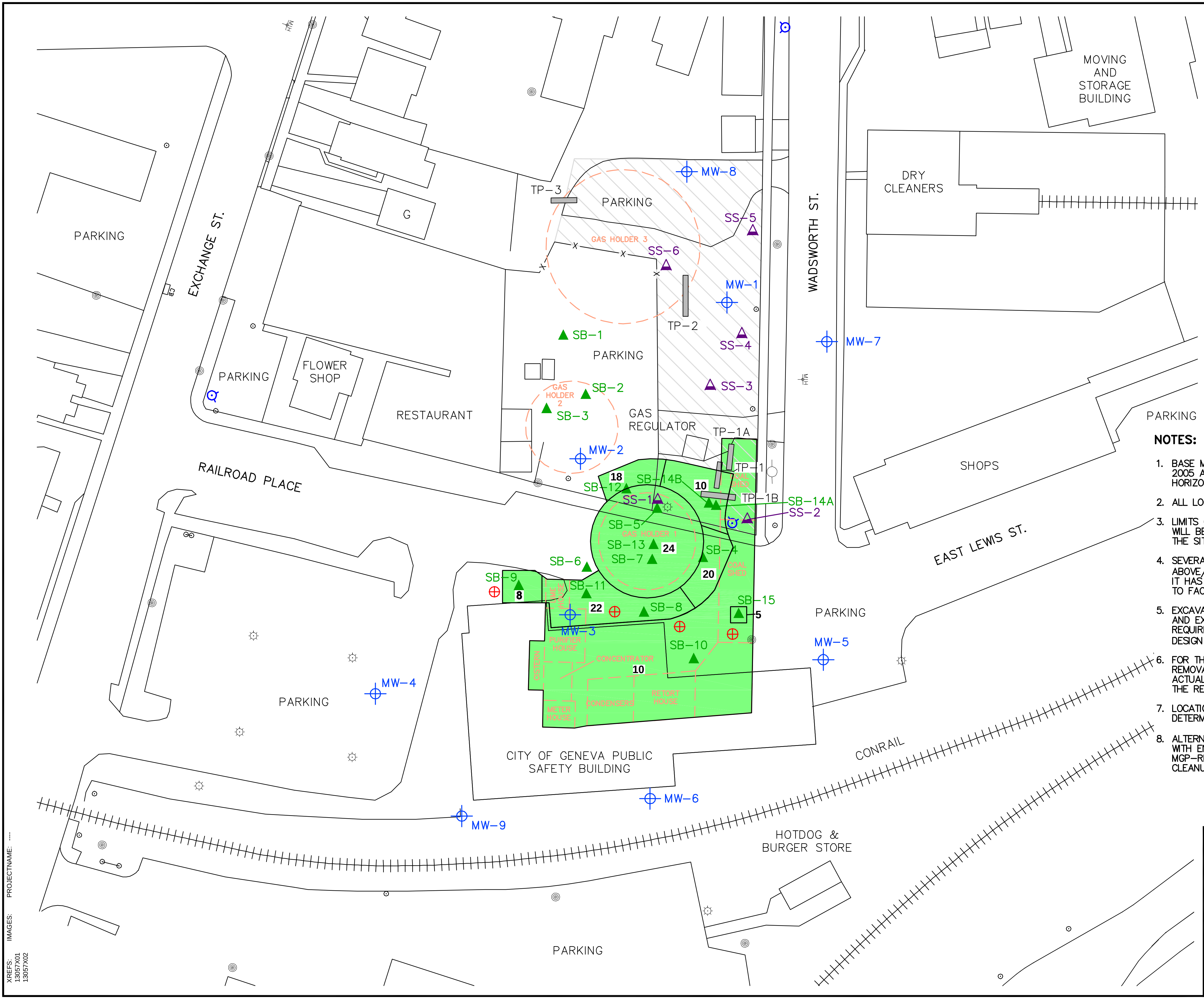
NEW YORK STATE ELECTRIC AND GAS
GENEVA (WADSWORTH ST.) FORMER MGP SITE
FEASIBILITY STUDY

SITE-WIDE REMEDIAL ALTERNATIVE IVC

ARCADIS

FIGURE
7C

CITY:Syracuse GROUP: ENV-141 DB: AMS PGL PM: A. FALZARANO LYR: ON=*;OFF=REF, (FRZ
\\corp2archive\CadArchive\ARC-OLD\syrdwg\2008\2008qtr3\B0013057\0001\00001\DWG\13057B11.DWG LAYOUT: 7CSAVED: 7/30/2008 12:31 PM ACADVER: 17.0S (LMS TECH) PAGESETUP: ----PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 2/1/2010 2:39 PM BY: POSENAUER, LISA
XREFS: 13057X01 13057X02 IMAGES: PROJECTNAME: ----



LEGEND:

⌖	MONITORING WELL LOCATION
▲	SOIL BORING LOCATION
△	SURFACE SOIL LOCATION
⊕	PROPOSED OXYGEN ENHANCEMENT WELLS
▬	TEST PIT LOCATION
▨	SURFACE SOIL REMOVAL AREA
🟩 8	SOIL REMOVAL AREA (DEPTH IN FEET)
—x—	FENCE
┼┼┼┼┼┼┼┼┼┼	RAILROAD
–○–	UTILITY POLE W/ GUY
◎	POWER POLE
☼	LIGHT POLE
⊙ ⊙⊙	POST, SIGN
⊙	HYDRANT
– – – –	FORMER MGP STRUCTURE
M/H	MANHOLE

NOTES:

1. BASE MAP BASED ON SURVEYS COMPLETED BY NYSEG ON DECEMBER 14, 2005 AND OCTOBER 2006. ELEVATIONS IN REFERENCE TO NGVD 1929, HORIZONTAL DATUM IS NAD 83 STATEPLANE, NEW YORK CENTRAL.
2. ALL LOCATIONS ARE APPROXIMATE.
3. LIMITS OF SOIL REMOVAL AREAS ARE APPROXIMATE. ACTUAL REMOVAL LIMITS WILL BE DETERMINED AS PART OF THE DESIGN OF THE CHOSEN REMEDY FOR THE SITE
4. SEVERAL UNDERGROUND UTILITIES ARE KNOWN TO BE PRESENT ABOVE/THROUGH THE HOLDER #1 FOUNDATION. FOR ESTIMATING PURPOSES, IT HAS BEEN ASSUMED THESE UTILITIES WILL BE TEMPORARILY RELOCATED TO FACILITATE HOLDER #1 REMOVAL ACTIVITIES.
5. EXCAVATION ADJACENT TO THE CITY OF GENEVA PUBLIC SAFETY BUILDING AND EXCAVATION ASSOCIATED WITH THE REMOVAL OF HOLDER #1 WILL REQUIRE A NEW YORK STATE REGISTERED PROFESSIONAL ENGINEER TO DESIGN AND APPROVE THE EXCAVATION SUPPORT SYSTEM(S).
6. FOR THE PURPOSES OF THIS FS REPORT, THE DEPTH OF SURFACE SOIL REMOVAL HAS BEEN ESTIMATED AT 1 FOOT bgs FOR THE AREA SHOWN. ACTUAL DEPTH AND EXTENT OF SOIL REMOVAL WILL BE DETERMINED DURING THE REMEDIAL DESIGN PHASE.
7. LOCATION OF OXYGEN ENHANCEMENT WELLS ARE APPROXIMATE AND WILL BE DETERMINED DURING A PRE–DESIGN INVESTIGATION.
8. ALTERNATIVE V INCLUDES INSTITUTIONAL CONTROLS/ENGINEERING CONTROLS WITH ENHANCED NATURAL ATTENUATION, AND REMOVAL OF SOIL CONTAINING MGP–RELATED CHEMICAL CONSTITUENTS GREATER THAN PART 375 SOIL CLEANUP OBJECTIVES FOR UNRESTRICTED USE.

0 60' 120'

GRAPHIC SCALE

NEW YORK STATE ELECTRIC AND GAS
GENEVA (WADSWORTH ST.) FORMER MGP SITE
FEASIBILITY STUDY

SITE-WIDE REMEDIAL ALTERNATIVE V

ARCADIS

FIGURE
8

CITY:Syracuse GROUP: ENV-141 DB: AMS PGL A.Schilling PM: LYR: ON=*;OFF=REF, (FRZ
\\corp2archive\CadArchive\ARC-OLD\syrdwg\2009\20091231\B0013057\0001\00001\DWG\13057B01.DWG LAYOUT: 8SAVED: 10/19/2009 9:51 AM ACADVER: 17.0S (LMS TECH) PAGESETUP: ----PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 2/1/2010 2:33 PM BY: POSENAUER, LISA
XREFS: 13057X01 13057X02 IMAGES: PROJECTNAME: ----

ARCADIS of New York, Inc
6723 Towpath Road
P O Box 66
Syracuse
New York 13214-0066
Tel 315 446 9120
Fax 315 449 0017
www arcadis-us com

ENVIRONMENTAL

John J. Ruspantini, CHMM
Environmental Analyst
Site Investigation and Remediation
NYSEG
18 Link Drive
Binghamton, New York 13904

Subject:
Wadsworth Street (Geneva) Former MGP Site
Pre-Design Investigation Summary

Date:
May 25, 2011

Contact:
Jason Brien, PE

Phone:
315.671.9114

Email:
jason.brien@arcadis-us.com

Our ref:
B0013104

Dear Mr. Ruspantini:

This letter presents a summary of the Pre-Design Investigation (PDI) conducted for the NYSEG Wadsworth Street Former Manufactured Gas Plant (MGP) Site (the site) located in Geneva, New York. PDI activities were completed in accordance with the New York State Department of Environmental Conservation- (NYSDEC-) approved October 2010 *Remedial Design Work Plan* (RDWP) (ARCADIS, 2010). The objectives of the PDI were to:

- Locate and inspect the structure encountered in Remedial Investigation (RI) soil boring SB-14A
- Delineate the visual extent of soil containing MGP-related impacts in the vicinity of soil boring SB-14A
- Document the extent of dissolved phase groundwater impacts at the site
- Evaluate the microbial community present at the site to support a *Natural Attenuation Evaluation*

PDI activities and results are summarized below. A photo log documenting PDI investigation activities is included as Attachment A.

General PDI Coordination

ARCADIS contacted (via telephone on March 16, 2011) the City of Geneva Department of Public Works Director, Mr. Paul Cosentino, regarding the scope of potential future remedial construction activities that would be conducted at the site. Based on the small site size, there is limited space available for equipment and material lay-down areas. ARCADIS inquired whether road closures would be permitted during remedial construction activities to provide more working room at the site. Mr. Cosentino indicated road closures and lane restrictions would only be permitted if remedial construction activities (e.g., excavation) were to be conducted within public streets.

Additionally, ARCADIS notified Mr. Cosentino that groundwater sampling would be conducted at the monitoring wells located around the Public Service Building (PSB) during the week of March 21, 2011. Per Mr. Cosentino’s request, ARCADIS notified the police department in the PSB each day prior to conducting groundwater sampling.

Utility Markout

Prior to conducting intrusive activities, an on-site meeting was held with local utility companies to assess and document the presence of subsurface activities near proposed investigation locations. Dig Safety New York (DigSafe) was contacted to perform a public utility markout (Ticket No. 03081-150-026-00). As part of the utility markout, representatives from the utilities were requested to attend an on-site meeting held on March 14, 2011 to review the scope of the PDI activities. In addition to DigSafe, representatives from the NYSEG Gas Department, City of Geneva Water and Sewer Department, a City of Geneva electrician, and Verizon attended the site meeting. Proposed monitoring well and soil boring locations were reviewed with the utility companies and proposed investigation locations were modified as appropriate to maintain adequate clearances.

ARCADIS also retained a private utility location subcontractor (SoftDig) to conduct an independent private utility markout. SoftDig utilized a magnetic locator and ground-penetrating radar (GPR) to confirm the utility markout conducted by DigSafe.

Soil Investigation

ARCADIS’ drilling subcontractor (Parratt-Wolff, Inc. [Parratt-Wolff]) completed a total of five soil borings (SB-14C and SB-16 through SB-19) at the locations shown on Figure 1. Prior to drilling the borings, Parratt-Wolff hand-cleared the upper five feet of each boring using air knife/vacuum equipment (air knife) to confirm that no utilities were present at the proposed soil boring locations. At the request of NYSEG, a representative from NYSEG's Gas Department was on-site during the hand-clearing activities.

The grout column associated with RI soil boring SB-14A was located during air knifing activities and the air knife was then used to clear material around soil boring SB-14A. During the air knife activities, a faint MGP-like odor was noted from 2 to 3 feet below grade and the top of metal tank was encountered at approximately 3.5 below grade. The invert of the tank was measured (through the hole in the top of the tank created during completion of RI soil boring SB-14A) at approximately 6.5 feet below grade. The air knife was then used to determine the horizontal limits of the tank, which measures approximately 7 feet long and 3.5 to 4 feet wide. The approximate location of the tanks is shown on Figure 1 and a photo log containing pictures of the tank is included as Attachment A. Visual impacts were not observed in soil to a depth of 8 feet below grade at the hand-cleared locations completed in the immediate vicinity of the tank. Note that during the hand-clearing activities, an approximately, 4-inch diameter pipe (oriented east/west) was encountered above the tank. The origin/termination of the pipe is unknown at this time.

A waste characterization sample was collected from the water within the tank and submitted to TestAmerica in Buffalo, New York for analysis for toxicity characteristic leaching procedure (TCLP) volatile organic compounds (VOCs), TCLP semi-volatile organic compounds (SVOCs), TCLP metals, reactivity, ignitability and corrosivity. Analytical results are presented in Table 1. The hole in the top of the tank was covered with bricks (removed during boring clearing) and the hand-cleared boreholes completed near the tank were backfilled with existing site material and grout.

Soil borings SB-16 through SB-19 were completed to a depth of 10 feet below grade (i.e., approximately 3.5 feet below the invert of the tank) using hollow-stem augers to delineate the visual extent of MGP-related impacts near RI soil boring SB-14A. Soil boring locations are shown on Figure 1. Soil samples were collected continuously in two foot sample intervals using split-barrel samplers. Each sample was visually characterized for color, texture, and moisture content, as well as the presence/absence of visible staining, sheen, NAPL, and obvious odors. NAPL was not observed in any of the PDI soil borings. A faint petroleum-like odor was noted in soil borings SB-16 (4 to 5 feet) and SB-18 (6.5 to 7.5 feet). Black staining was noted in soil borings SB-16 and SB-17 from 5.3 to 5.7 feet. Following completion of the soil borings, boreholes were backfilled with soil cuttings and cement-bentonite grout. Soil boring logs are included as Attachment B.

Investigation-derived waste (IDW) (e.g., soil cuttings, decontamination water, decontamination pad construction materials) were drummed and staged on-site. Drums were labeled with non-hazardous labels indicating relevant information (e.g., drum contents, date generated, generator name, etc.). A waste characterization composite soil sample was collected and submitted to TestAmerica for analysis for TCLP VOCs and polychlorinated biphenyls (PCBs). Waste characterization results for this material are presented Table 2.

Groundwater Investigation

As part of the groundwater investigation activities, a new monitoring well (MW-10) was installed hydraulically downgradient from the underground structure encountered at RI soil boring SB-14A. The upper five feet of the monitoring well boring was hand-cleared as described above for the soil borings. The soil boring completed to facilitate installation of monitoring well MW-10 was drilled to a depth of 25 feet below grade using hollow-stem augers. Soil samples were collected continuously and each sample was visually characterized as described above. The well was installed to a total depth of 25 feet below grade using 2-inch diameter schedule 40 PVC material and equipped with a 0.010 inch well screen from 15 to 25 feet below grade. Monitoring well MW-10 was completed at the ground surface with a flush-mount steel curb box secured in a 6-inch thick concrete pad. A monitoring well construction log is included as part of Attachment B.

Following installation and development of monitoring well MW-10, groundwater samples were collected from each existing and new groundwater monitoring well to document the extent of dissolved phase groundwater impacts and evaluate the existing microbial community in support of the *Natural Attenuation Evaluation*. Prior to collecting groundwater samples, groundwater level measurements were collected from each groundwater monitoring well. Water table elevations are presented in Table 3 and a water table contour map is included as Figure 2. Groundwater samples were then collected using low-flow sampling techniques and groundwater samples were submitted to TestAmerica, Microseeps, and Microbial Insights for laboratory analysis. Groundwater sampling logs are included as Attachment C and analytical results for groundwater samples are included as Table 4. Note that the groundwater sample collected from new monitoring well MW-10 contained benzene at a concentration (i.e., 14 micrograms per liter [ug/L]) that exceeded its NYSDEC TOGS 1.1.1 Class GA guidance value of 1 ug/L. Analytical results are currently being utilized as part of the *Natural Attenuation Evaluation* to evaluate the microbial community present at the site. Results of the *Natural Attenuation Evaluation* will be presented as part of the remedial design.

Monitoring well purge water was combined with the decontamination water generated during soil boring activities. A waste characterization composite water sample was collected and submitted to TestAmerica for analysis of TCLP VOCs and PCBs. Waste characterization results for this sample are presented in Table 2.

Site Survey

ARCADIS's survey subcontractor (Mr. Paul Olszewski, P.L.S.) conducted a site survey to document the following:

- the location of subsurface utilities marked out during the PDI
- the location of soil borings completed as part of the PDI
- the location and elevation of new monitoring well MW-10
- the existing site topography

Site survey information will be incorporated into the remedial design, as appropriate.

Please do not hesitate to contact John Ruspantini at 607.762.8787 or the undersigned at 315.671.9114 if you have any questions or comments regarding the information presented in this letter.

Sincerely,

ARCADIS of New York, Inc

Jason Brien, P.E.
Certified Project Manager

Copies:
Margaret A. Carrillo-Sheridan, P.E., ARCADIS (w/o enclosure)

Attachments:

- Table 1 – Tank Liquid Waste Characterization Results
- Table 2 – Solid and Liquid Waste Characterization Results
- Table 3 – Water Table Elevations
- Table 4 – Groundwater Analytical Results
- Figure 1 – PDI Locations
- Figure 2 – Water Table Contour Map – March 21, 2011
- Attachment A – Photo Log
- Attachment B – Soil Boring and Monitoring Well Construction Logs
- Attachment C – Groundwater Sampling Logs

Tables

Table 1
Tank Liquid Waste Characterization Results

NYSEG - Wadsworth Street Former MGP Site - Geneva, New York

Location ID: Date Collected: Sample Name:	Units	Regulatory Limit	TWS-1 03/17/11 TWS-1
TCLP VOCs			
1,1-Dichloroethene	mg/L	0.7	0.010 U
1,2-Dichloroethane	mg/L	0.5	0.010 U
2-Butanone	mg/L	200	0.050 U
Benzene	mg/L	0.5	0.020
Carbon Tetrachloride	mg/L	0.5	0.010 U
Chlorobenzene	mg/L	100	0.010 U
Chloroform	mg/L	6.0	0.010 U
Tetrachloroethene	mg/L	0.7	0.010 U
Trichloroethene	mg/L	0.5	0.010 U
Vinyl Chloride	mg/L	0.2	0.010 U
TCLP SVOCs			
1,4-Dichlorobenzene	mg/L	7.5	0.010 U
2,4,5-Trichlorophenol	mg/L	400	0.0050 U
2,4,6-Trichlorophenol	mg/L	2.0	0.0050 U
2,4-Dinitrotoluene	mg/L	0.13	0.0050 U
2-Methylphenol	mg/L	200	0.011
3-Methylphenol	mg/L	200	0.010 U
4-Methylphenol	mg/L	200	0.010 U
Hexachlorobenzene	mg/L	0.13	0.0050 U
Hexachlorobutadiene	mg/L	0.5	0.0050 U
Hexachloroethane	mg/L	3.0	0.0050 U
Nitrobenzene	mg/L	2.0	0.0050 U
Pentachlorophenol	mg/L	100	0.010 U
Pyridine	mg/L	5.0	0.025 U
TCLP Metals			
Arsenic	mg/L	5.0	0.0110
Barium	mg/L	100	0.190
Cadmium	mg/L	1.0	0.00100 U
Chromium	mg/L	5.0	0.00200 J
Lead	mg/L	5.0	0.00500 U
Mercury	mg/L	0.2	0.000200 U
Selenium	mg/L	1.0	0.0150 U
Silver	mg/L	5.0	0.00300 U
Misc. Compounds			
Flashpoint	deg. F	<140	>176
Cyanide, Reactivity	mg/L	250	0.180 JB
Sulfide, Reactivity	mg/L	500	10.0 U
pH	SU	< 2 or > 12.5	7.96 H

Notes:

1. Samples collected by ARCADIS on the date indicated.
2. Samples analyzed by TestAmerica located in Buffalo, NY.
3. Concentrations reported in milligrams per liter (mg/L) which is equivalent to parts per million (ppm) unless otherwise noted.
4. B - Indicates that the analyte was detected in the associated Method Blank.
5. J - Indicates that the associated numerical value is an estimated concentration.
6. U - Indicates that the compound was analyzed for but not detected. The associated value is the compound quantitation limit.
7. H - Indicates that the sample was prepared or analyzed beyond the specified holding time.

Table 2
Solid and Liquid Waste Characterization Results

NYSEG - Wadsworth Street Former MGP Site - Geneva, New York

Location ID: Date Collected: Sample Name:	Units	Regulatory Limits[5,6]	WC (solid) 03/23/11 WC-03230211	WC (liquid) 03/23/11 WC-03230211
TCLP VOCs				
1,1-Dichloroethene	mg/L	0.7	0.010 U	0.0010 U
1,2-Dichloroethane	mg/L	0.5	0.010 U	0.0010 U
2-Butanone	mg/L	200	0.050 U	0.0050 U
Benzene	mg/L	0.5	0.010 U	0.0012
Carbon Tetrachloride	mg/L	0.5	0.010 U	0.0010 U
Chlorobenzene	mg/L	100	0.010 U	0.0010 U
Chloroform	mg/L	6.0	0.010 U	0.0010 U
Tetrachloroethene	mg/L	0.7	0.010 U	0.0010 U
Trichloroethene	mg/L	0.5	0.010 U	0.0010 U
Vinyl Chloride	mg/L	0.2	0.010 U	0.0010 U
PCBs				
Aroclor-1016	mg/kg	50	0.019 U	0.49 U
Aroclor-1221	mg/kg	50	0.019 U	0.49 U
Aroclor-1232	mg/kg	50	0.019 U	0.49 U
Aroclor-1242	mg/kg	50	0.019 U	0.49 U
Aroclor-1248	mg/kg	50	0.011 J	0.49 U
Aroclor-1254	mg/kg	50	0.019 U	0.49 U
Aroclor-1260	mg/kg	50	0.019 U	0.49 U

Notes:

1. Samples collected by ARCADIS on the date indicated.
2. Samples analyzed by TestAmerica located in Buffalo, NY.
3. J - Indicates that the associated numerical value is an estimated concentration.
4. U - Indicates that the compound was analyzed for but not detected. The associated value is the compound quantitation limit.
5. Toxicity characteristic regulatory limits presented for VOCs.
6. Total PCB concentration greater than 50 parts per million is considered as a NYS hazardous waste.

Table 3
Water Table Elevations

NYSEG - Wadsworth Street Former MGP Site - Geneva, New York

Location ID	MP Elevation (ft. AMSL)	3/21/2011		
		DTW	Water Elevation (ft. AMSL)	Depth to Bottom
MW-1	453.49	6.54	446.95	19.64
MW-2	455.38	7.11	448.27	24.48
MW-3	456.38	6.01	450.37	16.79
MW-4	456.03	4.19	451.84	15.58
MW-5	455.20	5.58	449.62	19.58
MW-6	456.79	5.41	451.38	17.47
MW-7	453.15	6.19	446.96	16.41
MW-8	453.15	5.67	447.48	19.58
MW-9	457.20	6.83	450.37	16.28
MW-10	453.74	6.71	447.03	25.05

Notes:

1. Depths to water measured by ARCADIS on the date indicated.
2. MP - Measuring point. Measuring point elevations surveyed by NYSEG.
3. DTW - Depth to Water.
4. Elevations given in feet Above mean Sea Level (AMSL), 1929 NGVD.Water.

Table 4
Groundwater Analytical Results

NYSEG - Wadsworth Street Former MGP Site - Geneva, New York

Location ID: **Date Collected:** **Sample Name:**	**NYSDEC GA Groundwater Criteria Standards and Guidance Values**	**Units**	**MW-1** **03/21/11** **MW-01**	**MW-2** **03/22/11** **MW-2**	**MW-3** **03/22/11** **MW-3**	**MW-4** **03/22/11** **MW-4**	**MW-5** **03/22/11** **MW-5**	**MW-6** **03/23/11** **MW-6**	**MW-7** **03/22/11** **MW-7**	**MW-8** **03/22/11** **MW-8**	**MW-9** **03/23/11** **MW-9**	**MW-10** **03/21/11** **MW-10**
VOCs												
1,1,1-Trichloroethane	5	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
1,1,2,2-Tetrachloroethane	5	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
1,1,2-Trichloro-1,2,2-trifluoroethane	- -	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
1,1,2-Trichloroethane	1	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
1,1-Dichloroethane	5	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
1,1-Dichloroethene	5	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
1,2,4-Trichlorobenzene	5	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
1,2-Dibromo-3-chloropropane	0.04	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
1,2-Dibromoethane	5	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
1,2-Dichlorobenzene	3	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
1,2-Dichloroethane	0.6	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
1,2-Dichloropropane	1	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
1,3-Dichlorobenzene	3	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
1,4-Dichlorobenzene	3	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
2-Butanone	50	ug/L	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U [10 U]	10 U
2-Hexanone	50	ug/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	25 U	5.0 U	5.0 U	5.0 U [5.0 U]	5.0 U
4-Methyl-2-Pentanone	- -	ug/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	25 U	5.0 U	5.0 U	5.0 U [5.0 U]	5.0 U
Acetone	50	ug/L	10 U	10 U	10 U	10 U	10 U	50 U	10 U	10 U	10 U [10 U]	**3.3 J**
Benzene	1	ug/L	1.0 U	1.0 U	**4.5**	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	**14**
Bromodichloromethane	50	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
Bromoform	50	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
Bromomethane	5	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
Carbon Disulfide	60	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
Carbon Tetrachloride	5	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
Chlorobenzene	5	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
Chloroethane	5	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
Chloroform	7	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
Chloromethane	5	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
cis-1,2-Dichloroethene	5	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
cis-1,3-Dichloropropene	0.4	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
Cyclohexane	- -	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
Dibromochloromethane	50	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
Dichlorodifluoromethane	- -	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
Ethylbenzene	5	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
Isopropylbenzene	- -	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
Methyl acetate	- -	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
Methyl tert-butyl ether	10	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
Methylcyclohexane	- -	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
Methylene Chloride	5	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
Styrene	5	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
Tetrachloroethene	5	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
Toluene	5	ug/L	1.0 U	1.0 U	**2.9**	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	**0.81 J**
trans-1,2-Dichloroethene	5	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
trans-1,3-Dichloropropene	0.4	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
Trichloroethene	5	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
Trichlorofluoromethane	- -	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
Vinyl Chloride	2	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
Xylene (Total)	5	ug/L	2.0 U	2.0 U	**16**	2.0 U	2.0 U	10 U	2.0 U	2.0 U	2.0 U [2.0 U]	2.0 U

Table 4
Groundwater Analytical Results

NYSEG - Wadsworth Street Former MGP Site - Geneva, New York

Location ID: Date Collected: Sample Name:	NYSDEC GA Groundwater Criteria Standards and Guidance Values	Units	MW-1 03/21/11 MW-01	MW-2 03/22/11 MW-2	MW-3 03/22/11 MW-3	MW-4 03/22/11 MW-4	MW-5 03/22/11 MW-5	MW-6 03/23/11 MW-6	MW-7 03/22/11 MW-7	MW-8 03/22/11 MW-8	MW-9 03/23/11 MW-9	MW-10 03/21/11 MW-10
SVOCs												
2,4,5-Trichlorophenol	1	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
2,4,6-Trichlorophenol	1	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
2,4-Dichlorophenol	1	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
2,4-Dimethylphenol	1	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
2,4-Dinitrophenol	1	ug/L	9.7 U	9.5 U	9.9 U	9.7 U	9.8 U	9.9 U	9.8 U	11 U	9.4 U [9.5 U]	9.5 U
2,4-Dinitrotoluene	5	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
2,6-Dinitrotoluene	5	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
2-Chloronaphthalene	10	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
2-Chlorophenol	1	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
2-Methylnaphthalene	- -	ug/L	4.9 U	4.8 U	**0.79 J**	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
2-Methylphenol	1	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
2-Nitroaniline	5	ug/L	9.7 U	9.5 U	9.9 U	9.7 U	9.8 U	9.9 U	9.8 U	11 U	9.4 U [9.5 U]	9.5 U
2-Nitrophenol	1	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
3,3'-Dichlorobenzidine	5	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
3-Nitroaniline	5	ug/L	9.7 U	9.5 U	9.9 U	9.7 U	9.8 U	9.9 U	9.8 U	11 U	9.4 U [9.5 U]	9.5 U
4,6-Dinitro-2-methylphenol	1	ug/L	9.7 U	9.5 U	9.9 U	9.7 U	9.8 U	9.9 U	9.8 U	11 U	9.4 U [9.5 U]	9.5 U
4-Bromophenyl-phenylether	- -	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
4-Chloro-3-methylphenol	1	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
4-Chloroaniline	5	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
4-Chlorophenyl-phenylether	- -	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
4-Methylphenol	1	ug/L	9.7 U	9.5 U	9.9 U	9.7 U	9.8 U	9.9 U	9.8 U	11 U	9.4 U [9.5 U]	**0.88 J**
4-Nitroaniline	5	ug/L	9.7 U	**7.8 J**	9.9 U	9.7 U	9.8 U	9.9 U	9.8 U	11 U	9.4 U [9.5 U]	9.5 U
4-Nitrophenol	1	ug/L	9.7 U	9.5 U	9.9 U	9.7 U	9.8 U	9.9 U	9.8 U	11 U	9.4 U [9.5 U]	9.5 U
Acenaphthene	20	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
Acenaphthylene	- -	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
Acetophenone	- -	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
Anthracene	50	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
Atrazine	- -	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
Benzaldehyde	- -	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
Benzo(a)anthracene	0.002	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
Benzo(a)pyrene	0	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
Benzo(b)fluoranthene	0.002	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
Benzo(g,h,i)perylene	- -	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
Benzo(k)fluoranthene	0.002	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
Biphenyl	- -	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
bis(2-Chloroethoxy)methane	5	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
bis(2-Chloroethyl)ether	1	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
bis(2-chloroisopropyl)ether	5	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
bis(2-Ethylhexyl)phthalate	5	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
Butylbenzylphthalate	50	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
Caprolactam	- -	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
Carbazole	- -	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
Chrysene	0.002	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
Dibenz(a,h)anthracene	- -	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
Dibenzofuran	- -	ug/L	9.7 U	9.5 U	9.9 U	9.7 U	9.8 U	9.9 U	9.8 U	11 U	9.4 U [9.5 U]	9.5 U
Diethylphthalate	50	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
Dimethylphthalate	50	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
Di-n-butylphthalate	50	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	**0.44 JB**
Di-n-octylphthalate	50	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U

Table 4
Groundwater Analytical Results

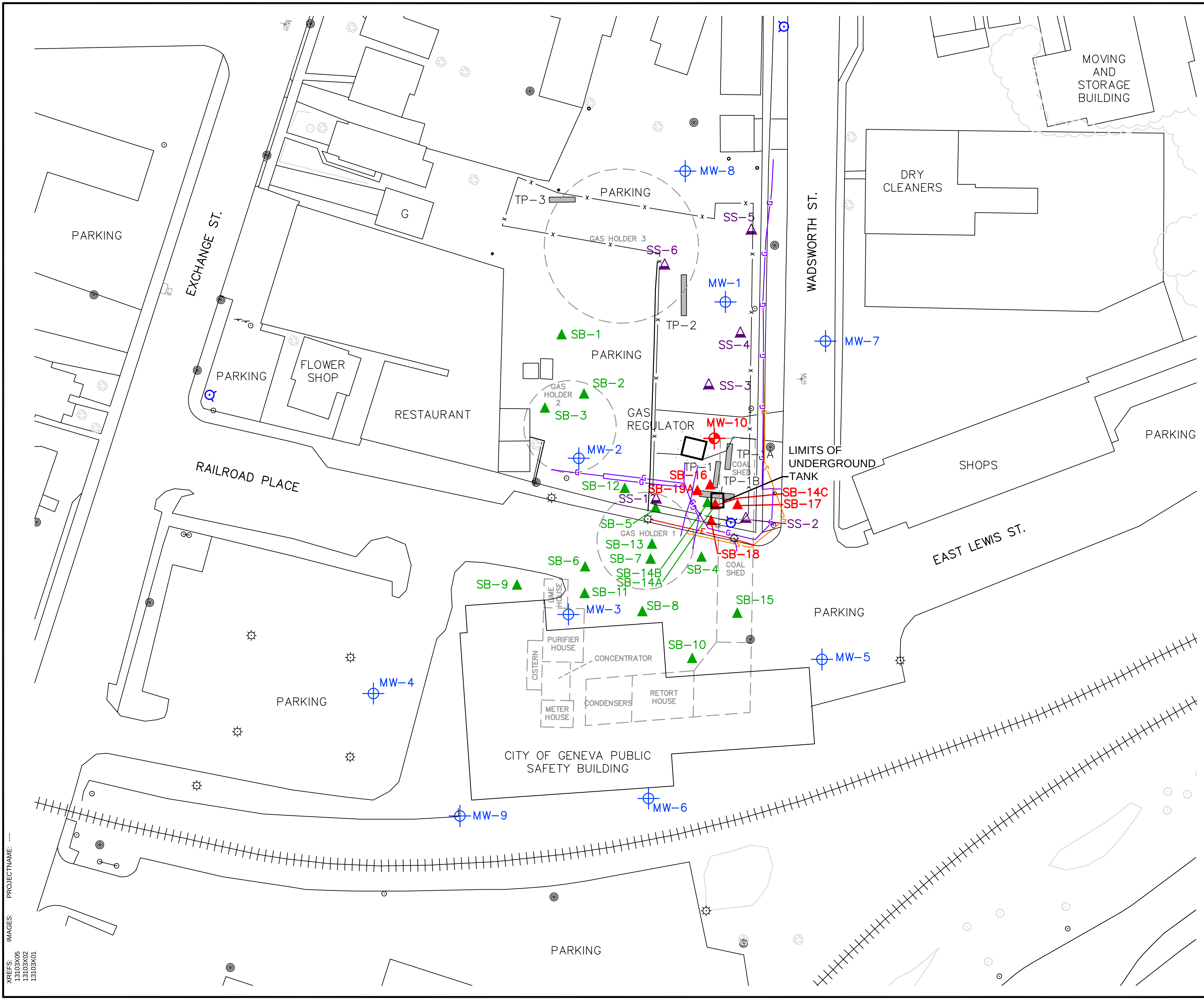
NYSEG - Wadsworth Street Former MGP Site - Geneva, New York

Location ID: Date Collected: Sample Name:	NYSDEC GA Groundwater Criteria Standards and Guidance Values	Units	MW-1 03/21/11 MW-01	MW-2 03/22/11 MW-2	MW-3 03/22/11 MW-3	MW-4 03/22/11 MW-4	MW-5 03/22/11 MW-5	MW-6 03/23/11 MW-6	MW-7 03/22/11 MW-7	MW-8 03/22/11 MW-8	MW-9 03/23/11 MW-9	MW-10 03/21/11 MW-10
SVOCs (continued)												
Fluoranthene	50	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
Fluorene	50	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
Hexachlorobenzene	0.04	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
Hexachlorobutadiene	0.5	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
Hexachlorocyclopentadiene	5	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
Hexachloroethane	5	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
Indeno(1,2,3-cd)pyrene	0.002	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
Isophorone	50	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
Naphthalene	10	ug/L	4.9 U	4.8 U	**7.7**	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
Nitrobenzene	0.4	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
N-Nitroso-di-n-propylamine	- -	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
N-Nitrosodiphenylamine	50	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
Pentachlorophenol	1	ug/L	9.7 U	9.5 U	9.9 U	9.7 U	9.8 U	9.9 U	9.8 U	11 U	9.4 U [9.5 U]	9.5 U
Phenanthrene	50	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
Phenol	1	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
Pyrene	50	ug/L	4.9 U	4.8 U	5.0 U	4.9 U	4.9 U	4.9 U	4.9 U	5.4 U	4.7 U [4.8 U]	4.8 U
Inorganics												
Alkalinity, Total	- -	mg/L	**389**	**351**	**216**	**452**	**458**	**415**	**413**	**496**	**333 [333]**	**278**
Cyanide, Total	0.2	mg/L	**0.066 ***	**0.290**	**0.330**	0.0100 U	0.0100 U	0.0100 U	**0.0310**	**0.0370**	0.0100 U [0.0100 U]	**0.160 ***
Ferric Iron	- -	mg/L	0.100 U	**0.990**	**0.260**	**25.8**	**2.50**	**0.680**	**1.00**	**0.200**	**0.520 [0.400]**	**1.20**
Nitrate Nitrite as N	- -	mg/L	**0.580**	**5.20**	**3.70**	0.0500 U	0.0500 U	**2.00**	0.0500 U	**0.0480 J**	0.0500 U [0.0500 U]	0.0500 U
Sulfate	250	mg/L	**143 B**	**85.8 B**	**168 B**	**116 B**	**31.0**	**76.7 B**	**189 B**	**188 B**	**62.5 B [60.5]**	**1,180 B**
Sulfide (S)	- -	mg/L	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	**0.0760 J [0.100 U]**	0.100 U
Metals												
Manganese	0.3	mg/L	**0.130 B7**	**1.60 B**	**0.0110 B**	**6.20 B**	**2.90 B**	**0.480**	**0.210 B**	**0.140 B**	**1.70 [1.80]**	**1.20 B7**
Metals-Filtered												
Iron	0.3	mg/L	**0.120**	**0.140**	**0.150**	**7.40**	**1.50**	0.0500 U	**0.0260 J**	**0.0370 J**	**0.130 [0.130]**	**1.50**
Manganese	0.3	mg/L	**0.0740**	**0.770 B**	**0.0160 B**	**5.80 B**	**2.80 B**	**0.260**	**0.0470 B**	**0.120 B**	**1.80 [1.80]**	**1.20**
Misc. Compounds												
Naphthalene Dioxygenase (qNAH)	- -	cells/mL	37,800	45,900	34,700	40,200	19,700	50,800	14,200	30,200	27,700	46,200
Toluene Dioxygenase (qTOD)	- -	cells/mL	6,490,000	5,660,000	2,100,000	1,980,000	2,410,000	74,300	705,000	2,760,000	50,400	17,100,000
Total Organic Carbon	- -	mg/L	**1.6**	**2**	1 U	**6.5**	1 U	**7.5**	**1.9**	1 U	**2.4 [2.3]**	**3.4**
Dissolved Gases												
Carbon Dioxide	- -	mg/L	**38**	**42**	**8.6**	**110**	**63**	**88**	**51**	**81**	**53**	**43**
Methane	- -	ug/L	**0.68**	**0.46**	**0.11**	**150**	**19**	**1.9**	**3**	**0.11**	**7.3**	**16**

Notes:

1. Samples collected by ARCADIS on the dates indicated.
2. Samples analyzed by TestAmerica located in Buffalo, NY; Microseeps in Pittsburgh, PA; and Microbial Insights in Rockford, TN. Dissolved gases analyses completed by Microseeps. qNAH and qTOD analyses completed by Microbial Insights. All other analyses completed by TestAmerica.
3. J - Indicates that the associated numerical value is an estimated concentration.
4. U - Indicates that the compound was analyzed for but not detected. The associated value is the compound quantitation limit.
5. * - Indicates that the Laboratory Control Spike or Laboratory Control Spike Duplicate exceeds the control limits.
6. B - Indicates that the analyte was also detected in the associated method blank.
7. B7 - Indicates that the target analyte was detected in method blank at or above method reporting limit. Concentration found in the sample at least 10 times above the concentration found in the blank.
8. Bold indicates detectable concentrations.
9. Shaded indicates concentration exceeds NYSDEC GA Groundwater Criteria Standards and Guidance Values.

Figures



LEGEND:

- ⊕ RI MONITORING WELL LOCATION
- ▲ RI SOIL BORING LOCATION
- △ RI SURFACE SOIL LOCATION
- ▬ RI TEST PIT LOCATION
- —x— FENCE
- ┼┼┼┼┼┼┼ RAILROAD
- ◉ POWER POLE
- ☼ LIGHT POLE
- ○ ⚮ POST, SIGN
- ʘ HYDRANT
- —S— SEWER LINE
- —G— GAS LINE
- —E— ELECTRIC LINE
- — — — FORMER MGP STRUCTURE
- M/H MANHOLE
- ▲ PDI SOIL BORING
- ⊕ PDI MONITORING WELL

NOTES:

1. BASE MAP BASED ON SURVEYS COMPLETED BY NYSEG ON DECEMBER 14, 2005, OCTOBER 2006, AND BY PAUL J. OLSZEWSKI, PLS, PLLC ON MARCH 14 AND 23, 2011. ELEVATIONS IN REFERENCE TO NGVD 1929, HORIZONTAL DATUM IS NAD 83 STATEPLANE, NEW YORK CENTRAL.
2. ALL LOCATIONS ARE APPROXIMATE.
3. PROPERTY BOUNDARIES WERE DIGITIZED FROM CITY OF GENEVA, ONTARIO COUNTY, NEW YORK TAX MAP [104.35], DATED MAY 1, 2008.

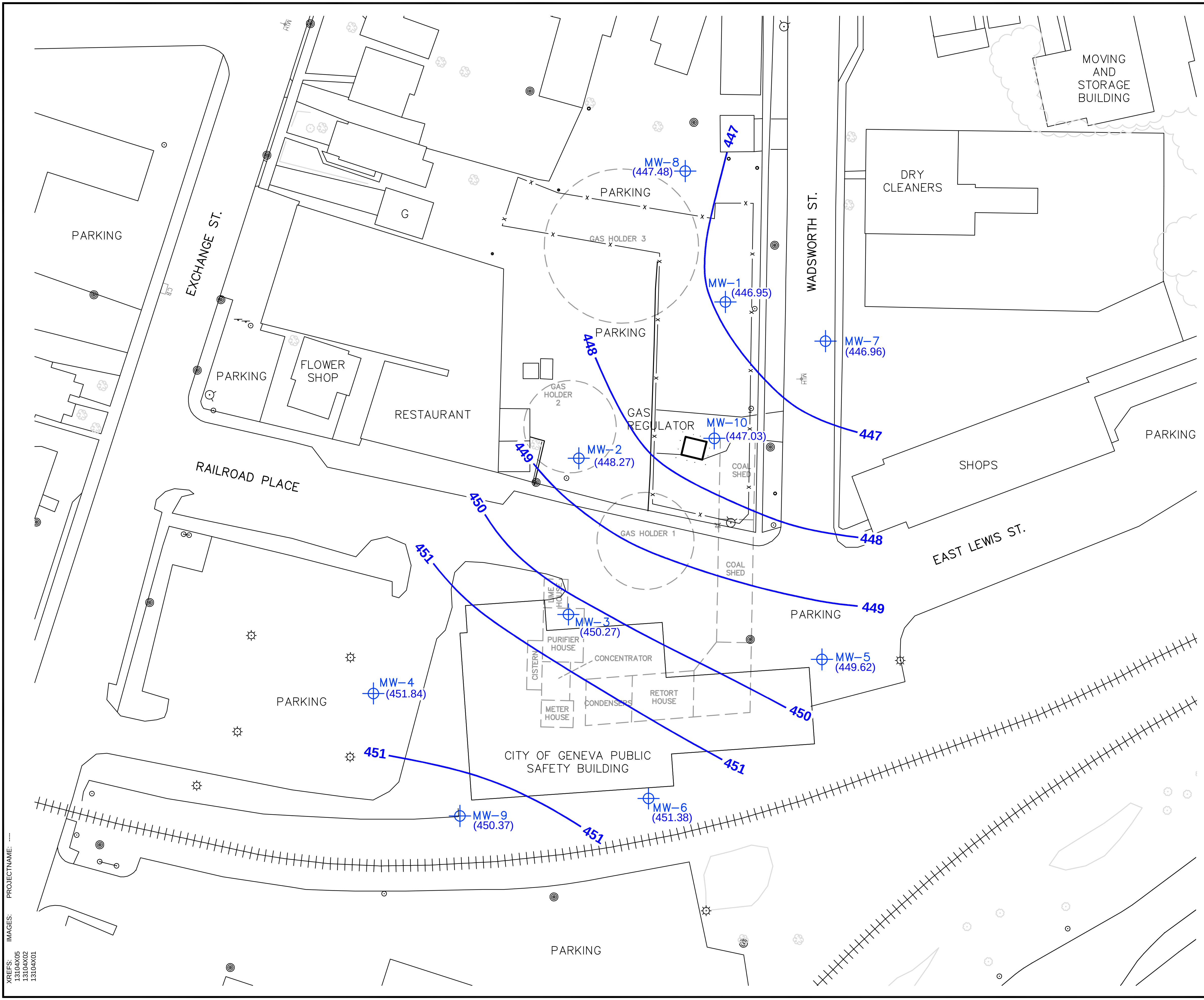
0 60' 120'
GRAPHIC SCALE

NYSEG
WADSWORTH STREET FORMER MGP SITE
GENEVA, NEW YORK
PDI SUMMARY REPORT

PDI LOCATIONS

ARCADIS

FIGURE
1



LEGEND:

⌖	MONITORING WELL LOCATION
——x——	FENCE
++++++++++	RAILROAD
◎	POWER POLE
☼	LIGHT POLE
○ ∞	POST, SIGN
⊙	HYDRANT
– – – –	FORMER MGP STRUCTURE
MH	MANHOLE
(449.62)	GROUNDWATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL (FT, AMSL)
447 ——	WATER TABLE ELEVATION CONTOUR (FT, AMSL)

NOTES:

1. BASE MAP BASED ON SURVEYS COMPLETED BY NYSEG ON DECEMBER 14, 2005, OCTOBER 2006, AND BY PAUL J. OLSZEWSKI, PLS, PLLC ON MARCH 14 AND 23, 2011. ELEVATIONS IN REFERENCE TO NGVD 1929, HORIZONTAL DATUM IS NAD 83 STATEPLANE, NEW YORK CENTRAL.
2. ALL LOCATIONS ARE APPROXIMATE.
3. PROPERTY BOUNDARIES WERE DIGITIZED FROM CITY OF GENEVA, ONTARIO COUNTY, NEW YORK TAX MAP [104.35], DATED MAY 1, 2008.

0 60' 120'
GRAPHIC SCALE

NYSEG
WADSWORTH STREET FORMER MGP SITE
GENEVA, NEW YORK
PDI SUMMARY REPORT

WATER TABLE CONTOUR MAP - MARCH 21, 2011

ARCADIS

FIGURE
2

CITY: SYRACUSE, NY DIV/GROUP: ENV/CADD DB: A. SCHILLING, W. JONES, P. LISTER PM/TM: J. BRIEN TR: J. GOLUBSKI LYR: ON=*;OFF=REF, (FRZ)
G:\ENVCAD\SYRACUSE\ACT\B0013104\0000\00011\DWG\13104W01.DWG LAYOUT: 2 SAVED: 4/21/2011 2:53 PM ACADVER: 18.0S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 4/21/2011 2:54 PM BY: LISTER, PAUL
XREFS: IMAGES: PROJECTNAME: ----
13104X05
13104X02
13104X01

ARCADIS

Attachment A

Photo Log

Attachment A – Photo Log

Pre-Design Investigation Summary Letter Report

CLIENT: NYSEG	**SITE NAME:** Wadsworth Street Former MGP Site
PROJECT #: B0013104	**SITE LOCATION:** Geneva, New York
PHOTOGRAPH #: 704 **PHOTOGRAPHER:** JRO **DATE:** 3/15/2011 **DIRECTION:** South **COMMENT:** Subsurface gas lines marked by Premier (yellow flags) and SoftDig (pink paint).	

CLIENT: NYSEG	**SITE NAME:** Wadsworth Street Former MGP Site
PROJECT #: B0013104	**SITE LOCATION:** Geneva, New York
PHOTOGRAPH #: 715 **PHOTOGRAPHER:** JRO **DATE:** 3/15/2011 **DIRECTION:** Northeast	

Attachment A – Photo Log

Pre-Design Investigation Summary Letter Report

COMMENT: Air knife and vac truck used to hand-clear boring locations.	

CLIENT: NYSEG	**SITE NAME:** Wadsworth Street Former MGP Site
PROJECT #: B0013104	**SITE LOCATION:** Geneva, New York
PHOTOGRAPH #: 727	
PHOTOGRAPHER: JRO	
DATE: March 15, 2011	
DIRECTION: East	
COMMENT: Abandoned steel pile (approximately 3-inch diameter encountered above tank).	

CLIENT: NYSEG	**SITE NAME:** Wadsworth Street Former MGP Site
PROJECT #: B0013104	**SITE LOCATION:** Geneva, New York
PHOTOGRAPH #: 729	
PHOTOGRAPHER: JRO	

DATE: 3/15/2011	
DIRECTION: North to the right	
COMMENT: Original SB-14A boring location. Hole in top of tank bridged with lumber. Grout column from previous boring in upper middle of photograph.	

CLIENT: NYSEG	**SITE NAME:** Wadsworth Street Former MGP Site
PROJECT #: B0013104	**SITE LOCATION:** Geneva, New York
PHOTOGRAPH #: 754	
PHOTOGRAPHER: JRO	
DATE: 3/15/2011	
DIRECTION: North to the right	
COMMENT: Original SB-14A boring location. Hole in top of tank. Additional soil cleared.	

CLIENT: NYSEG	**SITE NAME:** Wadsworth Street Former MGP Site

Attachment A – Photo Log

Pre-Design Investigation Summary Letter Report

PROJECT #: B0013104	**SITE LOCATION:** Geneva, New York
PHOTOGRAPH #: 758 **PHOTOGRAPHER:** JRO **DATE:** 3/15/2011 **DIRECTION:** North to the right **COMMENT:** Brick wall running east/west on right side of picture. You can just see another running north/south at the extreme right of the picture. Tank is on the left side (south) of the wall.	
CLIENT: NYSEG	**SITE NAME:** Wadsworth Street Former MGP Site
PROJECT #: B0013104	**SITE LOCATION:** Geneva, New York
PHOTOGRAPH #: 761 **PHOTOGRAPHER:** JRO **DATE:** 3/15/2011 **DIRECTION:** South **COMMENT:** Holes cleared using vac truck/air knife to delineate the lateral extent of the tank. Brick walls running east/west and north/south are in the foreground near the traffic cone.	

CLIENT: NYSEG	**SITE NAME:** Wadsworth Street Former MGP Site
PROJECT #: B0013104	**SITE LOCATION:** Geneva, New York

PHOTOGRAPH #: 769	
PHOTOGRAPHER: JRO	
DATE: 3/16/2011	**Pre-D**
DIRECTION:	
~~**COMMENT:** Soil boring SB-~~ 18 completed along Railroad Place.	

CLIENT: NYSEG	**SITE NAME:** Wadsworth Street Former MGP Site
PROJECT #: B0013104	**SITE LOCATION:** Geneva, New York
PHOTOGRAPH #: 780	
PHOTOGRAPHER: JRO	
DATE: 3/16/2011	
DIRECTION: North	
COMMENT: Installation of Monitoring Well MW-10.	

CLIENT: NYSEG	**SITE NAME:** Wadsworth Street Former MGP Site
PROJECT #: B0013104	**SITE LOCATION:** Geneva, New York

PHOTOGRAPH #: 788	Pre- 
PHOTOGRAPHER: JRO	
DATE: 3/17/2011	
DIRECTION: Northeast	
COMMENT: Augers placed on decontamination pad.	

ARCADIS

Attachment B

Well Boring Logs

Date Start/Finish: 3/15/2011-3/16/2011
Drilling Company: Parratt-Wolff
Driller's Name: Marquel Chatman
Drilling Method: Air Knife
Auger Size: NA
Rig Type: Vac. Truck 4000
Sampling Method: 2" Hand Auger

Northing: 1046474.88
Easting: 714261.4
Casing Elevation: NA

Borehole Depth: 4' bgs
Surface Elevation: 454.08

Descriptions By: Joshua Oliver

Well/Boring ID: **SB-14C**

Client: NYSEG

Location: Wadsworth Street
Geneva, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
	455									
0		1	0-1	NA	NA	NA	0.0		Dark brown SAND and SILT, trace fine subangular Gravel, organics, non-plastic, moist. (10R 2.5/1)	
		2	1-2	NA	NA	NA	0.0			
		3	2-3	NA	NA	NA	0.0		Red BRICK, some Slag and Concrete, little Silt and fine Sand, faint MGP-like odor, non-plastic, moist. (10R 3/3)	Borehole backfilled with soil removed from borehole to grade.
	450									
5									Boring terminated at 4.5 feet bgs	
	445								Cleared boring down to 3 feet bgs before finding old metal pipe with bolts running East-West. Hole found on top of structure with 2x6 wood piece vertically sticking up out of hole at 4 feet bgs, with grout surrounding it from 3 feet bgs to surface. Found sides of structure with it situated approximately 7x4 feet running North-South. Hole in structure plugged with red bricks and numerous holes covered with dirt upon completion. Water sample taken from inside the structure.	
10										
	440									
15										

ARCADIS
Infrastructure · Water · Environment · Buildings

Remarks: ags = above ground surface; bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level.

Date Start/Finish: 3/15/2011-3/17/2011
Drilling Company: Parratt-Wolff
Driller's Name: Marquel Chatman
Drilling Method: Air Knife/Hollow Stem Auger
Auger Size: 3.25" ID
Rig Type: Vac. Truck 4000/CME-55
Sampling Method: 2" x 2' Split Spoon

Northing: 1046487
Easting: 714258.08
Casing Elevation: NA

Borehole Depth: 10' bgs
Surface Elevation: 453.86

Descriptions By: Joshua Oliver

Well/Boring ID: **SB-16**

Client: NYSEG

Location: Wadsworth Street
Geneva, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
	455									
0		1	0-1	NA	NA	NA	0.0		Dark brown SILT, some to little fine Sand, trace red Brick, Slag, Organics, non-plastic, moist. (10R 2.5/1)	
		2	1-2	NA	NA	NA	0.0			
		3	2-3	NA	NA	NA	0.0		BOULDER and WOOD support pieces.	
		4	3-4	NA	NA	NA	0.0			
	450	5	4-5	NA	NA	NA	0.0		Dark brown to grey Clayey SILT, litle fine Sand, trace red Brick, Blag, non-plastic, saturated. Faint petroleum-like odor and possible grey staining. (GLEY2 5/5PB)	
5		6	5-7	1.8	3 2 3 4	5	0.0		Brown SILT, some Clay, trace fine Sand, no odor, non-plastic, saturated. (2.5YR 5/3) Possible black staining between 5.3-5.7 feet bgs. Increasing amount of Clay with depth.	Borehole backfilled with bentonite/grout to grade.
	445	7/8	7-9	0.0/1.5	3 3 4 3	7	NA/0.0		A second attempt at sampling 7-9 feet bgs was conducted with no recovery the first time.	
		9	9-10	0.8	4 3	NA	0.0		Brown Clayey SILT, little to trace fine Sand, non-plastic, saturated. (2.5YR 5/2)	
10									Boring terminated at 10 feet bgs	
	440									
15										

ARCADIS
Infrastructure · Water · Environment · Buildings

Remarks: ags = above ground surface; bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level.

Vac. Truck/Air Knife method used to clear boring down to 5 feet bgs, then CME-55 Truck Rig used for 5-10 feet bgs. Boring grouted upon completion, no samples taken for analysis.

Date Start/Finish: 3/15/2011-3/17/2011
Drilling Company: Parratt-Wolff
Driller's Name: Marquel Chatman
Drilling Method: Air Knife/Hollow Stem Auger
Auger Size: 3.25" ID
Rig Type: Vac. Truck 4000/CME-55
Sampling Method: 2" x 2' Split Spoon

Northing: 1046474.79
Easting: 714274.95
Casing Elevation: NA

Borehole Depth: 10' bgs
Surface Elevation: 454.08

Descriptions By: Joshua Oliver

Well/Boring ID: **SB-17**

Client: NYSEG

Location: Wadsworth Street
Geneva, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
	455									
0		1	0-1	NA	NA	NA	0.0		Brown medium SAND, some fine to coarse Sand, some to little fine subangular to subrounded Gravel, trace red Brick, moist. (10R 3/3)	
		2	1-2	NA	NA	NA	0.0		BRICK (pile).	
		3	2-3	NA	NA	NA	0.0			
	450	4	3-4	NA	NA	NA	0.0			
		5	4-5	NA	NA	NA	0.0		Brown CLAY, trace Silt, dense, stiff, plastic, saturated. (5YR 5/4)	
5		6	5-7	1.8	3 2 3 4	5	0.0		Brown to dark grey at 6.4 feet bgs, SILT and fine SAND, trace Clay, no odor, dense, non-plastic, wet to saturated. (5YR 6/4 & 5YR 4/1) Possible black staining between 5.3-5.7 feet bgs. Increasing amount of Clay with depth.	Borehole backfilled with bentonite/grout to grade.
		7/8	7-9	0.0/1.5	3 3 4 3	7	NA/0.0		Brown Clayey SILT, some to little fine Sand, non-plastic, saturated. (5YR 6/4) A second attempt at sampling 7-9 feet bgs was conducted with no recovery the first time.	
	445	9	9-10	0.8	4 3	NA	0.0			
10									Boring terminated at 10 feet bgs	
	440									
15										

Remarks: ags = above ground surface; bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level.

Vac. Truck/Air Knife method used to clear boring down to 5 feet bgs, then CME-55 Truck Rig used for 5-10 feet bgs. Boring grouted upon completion, no samples taken for analysis.

ARCADIS
Infrastructure · Water · Environment · Buildings

Date Start/Finish: 3/15/2011-3/16/2011
Drilling Company: Parratt-Wolff
Driller's Name: Marquel Chatman
Drilling Method: Air Knife/Hollow Stem Auger
Auger Size: 3.25" ID
Rig Type: Vac. Truck 4000/CME-55
Sampling Method: 2" x 2' Split Spoon

Northing: 1046464.85
Easting: 714258.66
Casing Elevation: NA

Borehole Depth: 10' bgs
Surface Elevation: 454.61

Descriptions By: Joshua Oliver

Well/Boring ID: **SB-18**

Client: NYSEG

Location: Wadsworth Street
Geneva, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Stratigraphic Description	Well/Boring Construction
	455								
0		1	0-1	NA	NA	NA	0.0	Dark brown SILT, some to little fine Sand, trace red Brick, non-plastic, moist. (GLEY2 2.5/10G)	
		2	1-2	NA	NA	NA	0.0	Brown SILT, little Clay, trace fine Sand and fine subangular Gravel, non-plastic, moist. (2.5YR 3/4)	
		3	2-3	NA	NA	NA	0.0	Brown SILT, some to little Clay, trace fine Sand, non-plastic, moist. (5YR 4/3)	
		4	3-4	NA	NA	NA	0.0	Brown Clayey SILT, trace fine Sand and red Brick, non-plasic, moist. (7.5YR 4/4)	
	450	5	4-5	NA	NA	NA	0.0	Brown SILT, some to little Clay, trace fine Sand, red Brick, black Slag and Coal, non-plastic, moist. (7.5YR 4/4)	
5		6	5-7	2.0	2 4 5 5	9	0.0	Brown SILT, little fine Sand, trace Clay, non-plastic, moist. (10R 4/2)	Borehole backfilled with bentonite/grout to grade.
								Grey fine SAND and SILT, trace Clay, non-plastic, wet-saturated. (10R 4/1) Faint petroleum-like odor with presence of saturated soils. lens of grey-sand (possible staining), faint petroleum-like odor.	
		7	7-9	1.6	5 6 7 9	13	0.0	Brown Clayey SILT, trace fine Sand, stiff, medium plasticity, moist. (10R 4/2)	
	445	8	9-10	0.8	3 4	NA	0.0	Brown SILT, lens of Clayey Silt and fine Sand throughout, non-plastic, wet-saturated. (10R 4/2)	
10								Boring terminated at 10 feet bgs	
	440								
15									

Remarks: ags = above ground surface; bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level.

Vac. Truck/Air Knife method used to clear boring down to 5 feet bgs, then CME-55 Truck Rig used for 5-10 feet bgs. Boring grouted upon completion, no samples taken for analysis.

Date Start/Finish: 3/15/2011-3/17/2011
Drilling Company: Parratt-Wolff
Driller's Name: Marquel Chatman
Drilling Method: Air Knife/Hollow Stem Auger
Auger Size: 3.25" ID
Rig Type: Vac. Truck 4000/CME-55
Sampling Method: 2" x 2' Split Spoon

Northing: 1946483.448
Easting: 714250.1943
Casing Elevation: NA

Borehole Depth: 10' bgs
Surface Elevation: 454.58

Descriptions By: Joshua Oliver

Well/Boring ID: **SB-19/SB-19A**

Client: NYSEG

Location: Wadsworth Street
Geneva, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
	455									
0		1	0-1	NA	NA	NA	0.0		Dark brown SILT, little fine Sand, trace red Brick, non-plastic, moist. (5YR 2.5/2)	
		2	1-2	NA	NA	NA	0.0			
		3	2-3	NA	NA	NA	0.0		Brown SILT, little Clay, trace Slag, Coal, red Brick, non-plastic, moist. (2.5YR 2/3)	
		4	3-4	NA	NA	NA	0.0		trace Ash, Organics at 4 feet bgs	
	450	5	4-5	NA	NA	NA	0.0		wet at 5 feet bgs	
5		6	5-7	1.1	2 4 5 5	4	0.0		Brown SILT, some to little Clay, trace fine Sand, organic odor, wet to saturated. (2.5YR 5/4)	Borehole backfilled with bentonite/grout to grade.
									Brown medium SAND, saturated. (2.5YR 5/2)	
		7	7-9	1.9	5 6 7 9	11	0.0		Brown SILT and fine subangular GRAVEL, trace fine Sand, Clay, soft, loose, saturated. (2.5YR 5/2) Brown Silty CLAY, trace fine Sand, dense, medium plasticity, saturated. (2.5YR 6/4)	
	445	8	9-10	0.6	3 4	NA	0.0		Brown SILT, loose, non-plastic, soft, saturated. (2.5YR 4/2)	
10									Boring terminated at 10 feet bgs	
	440									
15										

ARCADIS
Infrastructure · Water · Environment · Buildings

Remarks: ags = above ground surface; bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level.

Vac. Truck/Air Knife method used to clear boring SB-19 down to 3-3.5 feet bgs before finding brick structure blocking north side of hole, white sand on south side. (NYSEG confirmed anode associated with nearby gas pipe) Moved north 4.5 feet to procede with SB-19B to 5 feet bgs. CME-55 Truck Rig used for 5-10 feet bgs. Boring grouted upon completion. No samples taken for analysis.

Project Number:B0013104.0000.00011 Template:G:\Rockware\LogPlot 2001\LogFiles\Templates\2007 Templates\boring_HSA 2007.ldfx
Data File:boring HSA 2007 .dat Date:4/14/2011 JRO

Date Start/Finish: 3/15/2011-3/17/2011
Drilling Company: Parratt-Wolff
Driller's Name: Marquel Chatman
Drilling Method: Hollow Stem Auger
Auger Size: 4.25" ID
Rig Type: CME-55
Sampling Method: 2" x 2' Split Spoon

Northing: 1046516.33
Easting: 714260.61
Casing Elevation: 453.74

Borehole Depth: 25' bgs
Surface Elevation: 453.97

Descriptions By: Joshua Oliver

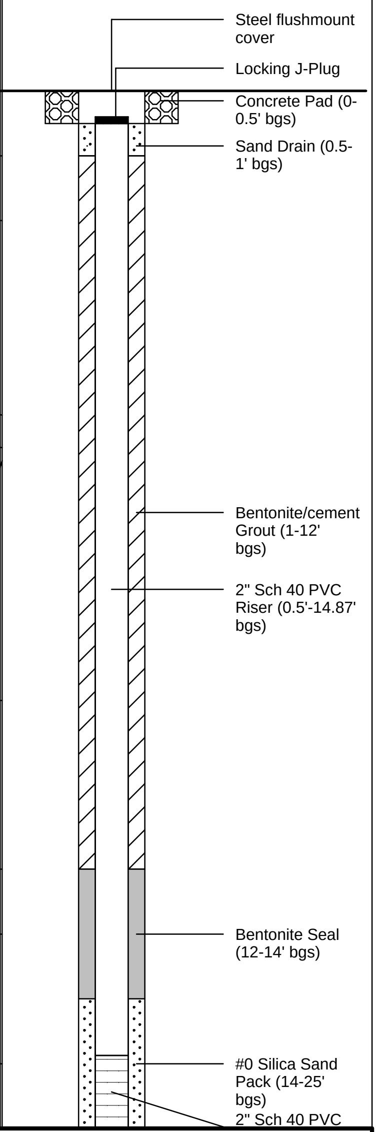
Well/Boring ID: **MW-10**

Client: NYSEG

Location: Wadsworth Street
Geneva, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
	455								
0		1	0-1	NA	NA	NA	NA		Dark brown SILT, little fine Sand, trace Slag, fine subangular Gravel, non-plastic, moist. (5YR 2.5/1)
		2	1-2	NA	NA	NA	NA		Dark brown SILT and CLAY, trace fine Sand, Slag, red Brick, Rubber soles, medium plasticity moist to wet. (5YR 2.5/1)
		3	2-3	NA	NA	NA	NA		Dark to light brown Clayey SILT, trace fine Sand, Coal, non-plastic, wet to saturated. (5YR 5/1)
	450	4	3-4	NA	NA	NA	NA		Little Coal.
		5	4-5	NA	NA	NA	NA		(5YR 4/3)
5		6	5-7	1.6	1 1 1 2	2	0.0		Brown fine SAND and SILT, trace Clay, non-plastic, moist to wet. (2.5YR 4/2) Grey-brown laminated SILT, some Clay, medium plasticity, moist. (5YR 7/1) Faint petroleum-like odor. Brown Clayey SILT, little to trace fine Sand, non-plastic, moist. (5YR 5/2)
	445	7	7-9	1.2	4 4 5 10	9	0.0		Increasing fine Sand with depth.
10		8	9-11	1.8	3 3 4 4	7	0.0		Pink-brown CLAY, trace Silt, laminations of fine Sand and Silt, medium plasticity, moist. (2.5YR 7/4)
		9	11-13	1.1	3 3 4 3	7	0.0		Pink-brown fine to medium SAND, trace Silt, non-plastic, wet. (2.5YR 5/2)
	440	10	13-15	2.0	WOH/2.0 6 2 9	NA	0.0		Pink-brown CLAY, trace Silt, soft, saturated. (2.5YR 4/2)
15					WOH/2.0 2				No Recovery.

Well/Boring Construction



ARCADIS
Infrastructure · Water · Environment · Buildings

Remarks: ags = above ground surface; bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level; WOH = Weight of Hammer

Vac. Truck/Air Knife method used to clear boring down to 5 feet bgs, then CME-55 Truck Rig used for 5-25 feet bgs. No samples taken for analysis.

Client: NYSEG

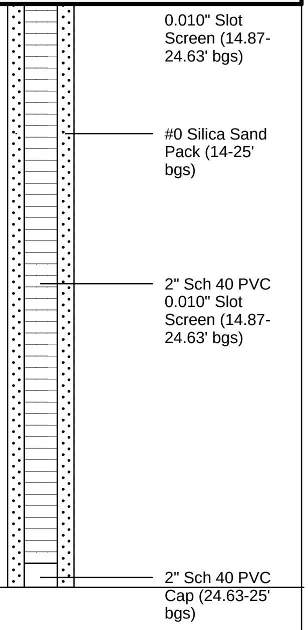
Well/Boring ID: **MW-10**

Borehole Depth: 25' bgs

Site Location:
Wadsworth Street
Geneva, NY

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery (feet)	Blow Counts	N - Value	PID Headspace (ppm)	Geologic Column	Stratigraphic Description
		11	15-17	0.0	3 2	NA	0.0		
	435	12	17-19	1.9	4 4 4 5	8	0.0		Pink-brown CLAY, trace Silt, soft, saturated. (2.5YR 4/2) Pink-brown CLAY, trace Silt with laminations of fine Sand, wet. (2.5YR 6/1) Brown medium to coarse SAND, little fine Sand, non-plastic, saturated. (2.5YR 4/1)
20		13	19-21	2.0	1 2 1 2	3	0.0		
		14	21-23	2.0	2 3 4 3	7	0.0		Pink-brown/brown fine SAND, little to trace Silt, non-plastic, saturated (2.5YR 4/1)
	430	15	23-25	2.0	5 5 4 4	9	0.0		Pink-brown/brown coarse to medium SAND, trace fine Sand, non-plastic, saturated. (2.5YR 5/1) Pink-brown/brown fine SAND, trace Silt, non-plastic, saturated. (2.5YR 5/3)
25									Boring terminated at 25 feet bgs.
	425								
30									
	420								
35									

Well/Boring Construction



ARCADIS
Infrastructure · Water · Environment · Buildings

Remarks: ags = above ground surface; bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level; WOH = Weight of Hammer

Vac. Truck/Air Knife method used to clear boring down to 5 feet bgs, then CME-55 Truck Rig used for 5-25 feet bgs. No samples taken for analysis.

ARCADIS

Attachment C

Groundwater Sampling Logs

Wadsworth Street - Geneva, NY

2011 Well Sampling Event

Site *Event*

MONITORING WELL SAMPLING LOG

Sampling Personnel: Joshua Oliver/ JDC

Well ID: MW-01

Client / Job Number: B0013104

Date: 3/21/11

Weather: OVERCAST 40° F

Time In: 1250 **Time Out:** 1536

Well Information

Depth to Water:	(feet)	6.14	(from MP)
Total Depth:	(feet)	19.64	(from MP)
Length of Water Column:	(feet)	13.5	
Volume of Water in Well:	(gal)	2.2005	

Well Type:	[✓ Flushmount]	Stick-Up	
Well Material:	Stainless Steel	[✓ PVC]	
Well Locked:	[✓ Yes]	No	
Measuring Point Marked:	[✓ Yes]	No	
Well Diameter:	1"	[✓ 2"]	Other:

Purging Information

Purging Method:	Bailer	[✓ Peristaltic]	Grundfos	Other:
Tubing/Bailer Material:	St. Steel	[✓ Polyethylene]	Teflon	Other:
Sampling Method:	[✓ Bailer]	[✓ Peristaltic]	Grundfos	Other:

Duration of Pumping: 80 (min)

Average Pumping Rate: 128 (ml/min) Water-Quality Meter Type: Horiba-22

Total Volume Removed: 2.15 (gal) Did well go dry: Yes [✓ No]

Conversion Factors				
gal / ft. of water	1" ID	2" ID	4" ID	6" ID
	0.041	0.163	0.653	1.469
1 gal = 3.785 L =3875 ml = 0.1337 cubic feet				

Unit Stability			
pH	DO	Cond.	ORP
±0.1	± 10%	± 3.0%	± 10 mV

Time: / Parameter:	1 13:01	2 13:06	3 13:11	4 13:16	5 13:21	6 13:26	7 1331	8 1336	9 1341
Volume Purged (gal)	—	0.44	0.57	0.65	0.76	0.87	0.94	1.02	1.24
Rate (mL/min)	—	140 mL/min	160	150	150	140	120	140	130
Depth to Water (ft.)	6.14	6.26	6.30	6.30	6.31	6.27	6.28	6.28	6.29
pH	—	7.20	7.32	7.35	7.41	7.41	7.42	7.47	7.34
Temp. (C)	—	11.72	11.89	11.75	11.76	11.73	11.67	11.85	11.80
Conductivity (mS/cm)	—	0.503	0.502	0.501	0.501	0.501	0.501	0.502	0.503
Dissolved Oxygen	—	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ORP (mV)	—	256	204	161	127	112	99	83	78
Turbidity (NTU)	—	330	240	190	150	120	120	90	80
Notes:	PUMP STARTED	SLIGHTLY TURBID/ CLOUDY							

Sampling Information

Analyses	#	Laboratory

Sample ID:	Sample Time: 1427
MS/MSD:	Yes [✓ No]
Duplicate:	Yes [✓ No]
Duplicate ID	Dup. Time:
Chain of Custody Signed By:	

Problems / Observations

2100

PID = 0.0

$\frac{1}{3875} = \frac{X}{2100}$

INITIAL OBSERVATION: CLOUDY AND TURBID,
NO ODOR

FINAL OBSERVATION: LESS CLOUDY,
NO ODOR

STARTED SAMPLING @ 1427 END 1536

Wadsworth Street - Geneva, NY

2011 Well Sampling Event

Site | *Event*

MONITORING WELL SAMPLING LOG

Sampling Personnel: Joshua Oliver/ JDL

Client / Job Number: B0013104

Weather: OVERCAST 40° F

Well ID: MW-01 (CONTINUED

Date: 3/21/11

Time In:

Time Out:

Well Information

Depth to Water: (feet) (from MP)

Total Depth: (feet) (from MP)

Length of Water Column: (feet)

Volume of Water in Well: (gal)

Well Type:	Flushmount	Stick-Up
Well Material:	Stainless Steel	PVC
Well Locked:	Yes	No
Measuring Point Marked:	Yes	No

Well Diameter: 1" 2" Other:

Purging Information

Purging Method:	Bailer	[✓ Peristaltic]	Grundfos	Other:
Tubing/Bailer Material:	St. Steel	[✓ Polyethylene]	Teflon	Other:
Sampling Method:	[✓ Bailer]	[✓ Peristaltic]	Grundfos	Other:

Duration of Pumping: (min)

Average Pumping Rate: (ml/min) Water-Quality Meter Type:

Total Volume Removed: (gal) Did well go dry: Yes No

Conversion Factors				
gal / ft. of water	1" ID	2" ID	4" ID	6" ID
	0.041	0.163	0.653	1.469
1 gal = 3.785 L =3875 ml = 0.1337 cubic feet				

Unit Stability			
pH	DO	Cond.	ORP
±0.1	± 10%	± 3.0%	± 10 mV

Parameter: / Time:	1 1346	2 1351	3 1356	4 1401	5 1406	6 1411	7 1416	8 1421	9
Volume Purged (gal)	1.34	1.53	1.68	1.89	2.04	2.23	2.49	2.59	
Rate (mL/min)	150	120	130	130	140	130	150	100	
Depth to Water (ft.)	6.30	6.24	6.25	6.25	6.24	6.23	6.21	6.24	
pH	7.39	7.42	7.44	7.45	7.44	7.45	7.44	7.44	
Temp. (C)	11.89	11.94	11.88	11.82	11.79	11.72	11.68	11.51	
Conductivity (mS/cm)	0.502	0.503	0.504	0.503	0.503	0.504	0.504	0.504	
Dissolved Oxygen	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
ORP (mV)	71	63	58	55	50	50	49	46	
Turbidity (NTU)	65	60	50	50	40	37	37	36	
Notes:							Pump fluctuation		

Sampling Information

Analyses	#	Laboratory

Sample ID: Sample Time:

MS/MSD: Yes No

Duplicate: Yes No

Duplicate ID Dup. Time:

Chain of Custody Signed By:

Problems / Observations

PID =

Wadsworth Street - Geneva, NY

2011 Well Sampling Event

Site *Event*

MONITORING WELL SAMPLING LOG

Sampling Personnel: Joshua Oliver/ JPL **Well ID:** MW-2
Client / Job Number: B0013104 **Date:** 3-22-11
Weather: cloudy, 40°F **Time In:** **Time Out:**

Well Information

Depth to Water: (feet) 6.21 (from MP)
Total Depth: (feet) 21.48' (from MP)
Length of Water Column: (feet) 15.27'
Volume of Water in Well: (gal) ~2.5 gal

Well Type:	[✓ Flushmount]	Stick-Up	
Well Material:	Stainless Steel	[✓ PVC]	
Well Locked:	[✓ Yes]	No	
Measuring Point Marked:	[✓ Yes]	No	
Well Diameter:	1"	[✓ 2"]	Other:

Purging Information

Purging Method:	Bailer	[✓ Peristaltic]	Grundfos	Other:
Tubing/Bailer Material:	St. Steel	[✓ Polyethylene]	Teflon	Other:
Sampling Method:	[✓ Bailer]	[✓ Peristaltic]	Grundfos	Other:

Duration of Pumping: (min) 42 min
Average Pumping Rate: (ml/min) ~230 Water-Quality Meter Type: Horiba-22
Total Volume Removed: (gal) ~2.5 gal Did well go dry: Yes [✓ No]

Conversion Factors				
gal / ft. of water	1" ID	2" ID	4" ID	6" ID
	0.041	0.163	0.653	1.469
1 gal = 3.785 L =3875 ml = 0.1337 cubic feet				

Unit Stability			
pH	DO	Cond.	ORP
±0.1	± 10%	± 3.0%	± 10 mV

Time: / Parameter:	1 1023	2 1028	3 1033	4 1038	5 1043	6 1048	7 1053	8 1058	9 1103	1105
Volume Purged (gal)										
Rate (mL/min)		~230	~230	~~183~~ ~250	~230	~230	~230	~230	~230	
Depth to Water (ft.)		6.54	6.96	7.24	7.15	7.13	7.11	7.10	7.10	
pH		7.41	7.43	7.43	7.43	7.42	7.40	7.38	7.39	
Temp. (C)		10.52	11.14	11.21	11.22	11.24	11.28	11.31	11.34	
Conductivity (mS/cm)		1.01	0.998	0.993	0.990	0.987	0.986	0.984	0.985	
Dissolved Oxygen		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
ORP (mV)		277	282	285	285	283	284	284	284	
Turbidity (NTU)		104.5	30.9	10.6	10.8	6.71	6.32	5.99	5.91	
Notes:	Pump Start		Pump fluctuating							SAMPLE TAKEN

Sampling Information

Analyses	#	Laboratory

Sample ID: MW-2 Sample Time: 1105
MS/MSD: Yes No
Duplicate: Yes [✓ No]
Duplicate ID Dup. Time:
Chain of Custody Signed By:

Problems / Observations

PID = 0.0

Initial obs. Brown, slightly turbid, odorless
<> rust-colored organics

Final Obs: Clear, odorless, colorless

C:\Users\joliver\Documents\ARCADIS Documents\Forms\well sampling geneva.doc

Wadsworth Street - Geneva, NY

2011 Well Sampling Event

Site | *Event*

MONITORING WELL SAMPLING LOG

Sampling Personnel: Joshua Oliver/ Jon LeMessurier
Well ID: MW-3
Client / Job Number: B0013104
Date: 3/22/11
Weather: OVERCAST, 40°F
Time In: 1037 **Time Out:** 1220

Well Information

Depth to Water:	(feet)	5.03	(from MP)
Total Depth:	(feet)	16.74	(from MP)
Length of Water Column:	(feet)	11.71	
Volume of Water in Well:	(gal)	1.91	

Well Type:	Flushmount	Stick-Up	
Well Material:	[✓ Stainless Steel]	PVC	
Well Locked:	[✓ Yes]	No	
Measuring Point Marked:	[✓ Yes]	No	
Well Diameter:	1"	[✓ 2"]	Other:

Purging Information

Purging Method:	Bailer	[✓ Peristaltic]	Grundfos	Other:
Tubing/Bailer Material:	St. Steel	[✓ Polyethylene]	Teflon	Other:
Sampling Method:	[✓ Bailer]	[✓ Peristaltic]	Grundfos	Other:

Duration of Pumping: (min) 35
Average Pumping Rate: (ml/min) 109
Water-Quality Meter Type: HORIBA 22
Total Volume Removed: (gal) 1.04
Did well go dry: Yes [✓ No]

Conversion Factors

	1" ID	2" ID	4" ID	6" ID
gal / ft. of water	0.041	0.163	0.653	1.469

1 gal = 3.785 L =3875 ml = 0.1337 cubic feet

Unit Stability

pH	DO	Cond.	ORP
±0.1	± 10%	± 3.0%	± 10 mV

Time: / Parameter:	1 1100 ~~1050~~	2 1105 ~~1055~~	3 1110 ~~1100~~	4 1115 ~~1105~~	5 1120 ~~1110~~	6 1125 ~~1115~~	7 1130	8 1135	9
Volume Purged (gal)	—	0.11	0.24	0.38	0.47	0.60	0.71	0.84	
Rate (mL/min)	—	160	140	140	100	110	110	110	
Depth to Water (ft.)	5.03	5.33	5.29	5.28	5.28	5.27	5.27	5.27	
pH	—	7.57	7.65	7.67	7.68	7.69	7.70	7.71	
Temp. (C)	—	9.74	9.66	9.49	9.50	9.39	9.33	9.29	
Conductivity (mS/cm)	—	3.19	3.22	3.27	3.29	3.30	3.30	3.30	
Dissolved Oxygen	—	1.10	1.24	1.14	1.24	1.08	1.06	1.04	
ORP (mV)	—	234	246	251	253	255	254	254	
Turbidity (NTU)	—	10	7.9	7.2	5.7	5.4	5.3	5.3	
Notes.	STARTED PUMP							STABLE, SAMPLE STARTED	

Sampling Information

Analyses	#	Laboratory

Sample ID: MW-3 Sample Time: 1140
MS/MSD: Yes [✓ No]
Duplicate: Yes [✓ No]
Duplicate ID Dup. Time:
Chain of Custody Signed By:

Problems / Observations

PID = 0.0

INITIAL OBSERVATION: LOW TURBIDITY SOMEWHAT CLEAR. MAYBE FAINT CHEMICAL ODOR.

FINAL OBSERVATION NO ODOR, CLEAR, LOW TURBIDITY

STARTED SAMPLING @ 1140 END @ 1215

Wadsworth Street - Geneva, NY

2011 Well Sampling Event

Site *Event*

MONITORING WELL SAMPLING LOG

Sampling Personnel: Joshua Oliver/ SRK
Well ID: MW-4
Client / Job Number: B0013024
Date: 3-22-11
Weather: Cloudy 40°F
Time In: 1230 **Time Out:**

Well Information

Depth to Water:	(feet)	4.40'	(from MP)
Total Depth:	(feet)	13.58'	(from MP)
Length of Water Column:	(feet)	9.18'	
Volume of Water in Well:	(gal)	~1.5 gal	

Well Type:	[✓ Flushmount]	Stick-Up
Well Material:	Stainless Steel	[✓ PVC]
Well Locked:	[✓ Yes]	No
Measuring Point Marked:	[✓ Yes]	No
Well Diameter:	1" [✓ 2"]	Other:

Purging Information

Purging Method:	Bailer	[✓ Peristaltic]	Grundfos	Other:
Tubing/Bailer Material:	St. Steel	[✓ Polyethylene]	Teflon	Other:
Sampling Method:	[✓ Bailer]	[✓ Peristaltic]	Grundfos	Other:

Duration of Pumping: (min) 75 min

Average Pumping Rate: (ml/min) ~175 Water-Quality Meter Type: Horiba 22

Total Volume Removed: (gal) ~3.3 gal Did well go dry: Yes [✓ No]

Conversion Factors

	1" ID	2" ID	4" ID	6" ID
gal / ft. of water	0.041	0.163	0.653	1.469

1 gal = 3.785 L =3875 ml = 0.1337 cubic feet

Unit Stability

pH	DO	Cond.	ORP
±0.1	± 10%	± 3.0%	± 10 mV

Time: / Parameter:	1 1233	2 1238	3 1243	4 1248	5 1253	6 1258	7 1303	8 1308	9 1313	1318
Volume Purged (gal)										
Rate (mL/min)		~100	~150	~175	~175	~175	~175	~175	~175	~175
Depth to Water (ft.)		4.43	4.43	4.44	4.44	4.44	4.44	4.45	4.45	4.45
pH		7.04	7.04	7.03	7.05	7.05	7.05	7.05	7.05	7.05
Temp. (C)		11.84	12.04	12.12	12.25	12.29	12.32	12.49	12.54	12.56
Conductivity (mS/cm)		11.7	11.6	11.4	11.2	11.1	11.1	11.1	11.0	11.0
Dissolved Oxygen		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ORP (mV)		-8	-12	-16	-23	-27	-29	-31	-31	-33
Turbidity (NTU)		324	220	180	110	91.8	79.7	60.1	52.8	43.7
Notes:	Pump Started									

3.3

Sampling Information

Analyses	#	Laboratory

Sample ID: MW-4	Sample Time: 1348
MS/MSD: Yes	No
Duplicate: Yes	No
Duplicate ID	Dup. Time:
Chain of Custody Signed By:	

Problems / Observations

PID = 0.0

Initial Obs. Brown, rust colored organics, odorless

Final Obs: Clear, colorless, odorless

Wadsworth Street - Geneva, NY

Site

2011 Well Sampling Event

Event

MONITORING WELL SAMPLING LOG

Sampling Personnel: Joshua Oliver/ SDL

Well ID: MW-4

Client / Job Number:

Date: 3-22-11

Weather:

Time In:

Time Out:

Well Information

Depth to Water:	(feet)	(from MP)
Total Depth:	(feet)	(from MP)
Length of Water Column:	(feet)	
Volume of Water in Well:	(gal)	

Well Type:	Flushmount	Stick-Up
Well Material:	Stainless Steel	PVC
Well Locked:	Yes	No
Measuring Point Marked:	Yes	No
Well Diameter:	1" 2"	Other:

Purging Information

Purging Method:	Bailer	[✓ Peristaltic]	Grundfos	Other:
Tubing/Bailer Material:	St. Steel	Polyethylene	Teflon	Other:
Sampling Method:	Bailer	Peristaltic	Grundfos	Other:
Duration of Pumping:	(min)			
Average Pumping Rate:	(ml/min)	Water-Quality Meter Type:		
Total Volume Removed:	(gal)	Did well go dry:	Yes	No

Conversion Factors

gal / ft. of water	1" ID	2" ID	4" ID	6" ID
	0.041	0.163	0.653	1.469

1 gal = 3.785 L =3875 ml = 0.1337 cubic feet

Unit Stability

pH	DO	Cond.	ORP
±0.1	± 10%	± 3.0%	± 10 mV

Time: / Parameter:	1 1323	2 1328	3 1333	4 1338	5 1343	6 1348	7	8	9
Volume Purged (gal)									
Rate (mL/min)	~175	~175	~175	~175	~175				
Depth to Water (ft.)	4.45	4.45	4.45	4.45	4.45				
pH	7.06	706	7.06	7.06	7.06				
Temp. (C)	12.49	12.51	12.53	12.55	12.58				
Conductivity (mS/cm)	10.9	10.9	10.9	10.8	10.8				
Dissolved Oxygen	0.00	0.00	0.00	0.00	0.00				
ORP (mV)	-35	-36	-36	-36	-36				
Turbidity (NTU)	36.4	30.0	25.6	25.0	24.7				
Notes:						SAMPLE TAKEN			

Sampling Information

Analyses	#	Laboratory

Sample ID:

Sample Time:

MS/MSD: Yes No

Duplicate: Yes No

Duplicate ID

Dup. Time:

Chain of Custody Signed By:

Problems / Observations

PID =

Site 1

Event

MONITORING WELL SAMPLING LOG

Sampling Personnel: Joshua Oliver/ JON LeMESSURIER
Well ID: MW-5
Client / Job Number: B0013104
Date: 3/22/11
Weather: OVERCAST, 38°F
Time In: 0805 **Time Out:** 1020

Well Information

Depth to Water: 5.90 (feet) (from MP)
Total Depth: 19.57 (feet) (from MP)
Length of Water Column: 1367 (feet)
Volume of Water in Well: 222 (gal)

Well Type:	Flushmount	Stick-Up
Well Material:	[✓ Stainless Steel]	PVC
Well Locked:	[✓ Yes]	No
Measuring Point Marked:	[✓ Yes]	No
Well Diameter:	1" [✓ 2"]	Other:

Purging Information

Purging Method:	Bailer	[✓ Peristaltic]	Grundfos	Other:
Tubing/Bailer Material:	St. Steel	[✓ Polyethylene]	Teflon	Other:
Sampling Method:	[✓ Bailer]	[✓ Peristaltic]	Grundfos	Other:

Duration of Pumping: (min) 85
Average Pumping Rate: (ml/min) 118
Water-Quality Meter Type: HORIBA 2.2
Total Volume Removed: (gal) 240
Did well go dry: Yes [✓ No]

Conversion Factors

gal / ft. of water	1" ID	2" ID	4" ID	6" ID
	0.041	0.163	0.653	1.469

1 gal = 3.785 L =3875 ml = 0.1337 cubic feet

Unit Stability

pH	DO	Cond.	ORP
±0.1	± 10%	± 3.0%	± 10 mV

Parameter: / Time:	1	2	3	4	5	6	7	8	9
	0810	0815	0820	0825	0830	0835	0840	0845	0850
Volume Purged (gal)	—	0.13	0.23	0.31	0.49	0.57	0.70	0.81	0.98
Rate (mL/min)	—	80	160	140	120	130	130	120	100
Depth to Water (ft.)	5.90	6.29	6.90	7.12	7.20	7.23	7.26	7.29	7.32
pH	—	6.71	6.98	7.09	7.12	7.00	6.97	6.97	7.04
Temp. (C)	—	7.49	7.01	7.11	6.96	7.06	7.54	7.82	7.97
Conductivity (mS/cm)	—	0.660	0.646	0.643	0.668	0.966	1.27	1.28	1.28
Dissolved Oxygen	—	11.04	10.91	10.66	10.44	9.48	7.93	6.98	6.29
ORP (mV)	—	222	213	210	209	80	-27	-22	-55
Turbidity (NTU)	—	38	36	31	23	10	4.8	3.8	3.2
Notes:	STARTED PUMPING	PRETTY CLEAR, NO ODOR				MAJOR CHANGES, NO ODOR			

Sampling Information

Analyses	#	Laboratory

Sample ID: MW-5 Sample Time: 0932
MS/MSD: Yes [✓ No]
Duplicate: Yes [✓ No]
Duplicate ID Dup. Time:
Chain of Custody Signed By:

Problems / Observations

PID = 0.0

INITIAL OBSERVATION: CLEAR, LOW TURBIDITY, NO ODOR

FINAL OBSERVATION VERY LOW TURBIDITY, NO ODOR

SAMPLE STARTED @ 0932, END 1015

Wadsworth Street - Geneva, NY

2011 Well Sampling Event

Site *Event*

MONITORING WELL SAMPLING LOG

Sampling Personnel: Joshua Oliver/ Jon LeMessurier
Well ID: MW-5
Client / Job Number: B0013104
Date: 3/22/11
Weather:
Time In: 0805 **Time Out:**

Well Information

Depth to Water: (feet) (from MP)
Total Depth: (feet) (from MP)
Length of Water Column: (feet)
Volume of Water in Well: (gal)

Well Type:	Flushmount	Stick-Up
Well Material:	Stainless Steel	PVC
Well Locked:	Yes	No
Measuring Point Marked:	Yes	No

Well Diameter: 1" 2" Other:

Purging Information

Purging Method:	Bailer	Peristaltic	Grundfos	Other:
Tubing/Bailer Material:	St. Steel	Polyethylene	Teflon	Other:
Sampling Method:	Bailer	Peristaltic	Grundfos	Other:

Duration of Pumping: (min) 35
Average Pumping Rate: (ml/min) Water-Quality Meter Type:
Total Volume Removed: (gal) Did well go dry: Yes No

Conversion Factors				
gal / ft. of water	1" ID	2" ID	4" ID	6" ID
	0.041	0.163	0.653	1.469
1 gal = 3.785 L =3875 ml = 0.1337 cubic feet				

Unit Stability			
pH	DO	Cond.	ORP
±0.1	± 10%	± 3.0%	± 10 mV

Time: / Parameter:	1 0855	2 0900	3 0905	4 0910	5 0915	6 0920	7 0925	8 0930	9 0935
Volume Purged (gal)	1.07	1.28	1.41	1.60	1.81	2.02	2.16	2.30	
Rate (mL/min)	110	130	130	130	140	130	130	130	
Depth to Water (ft.)	7.38	7.41	7.46	7.48	7.56	7.60	7.60	7.61	
pH	7.04	7.08	7.07	7.07	7.09	7.09	7.08	7.08	
Temp. (C)	8.16	8.14	8.22	8.26	8.27	8.35	8.35	8.41	
Conductivity (mS/cm)	1.28	1.28	1.29	1.29	1.29	1.29	1.30	1.31	
Dissolved Oxygen	5.59	4.95	4.23	3.92	3.48	3.22	3.19	3.17	
ORP (mV)	-55	-58	-59	-58	-58	-58	-59	-60	
Turbidity (NTU)	3.2	3.7	2.5	2.3	2.7	2.1	2.0	2.0	
Notes:									

Sampling Information

Analyses	#	Laboratory

Sample ID: Sample Time:
MS/MSD: Yes No
Duplicate: Yes No
Duplicate ID Dup. Time:
Chain of Custody Signed By:

Problems / Observations

PID =

i

Wadsworth Street - Geneva, NY

2011 Well Sampling Event

Site *Event*

MONITORING WELL SAMPLING LOG

Sampling Personnel:	Joshua Oliver/ JON LEMESSURIER	**Well ID:**	MW-6
Client / Job Number:	B0013104	**Date:**	3/23/11
Weather:	SNOW (HEAVY), 30°	**Time In:**	0750 **Time Out:** 1230

Well Information

Depth to Water:	(feet)	5.18	(from MP)
Total Depth:	(feet)	17.47	(from MP)
Length of Water Column:	(feet)	12.29	
Volume of Water in Well:	(gal)	2.00	

Well Type:	Flushmount	Stick-Up	
Well Material:	[✓ Stainless Steel]	PVC	
Well Locked:	[✓ Yes]	No	
Measuring Point Marked:	[✓ Yes]	No	
Well Diameter:	1"	[✓ 2"]	Other:

Purging Information

Purging Method:	Bailer	[✓ Peristaltic]	Grundfos	Other:
Tubing/Bailer Material:	St. Steel	[✓ Polyethylene]	Teflon	Other:
Sampling Method:	[✓ Bailer]	[✓ Peristaltic]	Grundfos	Other:

Duration of Pumping: (min) 40 MIN

Average Pumping Rate: (ml/min) 106 Water-Quality Meter Type: HORIBA 2.2

Total Volume Removed: (gal) 1.04 Did well go dry: Yes [✓ No]

Conversion Factors

	1" ID	2" ID	4" ID	6" ID
gal / ft. of water	0.041	0.163	0.653	1.469

1 gal = 3.785 L =3875 ml = 0.1337 cubic feet

Unit Stability

pH	DO	Cond.	ORP
±0.1	± 10%	± 3.0%	± 10 mV

Parameter: / Time:	1	2	3	4	5	6	7	8	9
	0940	0945	0950	0955	1000	1005	1010	1015	1020
Volume Purged (gal)	—	0.13	0.25	0.36	0.45	0.57	0.69	0.80	0.75
Rate (mL/min)	—	150	130	120	110	110	110	110	110
Depth to Water (ft.)	5.18	5.22	5.23	5.23	5.23	5.23	5.24	5.24	5.24
pH	—	6.86	7.04	7.02	6.96	6.88	6.97	6.94	6.92
Temp. (C)	—	8.75	8.88	8.67	8.39	8.22	8.10	8.45	8.53
Conductivity (mS/cm)	—	0.775	0.780	0.780	0.780	0.783	0.780	0.781	0.794
Dissolved Oxygen	—	1.42	1.30	0.92	0.41	0.41	0.19	0.18	0.10
ORP (mV)	—	191	187	187	192	197	194	196	197
Turbidity (NTU)	—	21	21	22	20	20	19	18	18
Notes:	START PUMP								END PUMP, START SAMPLE

Sampling Information

Analyses	#	Laboratory

Sample ID:	Sample Time: 1025
MS/MSD: [✓ Yes]	No
Duplicate: Yes	[✓ No]
Duplicate ID	Dup. Time:
Chain of Custody Signed By:	

⑥

Problems / Observations

PID = 0.0

INITIAL OBSERVATION: HIGHER TURBIDITY, NO ODOR

FINAL OBSERVATION: TURBIDITY SAME, NO ODOR

MS & MSD WERE EXTRACTED FROM MW-6.

STARTED SAMPLE @ 1025 END @ 1230

Wadsworth Street - Geneva, NY

Site

2011 Well Sampling Event

Event

MONITORING WELL SAMPLING LOG

Sampling Personnel: Joshua Oliver/
Client / Job Number: B0013104
Weather: cloudy, 40°

Well ID: MW-7
Date: 3-22-11
Time In: 0750 **Time Out:**

Well Information

Depth to Water:	(feet)	5.99	(from MP)
Total Depth:	(feet)	16.41'	(from MP)
Length of Water Column:	(feet)	10.42'	
Volume of Water in Well:	(gal)	~1.7 gal	

Well Type:	[✓ Flushmount]	Stick-Up	
Well Material:	Stainless Steel	[✓ PVC]	
Well Locked:	[✓ Yes]	No	
Measuring Point Marked:	[✓ Yes]	No	
Well Diameter:	1"	[✓ 2"]	Other:

Purging Information

Purging Method:	Bailer	[✓ Peristaltic]	Grundfos	Other:
Tubing/Bailer Material:	St. Steel	[✓ Polyethylene]	Teflon	Other:
Sampling Method:	[✓ Bailer]	[✓ Peristaltic]	Grundfos	Other:

Duration of Pumping: (min) ~60 min
Average Pumping Rate: (ml/min) ~130 ml/min
Water-Quality Meter Type: Horiba-22
Total Volume Removed: (gal) ~2 gal
Did well go dry: Yes [✓ No]

Conversion Factors

	1" ID	2" ID	4" ID	6" ID
gal / ft. of water	0.041	0.163	0.653	1.469

1 gal = 3.785 L =3875 ml = 0.1337 cubic feet

Unit Stability

pH	DO	Cond.	ORP
±0.1	± 10%	± 3.0%	± 10 mV

Parameter: / Time:	1	2	3	4	5	6	7	8	9	
	0820	0825	0830	0835	0840	0845	0850	0855	0900	0905
Volume Purged (gal)										
Rate (mL/min)		~130	~130	~130	~130	~130	~130	~130	~130	~130
Depth to Water (ft.)		6.13	6.15	6.15	6.15	6.14	6.15	6.15	6.15	6.15
pH		7.11	7.33	7.43	7.45	7.41	7.39	7.39	7.42	7.44
Temp. (C)		10.26	10.28	10.81	10.85	10.80	10.92	11.12	11.08	11.13
Conductivity (mS/cm)		1.12	1.14	1.11	1.10	1.10	1.10	1.10	1.10	1.10
Dissolved Oxygen		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ORP (mV)		263	257	251	249	247	250	242	237	236
Turbidity (NTU)		76	83	78	69	63	51.7	50.7	26.7	21.8
Notes:	Start Pump									

Sampling Information

Analyses	#	Laboratory

Sample ID: MW-7 Sample Time: 0920
MS/MSD: Yes No
Duplicate: Yes No
Duplicate ID Dup Time:
Chain of Custody Signed By:

Problems / Observations

PID = 0.0

Initial Obs: cloudy, odorless

Final Obs: clear, odorless

Wadsworth Street - Geneva, NY

2011 Well Sampling Event

Site *Event*

MONITORING WELL SAMPLING LOG

Sampling Personnel: Joshua Oliver/ JON LEMESSURIER **Well ID:** MW - 8
Client / Job Number: B0013104 **Date:** 3/22/11
Weather: OVERCAST, 40°F **Time In:** 1250 **Time Out:** 1445

Well Information

Depth to Water:	(feet)	5.56	(from MP)
Total Depth:	(feet)	19.58	(from MP)
Length of Water Column:	(feet)	14.02	
Volume of Water in Well:	(gal)	2.29	

Well Type:	Flushmount	Stick-Up	
Well Material:	[✓ Stainless Steel]	PVC	
Well Locked:	[✓ Yes]	No	
Measuring Point Marked:	[✓ Yes]	No	
Well Diameter:	1"	[✓ 2"]	Other:

Purging Information

Purging Method:	Bailer	[✓ Peristaltic]	Grundfos	Other:
Tubing/Bailer Material:	St. Steel	[✓ Polyethylene]	Teflon	Other:
Sampling Method:	[✓ Bailer]	[✓ Peristaltic]	Grundfos	Other:

Duration of Pumping: (min) 35

Average Pumping Rate: (ml/min) 105 Water-Quality Meter Type: HORIBA 2.2

Total Volume Removed: (gal) 0.93 Did well go dry: Yes [✓ No]

Conversion Factors				
gal / ft. of water	1" ID	2" ID	4" ID	6" ID
	0.041	0.163	0.653	1.469
1 gal = 3.785 L =3875 ml = 0.1337 cubic feet				

Unit Stability			
pH	DO	Cond.	ORP
±0.1	± 10%	± 3.0%	± 10 mV

Time: / Parameter:	1 1305	2 1310	3 1315	4 1320	5 1325	6 1330	7 1335	8 1340	9
Volume Purged (gal)	—	0.18	0.24	0.37	0.48	0.57	0.69	0.80	
Rate (mL/min)	—	200	130	100	100	90	110	110	
Depth to Water (ft.)	5.56	6.36	6.76	6.97	7.10	7.10	7.05	7.05	
pH	—	7.44	7.16	7.15	7.15	7.13	7.13	7.13	
Temp. (C)	—	9.13	9.16	9.08	9.07	9.07	9.00	8.89	
Conductivity (mS/cm)	—	1.24	1.21	1.20	1.19	1.19	1.18	1.18	
Dissolved Oxygen	—	0.48	0.00	0.00	0.00	0.00	0.00	0.00	
ORP (mV)	—	195	186	178	171	164	160	159	
Turbidity (NTU)	—	4.0	3.6	3.8	3.3	3.3	3.4	3.4	
Notes:	START PUMP								

Sampling Information

Analyses	#	Laboratory

Sample ID: MW-8 Sample Time: 1345
MS/MSD: Yes [✓ No]
Duplicate: Yes [✓ No]
Duplicate ID Dup. Time:
Chain of Custody Signed By:

Problems / Observations

PID = 0.0

INITIAL OBSERVATION: NO ~~SMELL~~ ODOR, LOW TURBIDITY

FINAL OBSERVATION NO ODOR, LESS TURBID

SAMPLE STARTED @ 1345 END @ 1440

Wadsworth Street - Geneva, NY

2011 Well Sampling Event

Site *Event*

MONITORING WELL SAMPLING LOG

Sampling Personnel: Joshua Oliver/ JPL

Well ID: MW-9

Client / Job Number: B0013104

Date: 3-23-11

Weather: Snow 35° F

Time In: 0830 **Time Out:**

Well Information

Depth to Water:	(feet)	5.58'	(from MP)
Total Depth:	(feet)	16.28'	(from MP)
Length of Water Column:	(feet)	10.7'	
Volume of Water in Well:	(gal)	~1.7 gal	

Well Type:	[✓ Flushmount]	Stick-Up	
Well Material:	Stainless Steel	[✓ PVC]	
Well Locked:	[✓ Yes]	No	
Measuring Point Marked:	[✓ Yes]	No	
Well Diameter:	1"	[✓ 2"]	Other:

Purging Information

Purging Method:	Bailer	[✓ Peristaltic]	Grundfos	Other:
Tubing/Bailer Material:	St. Steel	[✓ Polyethylene]	Teflon	Other:
Sampling Method:	[✓ Bailer]	[✓ Peristaltic]	Grundfos	Other:

Duration of Pumping: (min) 76

Average Pumping Rate: (ml/min) ~185

Water-Quality Meter Type: Horiba-22

Total Volume Removed: (gal) ~3.6 gal

Did well go dry: Yes [✓ No]

Conversion Factors				
gal / ft. of water	1" ID	2" ID	4" ID	6" ID
	0.041	0.163	0.653	1.469
1 gal = 3.785 L =3875 ml = 0.1337 cubic feet				

Unit Stability			
pH	DO	Cond.	ORP
±0.1	± 10%	± 3.0%	± 10 mV

Time: / Parameter:	1 0912	2 0917	3 0922	4 0927	5 0932	6 0937	7 0942	8 0947	9 0952
Volume Purged (gal)									
Rate (mL/min)		~180	~190	~190	~180	~190	~180	~180	~180
Depth to Water (ft.)		5.93	6.07	6.15	6.21	6.24	6.22	6.22	6.22
pH		7.01	6.96	7.09	7.24	7.37	7.38	7.38	7.38
Temp. (C)		9.94	9.97	10.23	10.33	10.40	10.36	10.34	10.33
Conductivity (mS/cm)		0.961	0.851	0.821	0.808	0.799	0.795	0.795	0.796
Dissolved Oxygen		0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.00
ORP (mV)		77	56	38	27	23	21	20	20
Turbidity (NTU)		869	359	151	97.9	78.9	60.9	56.7	40.4
Notes:	Pump Started								

Sampling Information

Analyses	#	Laboratory

Sample ID MW-9 Sample Time: 1028

MS/MSD: Yes [✓ No]

Duplicate: [✓ Yes] No

Duplicate ID DUP-032311 Dup. Time: —

Chain of Custody Signed By:

Problems / Observations

PID = 0.0

Initial Obs. cloudy, slight brown coloration, odorless

Final Obs: clear, colorless, odorless

Wadsworth Street - Geneva, NY

Site

2011 Well Sampling Event

Event

MONITORING WELL SAMPLING LOG

Sampling Personnel: Joshua Oliver/

Client / Job Number:

Weather:

Well ID: MW-9

Date: 3-23-11

Time In:

Time Out:

Well Information

Depth to Water:	(feet)	(from MP)
Total Depth:	(feet)	(from MP)
Length of Water Column:	(feet)	
Volume of Water in Well:	(gal)	

Well Type:	Flushmount	Stick-Up
Well Material:	Stainless Steel	PVC
Well Locked:	Yes	No
Measuring Point Marked:	Yes	No
Well Diameter:	1" 2"	Other:

Purging Information

Purging Method:	Bailer	[✓ Peristaltic]	Grundfos	Other:
Tubing/Bailer Material:	St. Steel	Polyethylene	Teflon	Other:
Sampling Method:	Bailer	Peristaltic	Grundfos	Other:

Duration of Pumping: (min)

Average Pumping Rate: (ml/min) Water-Quality Meter Type:

Total Volume Removed: (gal) Did well go dry: Yes No

Conversion Factors				
	1" ID	2" ID	4" ID	6" ID
gal / ft. of water	0.041	0.163	0.653	1.469
1 gal = 3.785 L =3875 ml = 0.1337 cubic feet				

Unit Stability			
pH	DO	Cond.	ORP
±0.1	± 10%	± 3.0%	± 10 mV

Time: / Parameter:	1 0957	2 1002	3 1007	4 1012	5 1017	6 1022	7 1028	8	9
Volume Purged (gal)									
Rate (mL/min)	~190	~195	~185	~185	~185	~185			
Depth to Water (ft.)	6.23	6.24	6.26	6.23	6.24	6.24			
pH	7.36	7.27	7.36	7.35	7.31	7.30			
Temp (C)	10.38	10.49	10.42	10.47	10.48	10.47			
Conductivity (mS/cm)	0.800	0.803	0.805	0.807	0.809	0.810			
Dissolved Oxygen	0.00	0.00	0.00	0.00	0.00	0.10			
ORP (mV)	16	21	16	16	18	16			
Turbidity (NTU)	35.6	21.8	18.5	15.1	15.5	15.0			
Notes:	Pump Malfunctioning						SAMPLE		

Sampling Information

Analyses	#	Laboratory

Sample ID: Sample Time:

MS/MSD: Yes No

Duplicate: Yes No

Duplicate ID Dup. Time:

Chain of Custody Signed By:

Problems / Observations

PID =

Wadsworth Street - Geneva, NY

2011 Well Sampling Event

Site

Event

MONITORING WELL SAMPLING LOG

Sampling Personnel: Joshua Oliver/ JDL
Client / Job Number: B0013064
Weather: Cloudy, 40°F

Well ID: MW-10
Date: 3-21-11
Time In: 1345 **Time Out:**

Well Information

Depth to Water: 6.81' (feet) (from MP)
Total Depth: 25.05' (feet) (from MP)
Length of Water Column: (feet) 18.24'
Volume of Water in Well: (gal) 2.9 gal

Well Type:	[✓ Flushmount]	Stick-Up
Well Material:	Stainless Steel	[✓ PVC]
Well Locked:	[✓ Yes]	No
Measuring Point Marked:	[✓ Yes]	No
Well Diameter:	1" [✓ 2"]	Other:

Purging Information

Purging Method:	Bailer	[✓ Peristaltic]	Grundfos	Other:
Tubing/Bailer Material:	St. Steel	[✓ Polyethylene]	Teflon	Other:
Sampling Method:	Bailer	[✓ Peristaltic]	Grundfos	Other:

Duration of Pumping: (min) 76 min
Average Pumping Rate: (ml/min) ~100 Water-Quality Meter Type: Horiba 22
Total Volume Removed: (gal) ~2 gal Did well go dry: Yes [✓ No]

Conversion Factors				
gal / ft. of water	1" ID	2" ID	4" ID	6" ID
	0.041	0.163	0.653	1.469
1 gal = 3.785 L =3875 ml = 0.1337 cubic feet				

Unit Stability			
pH	DO	Cond.	ORP
±0.1	± 10%	± 3.0%	± 10 mV

Time: / Parameter:	1 1404	2 1409	3 1414	4 1419	5 1424	6 1429	7 1434	8 1439	9 1444
Volume Purged (gal)									
Rate (mL/min)		~100	~100	~100	~100	~100	~100	~100	~100
Depth to Water (ft.)		7.51	8.07	8.31	8.57	8.80	8.93	9.04	9.08
pH		7.32	6.92	6.88	6.87	6.87	6.86	6.86	6.86
Temp. (C)		11.43	11.73	11.85	11.94	12.05	12.08	12.11	12.14
Conductivity (mS/cm)		2.04	2.02	2.00	1.95	1.91	1.91	1.91	1.91
Dissolved Oxygen		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ORP (mV)		-25	-35	-37	-39	-41	-40	-39	-39
Turbidity (NTU)		85	85	75	61	50	45	40	37
Notes:	Pump started	At lowest the pump could go w/o stopping							

Sampling Information

Analyses	#	Laboratory

Sample ID: MW-10 Sample Time: 1520
MS/MSD: Yes [✓ No]
Duplicate: Yes [✓ No]
Duplicate ID: Dup. Time:
Chain of Custody Signed By:

Problems / Observations

PID = 0.0

Initial Obs. slightly cloudy, no odor, no sheen

Final Obs. clear, no odor

Wadsworth Street - Geneva, NY

2011 Well Sampling Event

Site *Event*

MONITORING WELL SAMPLING LOG

Sampling Personnel: Joshua Oliver/ **Well ID:** MW-10
Client / Job Number: **Date:**
Weather: **Time In:** **Time Out:**

Well Information

Depth to Water: (feet) (from MP)
Total Depth: (feet) (from MP)
Length of Water Column: (feet)
Volume of Water in Well: (gal)

Well Type:	Flushmount	Stick-Up
Well Material:	Stainless Steel	PVC
Well Locked:	Yes	No
Measuring Point Marked:	Yes	No
Well Diameter:	1" 2"	Other:

See pg

Purging Information

Purging Method:	Bailer	Peristaltic	Grundfos	Other:
Tubing/Bailer Material:	St. Steel	Polyethylene	Teflon	Other:
Sampling Method:	Bailer	Peristaltic	Grundfos	Other:

Duration of Pumping: (min)
Average Pumping Rate: (ml/min) Water-Quality Meter Type:
Total Volume Removed: (gal) Did well go dry: Yes No

Conversion Factors				
gal / ft. of water	1" ID	2" ID	4" ID	6" ID
	0.041	0.163	0.653	1.469
1 gal = 3.785 L =3875 ml = 0.1337 cubic feet				

Unit Stability			
pH	DO	Cond.	ORP
±0.1	± 10%	± 3.0%	± 10 mV

Time: / Parameter:	1 1449	2 1454	3 1459	4 1504	5 1509	6 1514	7 1520	8	9
Volume Purged (gal)									
Rate (mL/min)	~100	~100	~100	~100	~100	~100			
Depth to Water (ft.)	9.11	9.14	9.16	9.17	9.18	9.18			
pH	6.56	6.86	6.86	6.86	6.86	6.36			
Temp. (C)	12.19	12.23	12.27	12.20	12.20	12.17			
Conductivity (mS/cm)	1.92	1.93	1.94	1.94	1.95	1.96			
Dissolved Oxygen	0.00	0.00	0.00	0.00	0.00	0.00			
ORP (mV)	-41	-43	-43	-44	-43	-44			
Turbidity (NTU)	33	32	31	30	30	30			
Notes:							SAMPLED		

Sampling Information

Analyses	#	Laboratory

Sample ID: MW-10 Sample Time: 1520
MS/MSD: Yes [✓ No]
Duplicate: Yes [✓ No]
Duplicate ID Dup. Time:
Chain of Custody Signed By:

Problems / Observations

PID = 0.0

See pg 1

C:\Users\joliver\Documents\ARCADIS Documents\Forms\well sampling geneva.doc

ARCADIS
Infrastructure, environment, buildings

Imagine the result

New York State Electric & Gas

Construction Completion Report
Interim Site Management Plan

Geneva (Wadsworth Street) former MGP
Geneva, New York

July 2010

ARCADIS

Construction Completion Report Interim Site Management Plan

Geneva (Wadsworth Street)
former MGP

Geneva, New York

Prepared for:
New York State Electric & Gas

Prepared by:
ARCADIS
6723 Towpath Road
P.O. Box 66
Syracuse
New York 13214-0066
Tel 315.446.9120
Fax 315.449.0017

Our Ref.:
B0013057 #10

Date:
July 2010

Certification

I certify that the Interim Site Management Plan for the former Wadsworth Street Station was performed in general accordance with the requirements specified in the February 2010 Fence Interim Site Management Plan Work Plan .

CHRISTOPHER DANE ENGLER
No. 069748

Christopher Engler, P.E. #069748 New York State
Associate Vice President

Table of Contents

Figure

Appendices

1. Introduction

1.1 Purpose

This Construction Completion Report (CCR) describes the Interim Site Management Plan (ISMP) activities implemented at the Geneva (Wadsworth Street) former Manufactured Gas Plant (MGP) located in Geneva, New York ("the site"). The ISMP involved the installation of a perimeter fence around the unpaved NYSEG (New York State Electric & Gas Corporation) owned portion of the Former MGP site located North West of the intersection of Railroad Place and Wadsworth Street in Geneva, New York based on a request by the New York State Department of Health (NYSDOH) and New York State Department of Environmental Conservation (NYSDEC). ISMP activities were performed in accordance with the February 2010 Fence Interim Site Management Plan Work Plan (ARCADIS 2010).

This CCR was prepared on behalf of NYSEG by ARCADIS to document the completion of ISMP activities.

1.2 Remedial Goals

The ISMP was implemented to limit the potential surface soil exposure of semi-volatile organic compounds (SVOCs) and metals to trespassers. ISMP activities have been completed to reduce the trespasser foot traffic and potential surface soil exposure at the above referenced site.

1.3 Site Location

The site is located in the City of Geneva, near the northwestern shore of Seneca Lake in eastern Ontario County, New York. The former MGP site comprised a rectangular piece of land that is now located in a mixed commercial and residential area in the east-central part of Geneva, New York (see Figure 1). Seneca Lake is located approximately 900 feet to the southeast. The ISMP was executed in the area of the former MGP site north of Railroad Place which is currently owned by NYSEG. This area includes a grass-covered area, a gas regulator shed maintained by NYSEG located near the intersection of Railroad Place and Wadsworth Street, and a gravel parking area located in the northeast corner of NYSEG's property currently used by residential property owners for vehicular parking.

1.4 Project Roles and Responsibilities

The following presents the roles and responsibilities of the parties involved with the ISMP activities:

Organization/Party	Project Roles and Responsibility
NYSEG	Property Owner
ARCADIS	Engineer Retained by NYSEG to Provide Project Coordination and Management
Massa Construction	ISMP Contractor
NYSDEC	Regulatory Agency

1.5 Construction Completion Report Organization

This CCR is organized as follows:

Section 1 - Introduction

Presents the purpose and objectives of this report, relevant background information, project responsibilities, and report organization.

Section 2 – ISMP Activities

Presents a description of ISMP activities

Section 3 - Acronyms and Abbreviations

Lists all acronyms and abbreviations used in this report.

Section 4 - References

Provides a list of references cited in this report.

2. ISMP Activities

This section describes the ISMP activities that occurred.

2.1 Preconstruction Activities

This subsection describes the activities that occurred prior to the start of ISMP activities. Photographs depicting the progression of the ISMP implementation activities are found in Appendix A.

2.1.1 Site Preparation

Activities that occurred during the site preparation phase of construction included surveying the site, mobilization of materials and equipment, and clearing and grubbing of debris onsite. An initial survey of the property was performed by ARCADIS's subcontractor, Paul J. Olszewski, P.L.S., to identify the existing property boundary lines and easements.

The clearing and grubbing activities took place within the unpaved, western portion of the site approximately along the property boundary. This included removing a dilapidated portion of an existing fence, extensive household and yard debris, brush, shrubs, and other vegetation which obstructed placement of the fence. Well-established trees remained.

2.1.2 Waste Handling, Treatment and Disposal

Approximately 45 tons of debris material was removed by Massa and transported by Riccelli Enterprises, Inc. to the Seneca Meadows Landfill in Waterloo, New York for disposal. Waste characterization samples were collected by ARCADIS and analyzed by Test America for lead, polychlorinated biphenyls (PCBs), and volatile organic compounds (VOCs). None of the constituents were detected above the Landfill's disposal criteria and the material was disposed as non-hazardous waste. Analytical results for representative debris samples are included in Appendix B. Scale tickets associated with the debris disposal are provided in Appendix C.

2.2 Fence Installation

A permanent chain-link fence was installed along a portion of the property boundary by Massa's subcontractor, Reale Fence, as presented on Figure 1. The chain-link fence is 6 feet in height and includes a 16-foot drive gate to allow for access to a Gas Regulator Building located at the site as well as general maintenance of the site. The drive gate was secured by NYSEG using a padlock and hasp to prevent trespassing on the site. A recess was integrated along the northern fence line to allow ease of vehicular movement by neighboring properties.

Soil and concrete that was removed in order to install the fence posts was accumulated in designated waste wranglers onsite and covered nightly. A representative sample was taken from this material and analyzed for cyanide and benzene, toluene, ethylbenzene, and xylenes (BTEX). Analytical results indicated that the material was non-hazardous. The soil will be handled and disposed by NYSEG.

2.2.1 Air Monitoring

Air monitoring was conducted by ARCADIS during ISMP activities in accordance with the Community Air Monitoring Plan (CAMP) (Attachment 1 to the ISMP Work Plan; ARCADIS, 2010).

The air monitoring program included monitoring for VOCs and particulate levels less than 10 microns in diameter (PM_{10}). The monitoring was performed during ground-intrusive activities that may generate dust. One VOC monitor and one PM_{10} monitor was setup within the vicinity of ground-intrusive activities (i.e. digging, augering, or coring holes for the fence posts).

Total VOCs in ambient air were monitored and recorded using portable organic vapor analyzers equipped with a photoionization detector (MiniRAE 2000). Particulate monitoring was performed using MIE dataRAM4 instruments. ARCADIS personnel manually recorded VOC and particulate levels at 5-minute intervals. During the site activities, no VOC or particulate levels were recorded over their respective action levels.

2.3 Surface Cover Installation

A temporary surface cover was installed along the northern portion of the site outside the fenceline. This area is used by neighbors to the north of the site as a parking area. The temporary surface cover consisted of a non-woven geotextile fabric material and typical crush and run stone. The geotextile fabric was placed over the existing grade in areas where stone or concrete from the existing driveway was not already in place. The fabric serves as both a demarcation layer and physical barrier in that area of the site which is not bounded by the fence. The stone was placed at a depth of 6 inches along the portion of the driveway spanning from the northwest corner of the property to the sidewalk.

2.4 Site Restoration

This section describes the restoration activities conducted at the site in accordance with the ISMP.

2.4.1 Topsoil and Seeding

A 6-inch layer of topsoil was placed over the area in the western side of the site that was disturbed by clearing and grubbing activities. The topsoil was then seeded with a permanent grass mixture including Empire, Pardee, KY-31, Rebel, Pennfine, and Linn varieties. Within one week after placement of the seed, grass within the area began to take root.

2.4.2 Surveying ISMP Area Boundaries

A final survey of the property was performed by ARCADIS's subcontractor, Paul J. Olszewski, P.L.S., to confirm that the ISMP was effectively implemented to limit exposure to trespassers. The results of this survey were incorporated into Figure 1.

3. Summary and Conclusions

The ISMP was implemented to limit the potential surface soil exposure of SVOCs and metals to trespassers. ISMP activities included the installation of a fence and surface cover. These have been completed to reduce the trespasser foot traffic and potential surface soil exposure at the site.

A permanent, 6-feet high chain-link fence with drive gate was installed along the property. The drive gate is secured to prevent trespassing on the site. The temporary surface cover was installed along the northern portion of the site outside the fenceline where there is regular vehicular traffic from the neighbors north of the site. The surface cover was installed over a non-woven geotextile fabric that serves as both a physical barrier and demarcation layer in that area of the site which is not bounded by the fence. Additionally, a layer of topsoil as well as a typical permanent grass seed mix was placed on the ground surface that was disturbed by the clearing and grubbing activities.

These actions have resulted in a reduction of trespasser foot traffic on the site. The continuance of the ISMP will minimize the potential surface soil exposure at the site.

3.1 Operation Maintenance & Monitoring (OM&M)

The fence, temporary surface cover, and parking area will be inspected and maintained by NYSEG until the elements of selected site remedy are implemented The selected site remedy is detailed in the NYSDEC Record of Decision dated March 2010 ..

Acronyms and Abbreviations

AMP	Air Monitoring Plan
ASTM	American Society for Testing and Materials
BTEX	benzene, toluene, ethylbenzene, and xylenes
CCR	Construction Completion Report
CY	cubic yard
HASP	Health and Safety Plan
ISMP	Interim Site Management Plan
NYSDEC	New York State Department of Environmental Conservation
NYSEG	New York State Electric & Gas
MGP	Manufactured Gas Plant
PCB	polychlorinated biphenyls
PM_{10}	particulate matter less than 10 microns in diameter
PPE	personal protective equipment
QA/QC	quality assurance and quality control
ROD	Record of Decision
SVOC	semi-volatile organic compound
the site	Geneva (Wadsworth Street) former MGP site
VOC	volatile organic compound

4. References

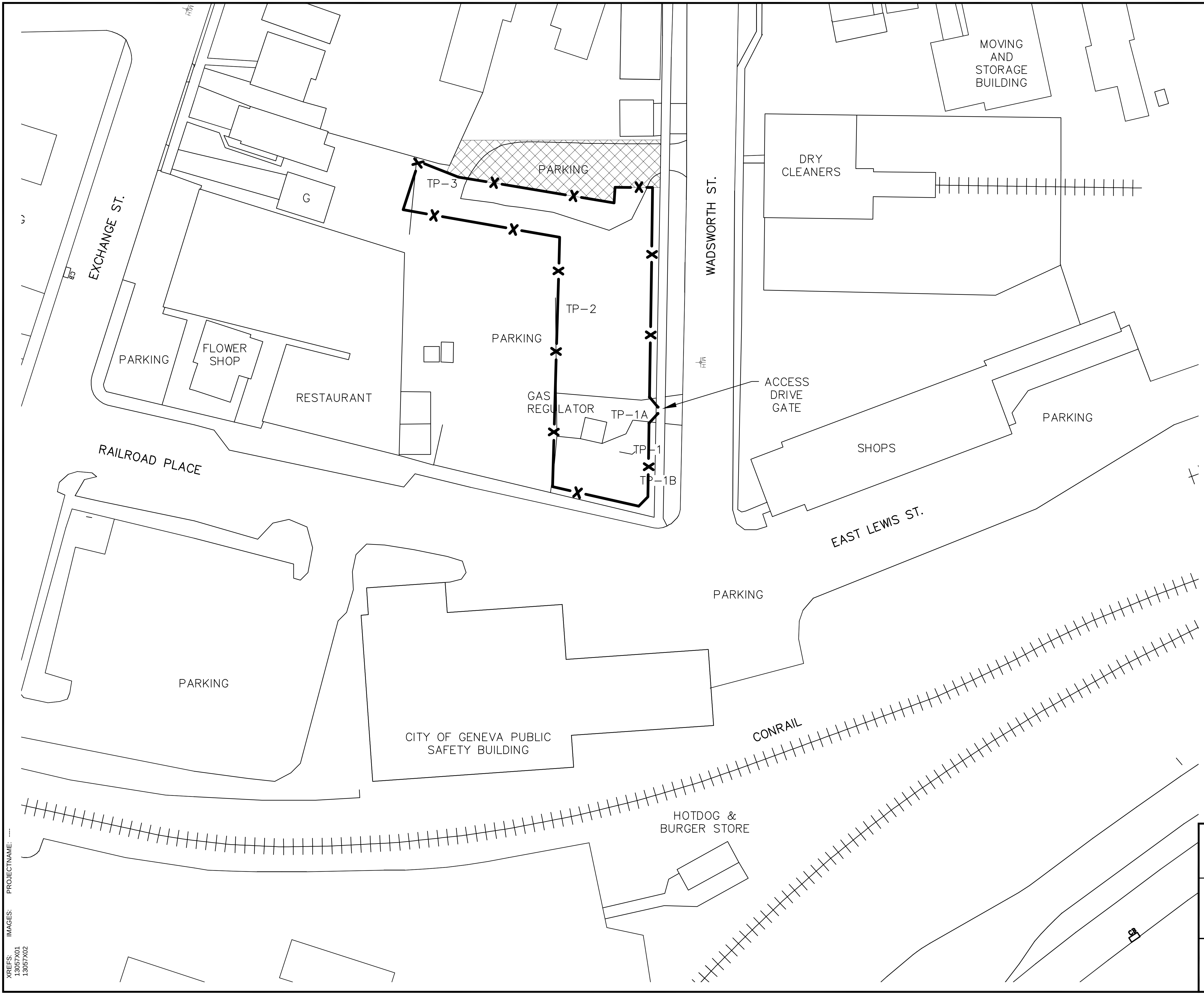
ARCADIS. July 2008. Draft Feasibility Study Report (FS). 2008.

ARCADIS February 2010 Fence Interim Site Management Plan (ISMP) Work Plan. 2010

NYSDEC. March 2010. Record of Decision, NYSEG – Wadsworth St – Geneva MGP Site, Geneva, Ontario County, New York, Site Number 835015. 2010.

Figure

CITY:Syracuse GROUP: ENV-141 DB: S. KOWALCZYK PM: A. FALZARANO LYR: ON=*;OFF=REF, (FRZ
G:\ENVCAD\SYRACUSE\ACT\B0013057\0001\00004\DWG\ISMP\13057B01.dwg LAYOUT: 1 SAVED: 7/9/2010 12:17 PM ACADVER: 17.0S (LMS TECH) PAGESETUP: C-LB-PDF PLOTSTYLETABLE: PLTCONT1.CTB PLOTTED: 7/9/2010 12:17 PM BY: KOWALCZYK, STEVE
XREFS: IMAGES: PROJECTNAME: ---
13057X01
13057X02



LEGEND:

—✕—	FENCE (TYP 6' CHAINLINK)
▨	SURFACE COVER
MH	MANHOLE

NOTES:

1. BASE MAP BASED ON SURVEYS COMPLETED BY NYSEG ON DECEMBER 14, 2005 AND OCTOBER 2006. ELEVATIONS IN REFERENCE TO NGVD 1929, HORIZONTAL DATUM IS NAD 83 STATEPLANE, NEW YORK CENTRAL.

0 60' 120'

GRAPHIC SCALE

NEW YORK STATE ELECTRIC AND GAS
GENEVA (WADSWORTH ST.) FORMER MGP SITE
INTERIM SITE MANAGEMENT PLAN
CONSTRUCTION COMPLETION REPORT

SITE PLAN

ARCADIS

FIGURE
1

ARCADIS

Appendix A

Progress Photos

Photo #01 - March 16, 2010
Prior to clearing and grubbing;
facing Southwest

Photo #02 - March 16, 2010
Prior to clearing and grubbing;
facing West

Photo #03 - March 16, 2010

Prior to clearing and grubbing; facing Southwest

Photo #04 - May 12, 2010

Loading waste disposal truck with cleared and grubbed materials

Photo #05 - May 12,2010

Clearing and grubbing complete; facing West

Photo #06 - May 19, 2010

Corner fence posts in place; facing Southwest

Photo #07 - May 24, 2010

South portion of fence in place; facing East

Photo #08 - May 25, 2010

Concrete encountered at North end of site required coring equipment to prepare fence post holes

Photo #09 - June 02, 2010

Fence in place; facing West

2010/06/02

Photo #10 - June 02, 2010
Fence in place; facing North

2010/06/02

Photo #11- June 02, 2010
Fence in place; facing West

2010/06/03

Photo #12 - June 03, 2010
Preparing surface cover area with geotextile fabric outside of the fence line; facing Southwest

Photo #13- June 13, 2010

Soil and surface cover in place; facing West

Photo #14 - June 03, 2010

Surface cover in place and extending to sidewalk; facing West

Photo #15 - June 14, 2010

Drive gate access to site (locked); facing West

2010/06/14

Photo #16 - June 14, 2010

Surface cover in place to property line outside fenced area; grass taking root within fenced area

2010/06/14

Photo #17- June 14, 2010

ISMP complete and in place; facing West

2010/06/14

Photo #18- June 14, 2010

ISMP complete and in place; facing Northwest

ARCADIS

Appendix B

Laboratory Analyses

Analytical Report

Work Order: RTD2105

Project Description
NYSEG Geneva Wadsworth Waste Characterization

For:

Alexander Ryan

New York State Electric & Gas - Binghamton, NY
P.O. Box 5224
Binghamton, NY 13904

Melissa Deyo

Melissa Deyo For Paul Morrow

Project Manager

melissa.deyo@testamericainc.com

Wednesday, May 5, 2010

The test results in this report meet all NELAP requirements for analytes for which accreditation is required or available. Any exception to NELAP requirements are noted in this report. Persuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory. All questions regarding this test report should be directed to the TestAmerica Project manager who has signed this report.

TestAmerica Buffalo
Current Certifications

As of 12/21/2009

STATE	Program	Cert # / Lab ID
Arkansas	CWA, RCRA, SOIL	88-0686
California*	NELAP CWA, RCRA	01169CA
Connecticut	SDWA, CWA, RCRA, SOIL	PH-0568
Florida*	NELAP CWA, RCRA	E87672
Georgia*	SDWA,NELAP CWA, RCRA	956
Illinois*	NELAP SDWA, CWA, RCRA	200003
Iowa	SW/CS	374
Kansas*	NELAP SDWA, CWA, RCRA	E-10187
Kentucky	SDWA	90029
Kentucky UST	UST	30
Louisiana*	NELAP CWA, RCRA	2031
Maine	SDWA, CWA	NY0044
Maryland	SDWA	294
Massachusetts	SDWA, CWA	M-NY044
Michigan	SDWA	9937
Minnesota	SDWA,CWA, RCRA	036-999-337
New Hampshire*	NELAP SDWA, CWA	233701
New Jersey*	NELAP,SDWA, CWA, RCRA,	NY455
New York*	NELAP, AIR, SDWA, CWA, RCRA,CLP	10026
Oklahoma	CWA, RCRA	9421
Pennsylvania*	NELAP CWA,RCRA	68-00281
Tennessee	SDWA	02970
Texas*	NELAP CWA, RCRA	T104704412-08-TX
USDA	FOREIGN SOIL PERMIT	S-41579
Virginia	SDWA	278
Washington*	NELAP CWA,RCRA	C1677
Wisconsin	CWA, RCRA	998310390
West Virginia	CWA,RCRA	252

*As required under the indicated accreditation, the test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report.

CASE NARRATIVE

According to 40CFR Part 136.3, pH, Chlorine Residual, Dissolved Oxygen, Sulfite, and Temperature analyses are to be performed immediately after aqueous sample collection. When these parameters are not indicated as field (e.g. field-pH), they were not analyzed immediately, but as soon as possible after laboratory receipt.

A pertinent document is appended to this report, 1 page, is included and is an integral part of this report.

Reproduction of this analytical report is permitted only in its entirety. This report shall not be reproduced except in full without the written approval of the laboratory.

TestAmerica Laboratories, Inc. certifies that the analytical results contained herein apply only to the samples tested as received by our Laboratory.

DATA QUALIFIERS AND DEFINITIONS

B	Analyte was detected in the associated Method Blank.
D07	Dilution required due to the nature of the TCLP matrix
J	Analyte detected at a level less than the Reporting Limit (RL) and greater than or equal to the Method Detection Limit (MDL). Concentrations within this range are estimated.
Z1	Surrogate recovery was above acceptance limits.
NR	Any inclusion of NR indicates that the project specific requirements do not require reporting estimated values below the laboratory reporting limit.

ADDITIONAL COMMENTS

Results are reported on a wet weight basis unless otherwise noted.

Executive Summary - Detections

Sample ID: RTD2105-01 (01-DEBRIS-042910 - Solid) **Sampled: 04/29/10 14:15** **Recvd: 04/30/10 08:45**

Analyte	Sample Result	Data Qualifiers	RL	MDL	Units	Dil Fac	Date Analyzed	Lab Tech	Batch	Method
TCLP Metals										
Lead	**0.0196**	B	0.0050	0.0030	mg/L	1.00	05/04/10 00:21	DAN	10E0081	6010B TCLP
General Chemistry Parameters										
Percent Solids	**85**		0.010	NR	%	1.00	05/01/10 13:12	LTT	10D2947	Dry Weight
Flashpoint	**>176**		50.0	50.0	°F	1.00	05/03/10 15:53	JLN	10E0124	1010
Paint Filter Test	**PASSED**		NR	0.0	N/A dry	1.00	05/03/10 23:45	MDM	10E0143	9095
Total Solids	**85.0**		NR	0.0	%	1.00	04/30/10 21:45	LTT	10E0165	2540G
pH	**7.11**		NR	0.00	SU	1.00	05/04/10 23:30	MDM	10E0259	9045

Sample Summary

Sample Identification	Lab Number	Client Matrix	Date/Time Sampled	Date/Time Received	Sample Qualifiers
01-DEBRIS-042910	RTD2105-01	Solid	04/29/10 14:15	04/30/10 08:45	

New York State Electric & Gas - Binghamton, NY
P.O. Box 5224
Binghamton, NY 13904

Work Order: RTD2105

Project: NYSEG Geneva Wadsworth Waste Characterization
Project Number: [none]

Received: 04/30/10
Reported: 05/05/10 09:01

Analytical Report

Sample ID: RTD2105-01 (01-DEBRIS-042910 - Solid) **Sampled: 04/29/10 14:15** **Recvd: 04/30/10 08:45**

TCLP Volatile Organic Compounds by EPA Method 1311/8260B

Analyte	Sample Result	Data Qualifiers	RL	MDL	Units	Dil Fac	Date Analyzed	Lab Tech	Batch	Method
1,1-Dichloroethene	ND	D07	10	2.9	ug/L	10.0	05/04/10 01:40	CDC	10E0083	8260B TCLP
1,2-Dichloroethane	ND	D07	10	2.1	ug/L	10.0	05/04/10 01:40	CDC	10E0083	8260B TCLP
2-Butanone (MEK)	ND	D07	50	13	ug/L	10.0	05/04/10 01:40	CDC	10E0083	8260B TCLP
Benzene	ND	D07	10	4.1	ug/L	10.0	05/04/10 01:40	CDC	10E0083	8260B TCLP
Carbon Tetrachloride	ND	D07	10	2.7	ug/L	10.0	05/04/10 01:40	CDC	10E0083	8260B TCLP
Chlorobenzene	ND	D07	10	7.5	ug/L	10.0	05/04/10 01:40	CDC	10E0083	8260B TCLP
Chloroform	ND	D07	10	3.4	ug/L	10.0	05/04/10 01:40	CDC	10E0083	8260B TCLP
Tetrachloroethene	ND	D07	10	3.6	ug/L	10.0	05/04/10 01:40	CDC	10E0083	8260B TCLP
Trichloroethene	ND	D07	10	4.6	ug/L	10.0	05/04/10 01:40	CDC	10E0083	8260B TCLP
Vinyl chloride	ND	D07	10	9.0	ug/L	10.0	05/04/10 01:40	CDC	10E0083	8260B TCLP
1,2-Dichloroethane-d4	*91 %*	*D07*	*Surr Limits:*	*(66-137%)*			*05/04/10 01:40*	*CDC*	*10E0083*	*8260B TCLP*
4-Bromofluorobenzene	*92 %*	*D07*	*Surr Limits:*	*(73-120%)*			*05/04/10 01:40*	*CDC*	*10E0083*	*8260B TCLP*
Toluene-d8	*93 %*	*D07*	*Surr Limits:*	*(71-126%)*			*05/04/10 01:40*	*CDC*	*10E0083*	*8260B TCLP*

Polychlorinated Biphenyls by EPA Method 8082

Analyte	Sample Result	Data Qualifiers	RL	MDL	Units	Dil Fac	Date Analyzed	Lab Tech	Batch	Method
Aroclor 1016	ND		260	51	ug/kg dry	1.00	05/01/10 14:57	JxM	10D2934	8082
Aroclor 1221	ND		260	51	ug/kg dry	1.00	05/01/10 14:57	JxM	10D2934	8082
Aroclor 1232	ND		260	51	ug/kg dry	1.00	05/01/10 14:57	JxM	10D2934	8082
Aroclor 1242	ND		260	57	ug/kg dry	1.00	05/01/10 14:57	JxM	10D2934	8082
Aroclor 1248	ND		260	51	ug/kg dry	1.00	05/01/10 14:57	JxM	10D2934	8082
Aroclor 1254	ND		260	55	ug/kg dry	1.00	05/01/10 14:57	JxM	10D2934	8082
Aroclor 1260	ND		260	120	ug/kg dry	1.00	05/01/10 14:57	JxM	10D2934	8082
Decachlorobiphenyl	*74 %*		*Surr Limits:*	*(34-148%)*			*05/01/10 14:57*	*JxM*	*10D2934*	*8082*
Tetrachloro-m-xylene	*79 %*		*Surr Limits:*	*(35-134%)*			*05/01/10 14:57*	*JxM*	*10D2934*	*8082*

TCLP Metals

Analyte	Sample Result	Data Qualifiers	RL	MDL	Units	Dil Fac	Date Analyzed	Lab Tech	Batch	Method
Lead	**0.0196**	B	0.0050	0.0030	mg/L	1.00	05/04/10 00:21	DAN	10E0081	6010B TCLP

General Chemistry Parameters

Analyte	Sample Result	Data Qualifiers	RL	MDL	Units	Dil Fac	Date Analyzed	Lab Tech	Batch	Method
Percent Solids	**85**		0.010	NR	%	1.00	05/01/10 13:12	LTT	10D2947	Dry Weight
Flashpoint	**>176**		50.0	50.0	°F	1.00	05/03/10 15:53	JLN	10E0124	1010
Paint Filter Test	**PASSED**		NA	0.0	N/A dry	1.00	05/03/10 23:45	MDM	10E0143	9095
Total Solids	**85.0**		NA	0.0	%	1.00	04/30/10 21:45	LTT	10E0165	2540G
pH	**7.11**		NA	0.00	SU	1.00	05/04/10 23:30	MDM	10E0259	9045

SAMPLE EXTRACTION DATA

Parameter	Batch	Lab Number	Wt/Vol Extracte	Units	Extract Volume	Units	Date Prepared	Lab Tech	Extraction Method
General Chemistry Parameters									
1010	10E0124	RTD2105-01	50.00	g	50.00	mL	05/03/10 15:53	JLN	No Prep Flashpoint
2540G	10E0165	RTD2105-01	1.00	g	1.00	mL	04/30/10 21:45	LTT	Solids
9045	10E0259	RTD2105-01	1.00	g	1.00	mL	05/04/10 23:30	MDM	LpH
9095	10E0143	RTD2105-01	60.99	mg	60.99	mg	05/03/10 23:45	MDM	NO PREP
Dry Weight	10D2947	RTD2105-01	10.00	g	10.00	g	04/30/10 21:44	LTT	Dry Weight
Polychlorinated Biphenyls by EPA Method 8082									
8082	10D2934	RTD2105-01	2.26	g	10.00	mL	04/30/10 16:00	LTT	3550B GC
TCLP Metals									
6010B TCLP	10E0081	RTD2105-01	50.00	mL	50.00	mL	05/03/10 10:35	JRK	3010A
TCLP Volatile Organic Compounds by EPA Method 1311/8260B									
8260B TCLP	10E0083	RTD2105-01	5.00	mL	5.00	mL	05/03/10 10:40	JRS	5030B MS TCLP

LABORATORY QC DATA

TCLP Volatile Organic Compounds by EPA Method 1311/8260B

Blank Analyzed: 05/04/10 (Lab Number:10E0083-BLK1, Batch: 10E0083)

Analyte	Source Result	Spike Level	RL	MDL	Units	Result	% REC	% REC Limits	% RPD	RPD Limit	Data Qualifiers
1,1-Dichloroethene			10	2.9	ug/L	ND					D07
1,2-Dichloroethane			10	2.1	ug/L	ND					D07
2-Butanone (MEK)			50	13	ug/L	ND					D07
Benzene			10	4.1	ug/L	ND					D07
Carbon Tetrachloride			10	2.7	ug/L	ND					D07
Chlorobenzene			10	7.5	ug/L	ND					D07
Chloroform			10	3.4	ug/L	ND					D07
Tetrachloroethene			10	3.6	ug/L	ND					D07
Trichloroethene			10	4.6	ug/L	ND					D07
Vinyl chloride			10	9.0	ug/L	ND					D07
Surrogate: 1,2-Dichloroethane-d4					*ug/L*		*90*	*66-137*			*D07*
Surrogate: 4-Bromofluorobenzene					*ug/L*		*90*	*73-120*			*D07*
Surrogate: Toluene-d8					*ug/L*		*91*	*71-126*			*D07*

LCS Analyzed: 05/04/10 (Lab Number:10E0083-BS1, Batch: 10E0083)

Analyte	Source Result	Spike Level	RL	MDL	Units	Result	% REC	% REC Limits	% RPD	RPD Limit	Data Qualifiers
1,1-Dichloroethene		25.0	1.0	0.29	ug/L	25.2	101	65-138			
1,2-Dichloroethane		25.0	1.0	0.21	ug/L	24.8	99	75-127			
2-Butanone (MEK)		125	5.0	1.3	ug/L	107	86	57-140			
Benzene		25.0	1.0	0.41	ug/L	24.8	99	71-124			
Carbon Tetrachloride		25.0	1.0	0.27	ug/L	25.4	102	72-134			
Chlorobenzene		25.0	1.0	0.75	ug/L	24.5	98	72-120			
Chloroform		25.0	1.0	0.34	ug/L	25.0	100	73-127			
Tetrachloroethene		25.0	1.0	0.36	ug/L	24.6	99	74-122			
Trichloroethene		25.0	1.0	0.46	ug/L	25.8	103	74-123			
Vinyl chloride		25.0	1.0	0.90	ug/L	29.7	119	65-133			
Surrogate: 1,2-Dichloroethane-d4					*ug/L*		*89*	*66-137*			
Surrogate: 4-Bromofluorobenzene					*ug/L*		*97*	*73-120*			
Surrogate: Toluene-d8					*ug/L*		*93*	*71-126*			

LABORATORY QC DATA

Polychlorinated Biphenyls by EPA Method 8082

Blank Analyzed: 05/01/10 (Lab Number:10D2934-BLK1, Batch: 10D2934)

Analyte	Source Result	Spike Level	RL	MDL	Units	Result	% REC	% REC Limits	% RPD	RPD Limit	Data Qualifiers
Aroclor 1016			230	45	ug/kg wet	ND					
Aroclor 1221			230	45	ug/kg wet	ND					
Aroclor 1232			230	45	ug/kg wet	ND					
Aroclor 1242			230	50	ug/kg wet	ND					
Aroclor 1248			230	45	ug/kg wet	ND					
Aroclor 1254			230	48	ug/kg wet	ND					
Aroclor 1260			230	110	ug/kg wet	ND					
Surrogate: Decachlorobiphenyl					*ug/kg wet*		*114*	*34-148*			
Surrogate: Tetrachloro-m-xylene					*ug/kg wet*		*119*	*35-134*			

LCS Analyzed: 05/01/10 (Lab Number:10D2934-BS1, Batch: 10D2934)

Analyte	Source Result	Spike Level	RL	MDL	Units	Result	% REC	% REC Limits	% RPD	RPD Limit	Data Qualifiers
Aroclor 1016		1890	190	37	ug/kg wet	2410	127	59-154			
Aroclor 1221			190	37	ug/kg wet	ND					
Aroclor 1232			190	37	ug/kg wet	ND					
Aroclor 1242			190	41	ug/kg wet	ND					
Aroclor 1248			190	37	ug/kg wet	ND					
Aroclor 1254			190	40	ug/kg wet	ND					
Aroclor 1260		1890	190	89	ug/kg wet	2790	147	51-179			
Surrogate: Decachlorobiphenyl					*ug/kg wet*		*128*	*34-148*			
Surrogate: Tetrachloro-m-xylene					*ug/kg wet*		*141*	*35-134*			*Z1*

LCS Dup Analyzed: 05/01/10 (Lab Number:10D2934-BSD1, Batch: 10D2934)

Analyte	Source Result	Spike Level	RL	MDL	Units	Result	% REC	% REC Limits	% RPD	RPD Limit	Data Qualifiers
Aroclor 1016		2230	220	44	ug/kg wet	2850	128	59-154	17	50	
Aroclor 1221			220	44	ug/kg wet	ND					
Aroclor 1232			220	44	ug/kg wet	ND					
Aroclor 1242			220	48	ug/kg wet	ND					
Aroclor 1248			220	44	ug/kg wet	ND					
Aroclor 1254			220	47	ug/kg wet	ND					
Aroclor 1260		2230	220	100	ug/kg wet	3300	148	51-179	17	50	
Surrogate: Decachlorobiphenyl					*ug/kg wet*		*128*	*34-148*			
Surrogate: Tetrachloro-m-xylene					*ug/kg wet*		*140*	*35-134*			*Z1*

LABORATORY QC DATA

Analyte	Source Result	Spike Level	RL	MDL	Units	Result	% REC	% REC Limits	% RPD	RPD Limit	Data Qualifiers
TCLP Metals											
Blank Analyzed: 05/03/10 (Lab Number:10E0081-BLK1, Batch: 10E0081)											
Lead			0.0050	0.0030	mg/L	0.0047					B,J
Blank Analyzed: 05/03/10 (Lab Number:10E0081-BLK2, Batch: 10E0081)											
Lead			0.0050	0.0030	mg/L	ND					
LCS Analyzed: 05/03/10 (Lab Number:10E0081-BS1, Batch: 10E0081)											
Lead		1.00	0.0050	0.0030	mg/L	1.02	102	80-120			B

LABORATORY QC DATA

Analyte	Source Result	Spike Level	RL	MDL	Units	Result	% REC	% REC Limits	% RPD	RPD Limit	Data Qualifiers
General Chemistry Parameters											
LCS Analyzed: 05/03/10 (Lab Number:10E0124-BS1, Batch: 10E0124)											
Flashpoint		81.0	50.0	50.0	°F	81.0	100	97.5-102.5			
General Chemistry Parameters											
Duplicate Analyzed: 05/03/10 (Lab Number:10E0143-DUP1, Batch: 10E0143) **QC Source Sample: RTD2105-01**											
Paint Filter Test	PASSED		NA	0.0	N/A dry	PASSED				200	
General Chemistry Parameters											
LCS Analyzed: 05/04/10 (Lab Number:10E0259-BS1, Batch: 10E0259)											
pH		7.00	NA	0.00	SU	6.98	100	99.3-100.8			

Chain of Custody Record

P

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: CHRISTIE BRYZ-GORNIA	Lab PM: Paul Morrow	Carrier Tracking No(s):	COC No: 04292010 10:52_1
Client Contact: Alexander Ryan	Phone: 315-671-9158	E-Mail: Paul.Morrow@testamericainc.com		Page: 1
Company: New York State Electric & Gas - Binghamton, NY				Job #:

Address: P.O. Box 5224
City: Binghamton
State, Zip: NY, 13904
Phone: 3156719619
Email: alexander.ryan@arcadis-us.com
Project Name: NYSEG Geneva Wadsworth Waste Characterization
Site:

Due Date Requested:
TAT Requested (Business Days): ~~10~~ 48 HR
PO #:
WO #: RTD1991
Project #:
SSOW#:

Parameter(s) Requested

Preservation Codes:
A=HCL
B=NaOH
C=Zn Acetate
D=Nitric Acid
I=Ice
N=None
S=H2SO4
V=MCAA
Z=Z

Container Codes:
A=Amber
G=Glass
P=Poly/Plastic
S=Summa
T=Tedlar
V=Vial

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix	Field Filtered Sample (Yes or No)	[redacted]		PCBs::Flash::Paint FT::%solids::pH::TCLP Mets	TCLP Voa											Total Number of containers	Special Instructions/Note:
			Preserv-Cont Code:					I-G	I-G												
61-DEBRIS-042910	4/29/10	1415	C	S				1	1											2	

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by: | Date: | Time: | Method of Shipment:

Relinquished by:	Date/Time: 04-29-10 15:20	Company: ARCADIS.	Received by: R English	Date/Time: 04-29-10 15:20	Company: Syr
Relinquished by: R English	Date/Time: 04-29-10 18:00	Company: Syr	Received by:	Date/Time: 4-30-10 0145	Company: B[illegible]
Relinquished by:	Date/Time:	Company:	Received by:	Date/Time:	Company:

Custody Seals Intact: △ Yes △ No
Custody Seal No.:
Cooler Temperature(s) °C and Other Remarks: 2.6

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Analytical Report

Work Order: RTF0360

Project Description
NYSEG Geneva Wadsworth Waste Characterization

For:

Alexander Ryan

New York State Electric & Gas - Binghamton, NY
P.O. Box 5224
Binghamton, NY 13904

Paul K Morrow

Paul Morrow

Project Manager

Paul.Morrow@testamericainc.com

Tuesday, June 15, 2010

The test results in this report meet all NELAP requirements for analytes for which accreditation is required or available. Any exception to NELAP requirements are noted in this report. Persuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory. All questions regarding this test report should be directed to the TestAmerica Project manager who has signed this report.

TestAmerica Buffalo
Current Certifications

As of 04/16/2010

STATE	Program	Cert # / Lab ID
Arkansas	CWA, RCRA, SOIL	88-0686
California*	NELAP CWA, RCRA	01169CA
Connecticut	SDWA, CWA, RCRA, SOIL	PH-0568
Florida*	NELAP CWA, RCRA	E87672
Georgia*	SDWA,NELAP CWA, RCRA	956
Illinois*	NELAP SDWA, CWA, RCRA	200003
Iowa	SW/CS	374
Kansas*	NELAP SDWA, CWA, RCRA	E-10187
Kentucky	SDWA	90029
Kentucky UST	UST	30
Louisiana*	NELAP CWA, RCRA	2031
Maine	SDWA, CWA	NY0044
Maryland	SDWA	294
Massachusetts	SDWA, CWA	M-NY044
Michigan	SDWA	9937
Minnesota	SDWA,CWA, RCRA	036-999-337
New Hampshire*	NELAP SDWA, CWA	233701
New Jersey*	NELAP,SDWA, CWA, RCRA,	NY455
New York*	NELAP, AIR, SDWA, CWA, RCRA,CLP	10026
North Dakota	CWA, RCRA	R-176
Oklahoma	CWA, RCRA	9421
Pennsylvania*	NELAP CWA,RCRA	68-00281
Tennessee	SDWA	02970
Texas*	NELAP CWA, RCRA	T104704412-08-TX
USDA	FOREIGN SOIL PERMIT	S-41579
Virginia	SDWA	278
Washington*	NELAP CWA,RCRA	C1677
Wisconsin	CWA, RCRA	998310390
West Virginia	CWA,RCRA	252

*As required under the indicated accreditation, the test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report.

CASE NARRATIVE

According to 40CFR Part 136.3, pH, Chlorine Residual, Dissolved Oxygen, Sulfite, and Temperature analyses are to be performed immediately after aqueous sample collection. When these parameters are not indicated as field (e.g. field-pH), they were not analyzed immediately, but as soon as possible after laboratory receipt.

A pertinent document is appended to this report, 1 page, is included and is an integral part of this report.

Reproduction of this analytical report is permitted only in its entirety. This report shall not be reproduced except in full without the written approval of the laboratory.

TestAmerica Laboratories, Inc. certifies that the analytical results contained herein apply only to the samples tested as received by our Laboratory.

DATA QUALIFIERS AND DEFINITIONS

NR	Any inclusion of NR indicates that the project specific requirements do not require reporting estimated values below the laboratory reporting limit.

ADDITIONAL COMMENTS

Results are reported on a wet weight basis unless otherwise noted.

New York State Electric & Gas - Binghamton, NY
P.O. Box 5224
Binghamton, NY 13904

Work Order: RTF0360

Project: NYSEG Geneva Wadsworth Waste Characterization
Project Number: [none]

Received: 06/02/10
Reported: 06/15/10 07:47

Executive Summary - Detections

Analyte	Sample Result	Data Qualifiers	RL	MDL	Units	Dil Fac	Date Analyzed	Lab Tech	Batch	Method
Sample ID: RTF0360-01 (WRANGLER-060110-01 - Solid)					**Sampled: 06/01/10 09:30**			**Recvd: 06/02/10 09:45**		
General Chemistry Parameters										
Percent Solids	**93**		0.010	NR	%	1.00	06/03/10 13:10	JRR	10F0224	Dry Weight
Cyanide	**14.0**		0.7	0.4	mg/kg dry	1.00	06/07/10 10:54	jmm	10F0410	9012A
Sample ID: RTF0360-02 (WRANGLER-060110-02 - Solid)					**Sampled: 06/01/10 09:30**			**Recvd: 06/02/10 09:45**		
General Chemistry Parameters										
Percent Solids	**94**		0.010	NR	%	1.00	06/11/10 15:00	JRR	10F0995	Dry Weight

Sample Summary

Sample Identification	Lab Number	Client Matrix	Date/Time Sampled	Date/Time Received	Sample Qualifiers
WRANGLER-060110-01	RTF0360-01	Solid	06/01/10 09:30	06/02/10 09:45	
WRANGLER-060110-02	RTF0360-02	Solid	06/01/10 09:30	06/02/10 09:45	

New York State Electric & Gas - Binghamton, NY
P.O. Box 5224
Binghamton, NY 13904

Work Order: RTF0360

Received: 06/02/10
Reported: 06/15/10 07:47

Project: NYSEG Geneva Wadsworth Waste Characterization
Project Number: [none]

Analytical Report

Sample ID: RTF0360-01 (WRANGLER-060110-01 - Solid) **Sampled: 06/01/10 09:30** **Recvd: 06/02/10 09:45**

General Chemistry Parameters

Analyte	Sample Result	Data Qualifiers	RL	MDL	Units	Dil Fac	Date Analyzed	Lab Tech	Batch	Method
Percent Solids	**93**		0.010	NR	%	1.00	06/03/10 13:10	JRR	10F0224	Dry Weight
Cyanide	**14.0**		0.7	0.4	mg/kg dry	1.00	06/07/10 10:54	jmm	10F0410	9012A
HCN Released From Waste	ND		10.0	0.0030	mg/kg	1.00	06/02/10 14:30	JLN	10F0197	Section 7.3
H2S Released From Waste	ND		10.0	0.6	mg/kg	1.00	06/02/10 14:30	JLN	10F0179	Section 7.3

New York State Electric & Gas - Binghamton, NY
P.O. Box 5224
Binghamton, NY 13904

Work Order: RTF0360

Project: NYSEG Geneva Wadsworth Waste Characterization
Project Number: [none]

Received: 06/02/10
Reported: 06/15/10 07:47

Analytical Report

Sample ID: RTF0360-02 (WRANGLER-060110-02 - Solid) **Sampled: 06/01/10 09:30** **Recvd: 06/02/10 09:45**

Analyte	Sample Result	Data Qualifiers	RL	MDL	Units	Dil Fac	Date Analyzed	Lab Tech	Batch	Method
Volatile Organic Compounds by EPA 8260B										
Benzene	ND		5.1	0.55	ug/kg dry	1.00	06/11/10 19:39	PQ	10F1010	8260B
Ethylbenzene	ND		5.1	0.35	ug/kg dry	1.00	06/11/10 19:39	PQ	10F1010	8260B
m-Xylene & p-Xylene	ND		10	0.44	ug/kg dry	1.00	06/11/10 19:39	PQ	10F1010	8260B
o-Xylene	ND		5.1	0.66	ug/kg dry	1.00	06/11/10 19:39	PQ	10F1010	8260B
Toluene	ND		5.1	0.38	ug/kg dry	1.00	06/11/10 19:39	PQ	10F1010	8260B
Xylenes, total	ND		10	0.44	ug/kg dry	1.00	06/11/10 19:39	PQ	10F1010	8260B
1,2-Dichloroethane-d4	*103 %*		*Surr Limits:*	*(61-136%)*			*06/11/10 19:39*	*PQ*	*10F1010*	*8260B*
4-Bromofluorobenzene	*103 %*		*Surr Limits:*	*(72-126%)*			*06/11/10 19:39*	*PQ*	*10F1010*	*8260B*
Toluene-d8	*107 %*		*Surr Limits:*	*(71-125%)*			*06/11/10 19:39*	*PQ*	*10F1010*	*8260B*
General Chemistry Parameters										
Percent Solids	**94**		0.010	NR	%	1.00	06/11/10 15:00	JRR	10F0995	Dry Weight

SAMPLE EXTRACTION DATA

Parameter	Batch	Lab Number	Wt/Vol Extracte	Units	Extract Volume	Units	Date Prepared	Lab Tech	Extraction Method
General Chemistry Parameters									
9012A	10F0410	RTF0360-01	0.73	g	50.00	mL	06/04/10 10:30	JME	Cn Digestion
Dry Weight	10F0224	RTF0360-01	10.00	g	10.00	g	06/03/10 09:32	JRR	Dry Weight
Dry Weight	10F0995	RTF0360-02	10.00	g	10.00	g	06/11/10 11:39	JRR	Dry Weight
Section 7.3	10F0197	RTF0360-01	5.00	g	5.00	mL	06/02/10 14:30	JLN	Reactivity
Section 7.3	10F0179	RTF0360-01	100.00	g	100.00	mL	06/02/10 14:30	JLN	Reactivity
Volatile Organic Compounds by EPA 8260B									
8260B	10F1010	RTF0360-02	5.26	g	5.00	mL	06/11/10 13:01	PJQ	5030B MS

LABORATORY QC DATA

Volatile Organic Compounds by EPA 8260B

Blank Analyzed: 06/11/10 (Lab Number:10F1010-BLK1, Batch: 10F1010)

Analyte	Source Result	Spike Level	RL	MDL	Units	Result	% REC	% REC Limits	% RPD	RPD Limit	Data Qualifiers
Benzene			5.0	0.55	ug/kg wet	ND					
Ethylbenzene			5.0	0.35	ug/kg wet	ND					
m-Xylene & p-Xylene			10	0.43	ug/kg wet	ND					
o-Xylene			5.0	0.65	ug/kg wet	ND					
Toluene			5.0	0.38	ug/kg wet	ND					
Xylenes, total			10	0.43	ug/kg wet	ND					
Surrogate: 1,2-Dichloroethane-d4					*ug/kg wet*		*106*	*61-136*			
Surrogate: 4-Bromofluorobenzene					*ug/kg wet*		*110*	*72-126*			
Surrogate: Toluene-d8					*ug/kg wet*		*113*	*71-125*			

LCS Analyzed: 06/11/10 (Lab Number:10F1010-BS1, Batch: 10F1010)

Analyte	Source Result	Spike Level	RL	MDL	Units	Result	% REC	% REC Limits	% RPD	RPD Limit	Data Qualifiers
Benzene		50.0	5.0	0.55	ug/kg wet	50.8	102	79-127			
Ethylbenzene		50.0	5.0	0.35	ug/kg wet	53.6	107	83-120			
m-Xylene & p-Xylene		100	10	0.43	ug/kg wet	107	107	84-120			
o-Xylene		50.0	5.0	0.65	ug/kg wet	52.5	105	82-121			
Toluene		50.0	5.0	0.38	ug/kg wet	51.7	103	74-128			
Xylenes, total		150	10	0.43	ug/kg wet	159	106	82-120			
Surrogate: 1,2-Dichloroethane-d4					*ug/kg wet*		*105*	*61-136*			
Surrogate: 4-Bromofluorobenzene					*ug/kg wet*		*105*	*72-126*			
Surrogate: Toluene-d8					*ug/kg wet*		*107*	*71-125*			

LABORATORY QC DATA

Analyte	Source Result	Spike Level	RL	MDL	Units	Result	% REC	% REC Limits	% RPD	RPD Limit	Data Qualifiers
General Chemistry Parameters											
Blank Analyzed: 06/02/10 (Lab Number:10F0179-BLK1, Batch: 10F0179)											
H2S Released From Waste			10.0	0.6	mg/kg	ND					
LCS Analyzed: 06/02/10 (Lab Number:10F0179-BS1, Batch: 10F0179)											
H2S Released From Waste		570	10.0	0.6	mg/kg	160	28	10-100			
General Chemistry Parameters											
Blank Analyzed: 06/02/10 (Lab Number:10F0197-BLK1, Batch: 10F0197)											
HCN Released From Waste			10.0	0.0030	mg/kg	ND					
LCS Analyzed: 06/02/10 (Lab Number:10F0197-BS1, Batch: 10F0197)											
HCN Released From Waste		1000	10.0	0.0030	mg/kg	676	68	10-100			
Duplicate Analyzed: 06/02/10 (Lab Number:10F0197-DUP1, Batch: 10F0197) **QC Source Sample: RTF0360-01**											
HCN Released From Waste	ND		10.0	0.0030	mg/kg	ND				20	
General Chemistry Parameters											
Blank Analyzed: 06/07/10 (Lab Number:10F0410-BLK1, Batch: 10F0410)											
Cyanide			1.0	0.5	mg/kg wet	ND					
LCS Analyzed: 06/07/10 (Lab Number:10F0410-BS1, Batch: 10F0410)											
Cyanide		31.5	0.8	0.4	mg/kg wet	23.4	74	40-160			

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Chain of Custody Record

Client Information	Sampler: C.J. BRYZ-GORNIA	Lab PM: Paul Morrow	Carrier Tracking No(s): :	COC No: 05132010 14:06_1
Client Contact: Alexander Ryan	Phone:	E-Mail: Paul.Morrow@testamericainc.com		Page: 1
Company: New York State Electric & Gas - Binghamton, NY		**Parameter(s) Requested**		Job #:
Address: P.O. Box 5224	Due Date Requested:			
City: Binghamton	TAT Requested (Business Days): 10			
State, Zip: NY, 13904				
Phone: 3156719619	PO #:			
Email: alexander.ryan@arcadis-us.com	WO #: RTE0745			
Project Name: NYSEG Geneva Wadsworth Waste Characterization	Project #:			
Site:	SSOW#:			

Preservation Codes:
A=HCL
B=NaOH
C=Zn Acetate
D=Nitric Acid
I=Ice
N=None
S=H2SO4
V=MCAA
Z=Z

Container Codes:
A=Amber
G=Glass
P=Poly/Plastic
S=Summa
T=Tedlar
V=Vial

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix	Field Filtered Sample (Yes or No)		Voa	CN::Cn RELSD::H9 Relsd	Total Number of containers	Special Instructions/Note:
				Preserv-Cont Code:			HG	LG		
				S			2	1	3	
WRANGLER-060110-01	6/1/10	0930	C	S				1		
WRANGLER-060110-02	6/1/10	0930	C	S			1			HOLD
WRANGLER-060110-02 DUP	6/1/10	0930	C	S			1			HOLD

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For ______ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment

Relinquished by:	Date/Time: 6/1/10 11:45	Company: ARCADIS	Received by:	Date/Time: 6/1/10 11:45	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time: 6/2/10 -945	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: △ Yes △ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks. 2.0

ARCADIS

Appendix C

Waste Manifests

Seneca Meadows, Inc.
1786 Salcman Rd.
Waterloo, NY 13165
Ph: (315) 539-5624 Fax: (315) 539-3097

Ticket: 1886643
Date: 05/12/2010
Time: 11:15:13 - 11:24:56

Customer: 31NEG / NYSEG

Carrier: 7318 / RICCELLI TRUCKING,
Profile: 2010-053-31NEG / 31NEG-2010-05

Origin: 9 / BROOME
Truck: RIC38
Comment:

Gross: 42600LBS
Tare: 28360LBS
Net: 14240LBS

Wastes & Services	Quantity
BCS01 / B/R-CONTAM SOIL	7.1200 Tons

Weighmaster: LYDIA 450104

Driver: ______________________

Seneca Meadows, Inc.
1786 Salcman Rd.
Waterloo, NY 13165
Ph: (315) 539-5624 Fax: (315) 539-3097

Ticket: 1886640
Date: 05/12/2010
Time: 11:23:53 - 11:24:08

Customer: 31NEG / NYSEG

Carrier: 7318 / RICCELLI TRUCKING,
Profile: 2010-053-31NEG / 31NEG-2010-05

Origin: 9 / BROOME
Truck: RIC38
Comment:

Gross: 45840LBS Manual
Tare: 28200LBS Manual
Net: 17640LBS

Wastes & Services	Quantity
BCS01 / B/R-CONTAM SOIL	8.8200 Tons

Weighmaster: LYDIA 450104

Driver: ______________________

Seneca Meadows, Inc.
1786 Salcman Rd.
Waterloo, NY 13165
Ph: (315) 539-5624 Fax: (315) 539-3097

Ticket: 1886641
Date: 05/12/2010
Time: 11:24:18 - 11:24:33

Customer: 31NEG / NYSEG

Carrier: 7318 / RICCELLI TRUCKING,
Profile: 2010-053-31NEG / 31NEG-2010-05

Gross: 43860LBS Manual
Tare: 28480LBS Manual
Net: 15380LBS

Origin: 9 / BROOME
Truck: RIC56
Comment:

Wastes & Services	Quantity
BCS01 / B/R-CONTAM SOIL	7.6900 Tons

Weighmaster: LYDIA 450104

Driver: ______________________

Seneca Meadows, Inc.
1786 Salcman Rd.
Waterloo, NY 13165
Ph: (315) 539-5624 Fax: (315) 539-3097

Ticket: 1886662
Date: 05/12/2010
Time: 11:38:52 - 11:49:49

Customer: 31NEG / NYSEG

Carrier: 7318 / RICCELLI TRUCKING,
Profile: 2010-053-31NEG / 31NEG-2010-05

Gross: 38580LBS
Tare: 28440LBS
Net: 10140LBS

Origin: 9 / BROOME
Truck: RIC56
Comment:

Wastes & Services	Quantity
BCS01 / B/R-CONTAM SOIL	5.0700 Tons

Weighmaster: LYDIA 450104

Driver: ______________________

Seneca Meadows, Inc.
1786 Salcman Rd.
Waterloo, NY 13165
Ph: (315) 539-5624 Fax: (315) 539-3097

Ticket: 1886776
Date: 05/12/2010
Time: 13:18:42 - 13:41:50

Customer: 31NEG / NYSEG

Carrier: 7318 / RICCELLI TRUCKING,
Profile: 2010-053-31NEG / 31NEG-2010-05

Gross: 43940LBS
Tare: 28420LBS
Net: 15520LBS

Origin: 9 / BROOME
Truck: RIC38
Comment:

Wastes & Services	Quantity
BCS01 / B/R-CONTAM SOIL	7.7600 Tons

Weighmaster: RUSS 450014

Driver: ______________________

Seneca Meadows, Inc.
1786 Salcman Rd.
Waterloo, NY 13165
Ph: (315) 539-5624 Fax: (315) 539-3097

Ticket: 1886790
Date: 05/12/2010
Time: 13:29:04 - 13:53:26

Customer: 31NEG / NYSEG

Carrier: 7318 / RICCELLI TRUCKING,
Profile: 2010-053-31NEG / 31NEG-2010-05

Gross: 45020LBS
Tare: 28380LBS
Net: 16640LBS

Origin: 9 / BROOME
Truck: RIC56
Comment:

Wastes & Services	Quantity
BCS01 / B/R-CONTAM SOIL	8.3200 Tons

Weighmaster: RUSS 450014

Driver: ______________________

Attachment 2

Natural Attenuation Evaluation Report

ARCADIS
Infrastructure · Water · Environment · Buildings

Imagine the result

NYSEG

Natural Attenuation Evaluation Report

Wadsworth Street Former Manufactured Gas Plant Site

Site No. 8-35-015

Geneva, New York

January 2012

ARCADIS

Natural Attenuation Evaluation Report

Wadsworth Street Former
Manufactured Gas Plant Site
Site No. 8-35-015

Prepared for:
NYSEG

Prepared by:
ARCADIS of New York, Inc.
6723 Towpath Road
P O Box 66
Syracuse
New York 13214-0066
Tel 315 446 9120
Fax 315 449 0017

Our Ref.:
B0013104

Date:
January 2012

Tables

Figures

1. Introduction

This *Natural Attenuation Evaluation Report* has been prepared by ARCADIS on behalf of NYSEG to evaluate the effectiveness of natural attenuation processes in addressing the dissolved phase groundwater impacts at the Wadsworth Street Former Manufactured Gas Plant (MGP) site (the site) located in Geneva, New York.

1.1 Background

The former MGP operated for approximately 50 years (ca. 1853 to 1903), producing gas using the coal carbonization process. This process generates byproducts including coal tar, coal, slag, cinders, ash, and purifier wastes, that were likely sold, disposed off site, or (except for coal tar) potentially used as fill at the site. Several organic compounds commonly associated with coal tar have been detected in soil and groundwater at the site. Groundwater constituents of concern (COCs) have been identified as benzene, toluene, ethylbenzene, and xylene (BTEX), and polycyclic aromatic hydrocarbons (PAHs) (ARCADIS 2010). The inorganic compound cyanide, typically associated with purifier waste, has also been identified as a groundwater COC associated with the site (ARCADIS 2010). Based on the interpreted groundwater flow direction (see Figure 1) and location of former MGP structures, potential sources of the dissolved phase COCs include the former lime house, the former purifier house, former Gas Holder 1, and a buried structure encountered just east of former Gas Holder 1 during the Remedial Investigation (ARCADIS 2010).

The selected remedy for the site, as described in the New York State Department of Environmental Conservation (NYSDEC) March 2010 Record of Decision (ROD) (NYSDEC 2010), includes removal of the subsurface structure east of Gas Holder 1 and impacted soil immediately surrounding the structure (if any). The ROD also requires an evaluation of the potential for natural attenuation of the groundwater COCs as part of the remedial design (ARCADIS 2010).

1.2 Natural Attenuation Processes for Site-Specific COCs

Natural attenuation is the reliance on natural physical, chemical, and/or biological processes to reduce the mass, toxicity, mobility, volume, or concentration of contaminants and achieve site-specific remediation objectives within a reasonable timeframe (USEPA 1999, USEPA 2002). The major mechanism for destruction of hydrocarbon contaminant mass in the subsurface is biological degradation (USEPA 1999, USEPA 2002). Biodegradation of BTEX and PAHs can proceed via aerobic or anaerobic microbial processes, with naturally-occurring bacteria using these constituents as sources of carbon and/or energy. Bacteria obtain energy for cell production and maintenance by facilitating reduction-oxidation (redox) reactions involving the transfer of electrons from electron donors (e.g., hydrocarbon constituents) to available electron acceptors. Electron acceptors in groundwater systems include oxygen, nitrate, manganese, ferric iron, sulfate, and carbon dioxide. When sufficient oxygen is present in groundwater, aerobic biodegradation is the dominant reaction for degradation of organic contaminants. As oxygen becomes less available, anaerobic degradation reactions consume alternate electron acceptors, with those that yield the most energy consumed first. These electron acceptors are used in the following order of preference, with conditions becoming more strongly reducing as they are consumed: nitrate (nitrate reduction), manganese (manganese (IV) reduction), ferric iron (ferric iron reduction), sulfate (sulfate reduction), and carbon dioxide (methanogenesis).

Cyanide in soil and groundwater can exist in a number of chemical forms; the most toxic form, and thus the cyanide species of greatest environmental concern, is free cyanide (i.e., hydrogen cyanide, HCN, or the cyanide anion, CN^-). Cyanide at the site is unlikely to be in the form of free cyanide. “Although some cyanide compounds are highly toxic, there is evidence that the cyanide compounds typically leached from purifier waste are in a chemically complexed form which is significantly less toxic” (NYSDEC website). The concern is whether these complexes are able to release free cyanide to groundwater (NYSDEC, 2011). In a study of ten MGP sites in New York State, the dominant form of cyanide in groundwater was found to be strong iron-cyanide complexes (Ghosh et al. 2004). These iron-cyanide complexes are highly stable under a wide range of groundwater conditions, including oxidizing to mildly reducing conditions and mildly acidic to high pH. Dissolution of these iron-cyanide complexes and release of significant free cyanide requires strongly acidic pH conditions (Dzombak et al. 2005, Ghosh et al. 2004), which are not encountered in site groundwater. However, if present, free cyanide in groundwater can be biodegraded to inorganic carbon and nitrogen species by a variety of microbial groups under both aerobic and anaerobic conditions (Dzombak et al. 2005, Environment Canada 1997). In addition, hydrogen cyanide is highly volatile, although this is less likely to be a dominant attenuation mechanism in groundwater environments (Dzombak et al. 2005).

1.3 Natural Attenuation Evaluation Parameters

The following indications are typically used to demonstrate the occurrence of, or the potential for, natural attenuation of COCs in groundwater:

1) Decreasing COC concentrations over time.

2) The presence of geochemical conditions favorable for or indicative of COC attenuation processes.

3) Populations of appropriate microbial groups for COC biodegradation and biotransformation.

As detailed in the May 25, 2011 *Pre-Design Investigation Summary* letter report (ARCADIS 2011), groundwater samples were collected at the site in March 2011 to document the extent of dissolved phase impacts and to support an evaluation of the geochemical characteristics and existing microbial community as part of the natural attenuation evaluation. In addition to monitoring the COC concentrations, groundwater samples were submitted for laboratory analysis for a suite of geochemical parameters to provide the data necessary to evaluate potential biodegradation processes. The geochemical parameters monitored consisted of pH and oxidation-reduction potential, as well as the following electron acceptors and/or byproducts of the redox reactions described previously:

- dissolved oxygen
- nitrate plus nitrite as nitrogen (nitrate/nitrite as N)
- total and dissolved manganese, ferric iron, and dissolved iron
- sulfate
- methane

Groundwater samples were also analyzed for the presence and population of microbial groups capable of aerobic degradation of BTEX and PAHs.

Analytical results obtained from the groundwater samples collected in March 2011 (as well as historical samples) are presented in the following subsections as they relate to this natural attenuation evaluation.

2. Groundwater COC Concentration Evaluation

Groundwater monitoring events were conducted at the site in December 2005, October 2006, and March 2011. Groundwater samples were submitted for laboratory analysis for VOCs, SVOCs, and total cyanide. Analytical results (as presented in Table 1) were compared to New York State Ambient Water Quality Standards and Guidance Values, Class GA (groundwater as a source of drinking water) (NYSDEC Class GA standards and guidance values) as compiled in Section 1.1.1 of the NYSDEC Division of Water Technical and Operational Guidance Series (TOGS 1.1.1, NYSDEC 1998). Analytical results exceeding NYSDEC Class GA standards and guidance values are shown on Figure 2.

2.1 Monitoring Well MW-2

A groundwater sample collected from monitoring well MW-2 during the March 2011 sampling event contained 4-nitroaniline (which is not typically associated with MGP residuals) at a concentration of 7.8(J) micrograms per liter (µg/L), exceeding the groundwater guidance value of 5 µg/L. The J qualifier indicates an estimated concentration. No other VOC and SVOC constituents have been detected at concentrations above laboratory detection limits in groundwater samples from this monitoring well.

Total cyanide was detected at concentrations of 340 µg/L and 290 µg/L in groundwater samples collected from monitoring well MW-2 in 2005 and 2011 (respectively). These concentrations exceed the NYSDEC Class GA cyanide guidance value of 200 µg/L.

2.2 Monitoring Well MW-3

Groundwater samples collected from monitoring well MW-3 have historically contained COCs at concentrations that exceed the NYSDEC Class GA standards and guidance values for BTEX compounds, styrene, 2,4-dimethylphenol, 2-methylphenol, 4-methylphenol, naphthalene, phenol, and total cyanide. However, as summarized in Table 2.1, COC concentrations have substantially decreased over time, and only benzene, total xylenes, and total cyanide were detected at concentrations that exceeded NYSDEC Class GA standards and guidance values during the March 2011 sampling event .

Table 2.1 Constituents Exceeding Groundwater Criteria at Monitoring Well MW-3

Constituent	NYSDEC Class GA Standards and Guidance Values (µg/L)	Groundwater Concentration (µg/L) 12/20/05	Groundwater Concentration (µg/L) 10/5/06	Groundwater Concentration (µg/L) 3/22/11
Benzene	1	7,100 [7,000]	1,600 D [1,900 D]	4.5
Ethylbenzene	5	680 [730]	220 D [260 D]	1.0 U
Toluene	5	4,300 [4,300]	1,400 D [1,400 D]	2.9
Xylenes, total	5	7,900 [8,100]	2,200 D [2,500 D]	16
2,4-Dimethylphenol	1	NA	130 [190]	5.0 U
2-Methylphenol	1	NA	110 [150]	5.0 U
4-Methylphenol	1	NA	130 [160]	9.9 U
Naphthalene	10	3,600 [4,000]	1,200 DJ [580 J]	7.7
Phenol	1	NA	38 [59 J]	5.0 U
Styrene	5	320 J [360]	170 D [160 D]	1.0 U
Cyanide, total	200	600 [580]	259 J [210 J]	330

Notes:

1. D - quantitated using a secondary dilution
2. J - estimated concentration
3. U - compound was not detected at or above the specified reporting limit
4. NA - not analyzed
5. µg/L - micrograms per liter
6. Field duplicate sample results are presented in brackets.
7. Shading indicates concentration exceeds New York State Ambient Water Quality Standards and Guidance Values, Class GA (groundwater as a source of drinking water).

2.3 Monitoring Well MW-6

A groundwater sample collected from monitoring well MW-6 in 2005 contained acetone at a concentration of 68(J) µg/L, exceeding the groundwater guidance value of 50 µg/L. Acetone has not been detected at concentrations above laboratory detection limits in subsequent groundwater samples collected from monitoring well MW-6. Acetone is not considered a COC at the site, as it is not known to be associated with MGPs, and is a common laboratory contaminant. No COCs have been detected at concentrations greater than laboratory detection limits in groundwater samples collected from this monitoring well.

2.4 Monitoring Well MW-10

Monitoring well MW-10 was installed during the March 2011 pre-design investigation (PDI) to characterize groundwater downgradient from the subsurface structure encountered at Remedial Investigation (RI) soil boring SB-14A (see Figure 2). Note that as part of the PDI, it was determined that the subsurface structure is a former underground storage tank. The groundwater sample collected from monitoring well MW-10 contained benzene at a concentration of 14 µg/L, exceeding the benzene NYSDEC Class GA standard of 1 µg/L.

2.5 COC Evaluation Summary

Based on the 2011 analytical results, potentially MGP-related COCs are currently present in site groundwater at concentrations exceeding the NYSDEC Class GA standards and guidance values in monitoring wells MW-2, MW-3, and MW-10. The exceedances are within an order of magnitude of the New York State Class GA Water Quality Standards and Guidance Values. The analytical results from groundwater samples collected from 2005 to 2011 document a potentially decreasing trend in the COC concentrations, which may be indicative of a shrinking groundwater plume and the occurrence of natural attenuation processes in site groundwater.

3. Geochemical Evaluation

Geochemical indicator parameters were analyzed in groundwater samples collected in March 2011. While decreasing trends in COC concentrations (discussed in Section 2) generally represent the primary line of evidence for natural attenuation of groundwater impacts at the site, geochemical indicator parameters can provide a secondary line of evidence to document favorable groundwater conditions for ongoing attenuation mechanisms and evaluate potential biodegradation processes that may be occurring at the site.

Geochemical indicator parameter analytical results are presented in Table 2 and shown on Figure 3, and the geochemical evaluation is discussed in the following subsections.

3.1 Dissolved Oxygen and Oxidation-Reduction Potential

When sufficient oxygen is present in groundwater, biodegradation is primarily aerobic. As oxygen becomes less available, anaerobic biodegradation processes utilize alternate electron acceptors, and groundwater conditions become more reducing.

Dissolved oxygen (DO) concentrations (measured in the field) ranged from 0.00 to 0.10 milligrams per liter (mg/L) at eight of the ten monitoring locations. These low DO concentrations indicate that anaerobic conditions likely prevail, including at upgradient monitoring locations MW-4, MW-6, and MW-9. However, DO readings at monitoring wells MW-3 (1.04 mg/L) and MW-5 (3.17 mg/L) suggest that some oxygen is available in site groundwater.

Field-measured oxygen-reduction potential (ORP) data can be used as a qualitative indicator of whether conditions are favorable for aerobic degradation (oxidizing conditions; positive ORP) or anaerobic degradation (reducing conditions; negative ORP). The ORP values at the site range between -64 and 284 millivolts (mV), suggesting that conditions range from oxidizing to mildly reducing, and indicating potential for aerobic and anaerobic biodegradation reactions. Field measurements of DO and ORP, in particular, can be variable; while these parameters provide insight into the groundwater conditions at the site, the data should be evaluated in the context of other geochemical indicator parameters.

3.2 pH

The groundwater pH measured at monitoring wells across the site ranges from 6.86 to 7.71, which is within the ideal pH range for growth of microorganisms in the natural environment (typically pH 6 to 8). In addition, iron-cyanide species are stable at this pH.

3.3 Nitrate/Nitrite

Nitrate is used by denitrifying microorganisms under anaerobic conditions as an electron acceptor to oxidize organic carbon (nitrate reduction). Nitrate (NO_3^-) is reduced to nitrite (NO_2^-) during nitrate reduction, which generally occurs when oxygen has become depleted and indicates mildly reducing conditions. Lower nitrate concentrations at impacted wells as compared with upgradient locations can indicate microbial nitrate reduction processes are occurring within the impacted areas.

Groundwater samples collected at the site were analyzed for nitrate plus nitrite as nitrogen (nitrate/nitrite-N). Concentrations of nitrate/nitrite-N were below laboratory detection limits at five locations, including upgradient monitoring wells MW-4 and MW-9. However, the groundwater concentrations measured at monitoring wells MW-2 (5.20 mg/L), MW-3 (3.70 mg/L), and MW-6 (2.00 mg/L), suggest some availability of nitrate in site groundwater, and non-detect results at wells downgradient of these locations may indicate anaerobic nitrate reduction processes.

3.4 Manganese and Iron

Manganese and iron reduction are anaerobic redox reactions in which bacteria use manganic manganese (Mn(IV)) or ferric iron (Fe(III)) as electron acceptors to facilitate oxidation of organic compounds. When manganese is used as an electron acceptor during anaerobic microbial respiration, manganese is reduced to soluble manganous manganese (Mn(II)). Similarly, when ferric iron is used as an electron acceptor during anaerobic microbial respiration, ferric iron is reduced to soluble ferrous iron (Fe(II)). These reduced manganese and iron species are evaluated through analysis of groundwater samples for dissolved manganese and iron.

Groundwater samples collected at the site were analyzed for total and dissolved manganese, as well as ferric iron and dissolved iron. Manganese appears to be primarily in the dissolved form at many locations (including the upgradient monitoring wells), suggesting anaerobic and mildly reducing groundwater conditions. Dissolved iron is also detected in groundwater, although at most locations more iron is present in the ferric form than the reduced ferrous form, suggesting that conditions are not strongly iron-reducing.

3.5 Sulfate

Sulfate reduction is an anaerobic redox reaction in which sulfate is used as an electron acceptor, producing sulfides as a byproduct, and is indicative of an anaerobic and strongly reducing groundwater environment.

With the exception of a sample collected from monitoring well MW-10, groundwater samples contained sulfate at concentrations ranging from 31.0 mg/L (at monitoring well MW-5) to 189 mg/L (at monitoring well MW-7). Sulfate concentrations are not lower in groundwater samples collected at impacted locations as compared to upgradient locations, indicating that groundwater conditions are not strongly reducing and sulfate reduction likely is not occurring to a significant extent within the impacted areas. An elevated concentration of 1,180 mg/L sulfate was detected at monitoring well MW-10, which could indicate a source of sulfate in this vicinity. However, sulfate concentrations at nearby monitoring wells (i.e., MW-1, MW-2, and MW-7) did not exceed 189 mg/L.

3.6 Methane

Methanogenesis is an anaerobic redox reaction in which bacteria use carbon dioxide as an electron acceptor in the degradation of organic compounds, thereby producing methane as a byproduct. Methanogenesis is indicative of an anaerobic and highly reducing groundwater environment. Groundwater samples contained low concentrations of methane, ranging from 0.11 µg/L (at monitoring wells MW-3 and MW-8) to 150 µg/L (at monitoring well MW-4), indicating that groundwater conditions are not strongly reducing.

3.7 Geochemical Evaluation Summary

Overall, the geochemical parameters monitored at the site in March 2011 suggest that the groundwater conditions likely range from slightly aerobic to anaerobic and mildly reducing. However, the data generally do not indicate substantially different conditions in impacted areas versus the upgradient monitoring locations, making it difficult to infer the dominant biodegradation mechanisms in the observed attenuation of groundwater impacts. Since the geochemical data were collected after an apparent decrease in hydrocarbon concentrations had occurred (based on comparison of the 2011 COC concentrations with the COC concentrations measured in 2005), and the current hydrocarbon concentrations at the site are relatively low, the groundwater geochemical environment within the impacted area may potentially be returning to background (i.e., non-impacted) conditions. Current geochemical conditions are conducive to ongoing biodegradation, which can occur via both aerobic and anaerobic microbial processes. In addition, iron-cyanide complexes (i.e., the dominant form of cyanide in groundwater at former MGP sites) are highly stable under the geochemical conditions present in groundwater at the site.

4. Microbial Indicators

Groundwater samples collected at the site in March 2011 were analyzed for the presence and population of microbial groups capable of aerobic degradation of BTEX and PAHs to support the evaluation of biodegradation processes that may be occurring at the site.

Groundwater samples collected at each monitoring well were analyzed for the genes responsible for production of the enzymes toluene dioxygenase (TOD) and naphthalene dioxygenase (NAH) to detect and quantify microbial groups capable of aerobic degradation of BTEX and PAHs. The TOD enzyme catalyzes aerobic microbial degradation of toluene, benzene, and ethylbenzene. The NAH enzyme catalyzes aerobic microbial degradation of several PAHs including naphthalene, anthracene, phenanthrene, acenaphthalene, fluorine, acenaphthene, dibenzo-1,4-dioxin, dibenzothiophene, and dibenzofuran, and is also commonly detected at sites with BTEX impacts (Microbial Insights 2009).

Results of these analyses indicate the presence of microbial populations capable of aerobic degradation of PAHs and BTEX in site groundwater. As presented in Table 2 and on Figure 3, the highest populations of bacteria with the qNAH gene (which is responsible for production of the NAH enzyme for degradation of PAHs) were observed at monitoring wells MW-2, MW-6, and MW-10 (45,900 to 50,800 cells per milliliter [cells/mL]). The lowest populations of bacteria with the qNAH gene (14,200 to 27,700 cell/mL) were observed at monitoring wells MW-5, MW-7, and MW-9. Results of the qNAH analysis suggest slightly higher cell counts in areas of the site containing MGP-related impacts (i.e., PAHs), but on the same order of magnitude as the cell counts measured in upgradient locations. This is consistent with the 2011 groundwater PAH analytical results at the site, which indicate that NYSDEC Class GA standards are no longer exceeded. Therefore, the presence of substantially elevated populations of bacteria with the qNAH gene would not necessarily be expected at this time.

The highest populations of bacteria with the qTOD gene (which is responsible for production of the TOD enzyme for degradation of BTEX) were observed at wells MW-1, MW-2, and MW-10 (5,660,000 to 17,100,000 cells/mL), and the lowest populations were observed at MW-6, MW-7, and MW-9 (50,400 to 705,000 cells/mL). Higher cell counts for bacteria capable of degrading BTEX were generally observed in groundwater samples collected from monitoring wells that contain MGP-related COCs (as compared to upgradient locations). For example, the highest cell count determined by the qTOD analysis was observed at monitoring well MW-10 (17,100,000 cells/mL) and was several orders of magnitude larger than the cell count at upgradient monitoring well MW-9 (50,400 cells/mL). The relative difference in these cell counts indicate that the declining COC concentration trends observed at the site are due in part to biodegradation, and suggest sufficient oxygen available in groundwater to facilitate these processes.

5. Natural Attenuation Evaluation Summary

5.1 Conclusions

Based on the observed decreases in groundwater COC concentrations between 2005 and 2011 and the results obtained for the analysis of groundwater for microbial indicator populations, natural attenuation is potentially occurring and could be an effective means for addressing the dissolved phase impacts at the site. The observed groundwater impacts are limited in nature and extent, have shown an apparent decreasing concentration trend over the past six years, and COCs have not been detected in groundwater samples collected from downgradient monitoring wells (i.e., MW-1, MW-7 and MW-8).

Only benzene, total xylenes, 4-nitroaniline, and total cyanide were detected at concentrations exceeding the NYSDEC Class GA standards and guidance values in select groundwater samples collected during the March 2011 sampling event. Groundwater analytical results for microbial populations are consistent with the general decrease in COC concentrations observed during the most recent monitoring event. Geochemical indicators suggest that groundwater conditions range from slightly aerobic to anaerobic and mildly reducing, and these conditions are conducive to biodegradation processes and to the stability of iron-cyanide complexes. Microbial populations capable of and consistent with aerobic degradation of BTEX and PAH constituents have been detected at the site, with the highest populations of BTEX degrading populations measured at monitoring wells that contain MGP-related COCs, further supporting that biodegradation of the hydrocarbon impacts is occurring.

5.2 Recommendations

Considering groundwater beneath the site is not used as a potable source, the depth to water (approximately 6 to 10 feet below grade), and the lack of surface expressions, exposure of humans and wildlife to impacted groundwater is unlikely (ARCADIS 2008). Additionally, removal of the subsurface structure and impacted soil (if any) in the vicinity of SB-14A is planned as part of the site remedy, thereby eliminating a potential source of COCs in groundwater. Overall, the data appear to indicate that natural attenuation is an appropriate remedy for addressing the groundwater impacts observed at the site.

Based on the limited COC detections and the relatively low COC concentrations observed in groundwater in March 2011, an enhanced natural attenuation remedy is not recommended at this time. However, ARCADIS recommends that groundwater sampling be conducted during late summer/early fall 2012 to evaluate potential seasonal fluctuations in COC concentrations (i.e., samples analyzed for VOCs, SVOCs and cyanide only).

Additionally, ongoing groundwater sampling is recommended to continue monitoring the concentrations of dissolved phase COCs following the completion remedial construction activities at the site. Requirements for post-remedial construction sampling will be detailed in the forthcoming *Monitoring Plan* for the site (to be developed as part of the *Site Management Plan* following the completion of remedial construction activities).

6. References

ARCADIS. 2008. Remedial Investigation Report, Former Manufactured Gas Plant Site, Geneva, New York.

ARCADIS. 2010. Remedial Design Work Plan, Wadsworth Street Former Manufactured Gas Plant.

ARCADIS. 2011. Wadsworth Street (Geneva) Former MGP Site Pre-Design Investigation Summary.

Dzombak, D.A., Ghosh, R.S., and Wong-Chong, G.M. 2005. Cyanide in Water and Soil: Chemistry, Risk, and Management.

Environment Canada. 1997. Canadian soil quality guidelines for the protection of environmental health: cyanide (free).

Ghosh, R.S., Nakles, D.V., Murarka, I.P., and Neuhauser, E.F. 2004. Cyanide Speciation in Soil and Groundwater at Manufactured Gas Plant (MGP) Sites. Environmental Engineering Science. 21(6):752-767.

Microbial Insights. 2009. http://www.microbe.com/census-applications/aerobic-btex-and-mtbe.html.

NYSDEC. 1998. Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations. Division of Water Technical and Operational Guidance Series (1.1.1).

NYSDEC. 2010. *Record of Decision*. NYSEG, Wadsworth Street, Geneva MGP Site, Site Number 8-35-015, March 2010.

NYSDEC. 2011. http://www.dec.ny.gov/chemical/24907.html.
http://www.dec.ny.gov/chemical/24922.html.

USEPA. 1999. Microbial Processes Affecting Monitored Natural Attenuation of Contaminants in the Subsurface. EPA/540/S-99/001.

USEPA. 2002. Calculation and Use of First-Order Rate Constants for Monitored Natural Attenuation Studies. EPA/540/S-02/500.

Tables

Table 1
Historical Groundwater Analytical Results

NYSEG - Wadsworth Street Former MGP Site - Geneva, New York

Location ID:	New York State Class GA Water Quality Standards and Guidance Values		**MW-1**			**MW-2**			**MW-3**		
Date Collected:		**Units**	**12/20/05**	**10/05/06**	**03/21/11**	**12/20/05**	**10/05/06**	**03/22/11**	**12/20/05**	**10/05/06**	**03/22/11**
VOCs											
1,1,1-Trichloroethane	5	µg/L	5.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	500 U [250 U]	1.0 U [1.0 U]	1.0 U
1,1,2,2-Tetrachloroethane	5	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	100 U [50 U]	1.0 U [1.0 U]	1.0 U
1,1,2-Trichloro-1,2,2-trifluoroethane	- -	µg/L	NA	NA	1.0 U	NA	NA	1.0 U	NA	NA	1.0 U
1,1,2-Trichloroethane	1	µg/L	3.0 U	1.0 U	1.0 U	3.0 U	1.0 U	1.0 U	300 U [150 U]	1.0 U [1.0 U]	1.0 U
1,1-Dichloroethane	5	µg/L	5.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	500 U [250 U]	1.0 U [1.0 U]	1.0 U
1,1-Dichloroethene	5	µg/L	2.0 U	1.0 U	1.0 U	2.0 U	1.0 U	1.0 U	200 U [100 U]	1.0 U [1.0 U]	1.0 U
1,2,4-Trichlorobenzene	5	µg/L	NA	1.0 U	1.0 U	NA	1.0 U	1.0 U	NA	1.0 U [1.0 U]	1.0 U
1,2-Dibromo-3-chloropropane	0.04	µg/L	NA	1.0 UJ	1.0 U	NA	1.0 UJ	1.0 U	NA	1.0 UJ [1.0 UJ]	1.0 U
1,2-Dibromoethane	5	µg/L	NA	1.0 U	1.0 U	NA	1.0 U	1.0 U	NA	1.0 U [1.0 U]	1.0 U
1,2-Dichlorobenzene	3	µg/L	NA	1.0 U	1.0 U	NA	1.0 U	1.0 U	NA	1.0 U [1.0 U]	1.0 U
1,2-Dichloroethane	0.6	µg/L	2.0 U	1.0 U	1.0 U	2.0 U	1.0 U	1.0 U	200 U [100 U]	1.0 U [1.0 U]	1.0 U
1,2-Dichloropropane	1	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	100 U [50 U]	1.0 U [1.0 U]	1.0 U
1,3-Dichlorobenzene	3	µg/L	NA	1.0 U	1.0 U	NA	1.0 U	1.0 U	NA	1.0 U [1.0 U]	1.0 U
1,4-Dichlorobenzene	3	µg/L	NA	1.0 U	1.0 U	NA	1.0 U	1.0 U	NA	1.0 U [1.0 U]	1.0 U
2-Butanone	50	µg/L	5.0 U	5.0 U	10 U	5.0 U	5.0 U	10 U	500 U [250 U]	**2.7 J [3.1 J]**	10 U
2-Hexanone	50	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	500 U [250 U]	5.0 U [5.0 U]	5.0 U
4-Methyl-2-Pentanone	- -	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	500 U [250 U]	5.0 U [5.0 U]	5.0 U
Acetone	50	µg/L	5.0 UJ	5.0 U	10 U	5.0 UJ	5.0 U	10 U	500 UJ [250 UJ]	**6.2 [7.5]**	10 U
Benzene	1	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	**7,100 [7,000]**	**1,600 D [1,900 D]**	**4.5**
Bromodichloromethane	50	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	100 U [50 U]	1.0 U [1.0 U]	1.0 U
Bromoform	50	µg/L	4.0 U	1.0 UJ	1.0 U	4.0 U	1.0 UJ	1.0 U	400 U [200 U]	1.0 UJ [1.0 UJ]	1.0 U
Bromomethane	5	µg/L	5.0 U	1.0 UJ	1.0 U	5.0 U	1.0 UJ	1.0 U	500 U [250 U]	1.0 UJ [1.0 UJ]	1.0 U
Carbon Disulfide	60	µg/L	5.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	500 U [250 U]	1.0 U [1.0 U]	1.0 U
Carbon Tetrachloride	5	µg/L	2.0 U	1.0 U	1.0 U	2.0 U	1.0 U	1.0 U	200 U [100 U]	1.0 U [1.0 U]	1.0 U
Chlorobenzene	5	µg/L	5.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	500 U [250 U]	**0.72 J [0.89 J]**	1.0 U
Chloroethane	5	µg/L	5.0 U	1.0 UJ	1.0 U	5.0 U	1.0 UJ	1.0 U	500 U [250 U]	1.0 UJ [1.0 UJ]	1.0 U
Chloroform	7	µg/L	5.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	500 U [250 U]	1.0 U [1.0 U]	1.0 U
Chloromethane	5	µg/L	5.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	500 U [250 U]	1.0 U [1.0 U]	1.0 U
cis-1,2-Dichloroethene	5	µg/L	5.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	500 U [250 U]	1.0 U [1.0 U]	1.0 U
cis-1,3-Dichloropropene	0.4	µg/L	5.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	500 U [250 U]	1.0 U [1.0 U]	1.0 U
Cyclohexane	- -	µg/L	NA	1.0 U	1.0 U	NA	1.0 U	1.0 U	NA	**3.4 [4.0]**	1.0 U
Dibromochloromethane	50	µg/L	5.0 U	1.0 UJ	1.0 U	5.0 U	1.0 UJ	1.0 U	500 U [250 U]	1.0 UJ [1.0 UJ]	1.0 U
Dichlorodifluoromethane	- -	µg/L	NA	1.0 U	1.0 U	NA	1.0 U	1.0 U	NA	1.0 U [1.0 U]	1.0 U
Ethylbenzene	5	µg/L	4.0 U	1.0 U	1.0 U	4.0 U	1.0 U	1.0 U	**680 [730]**	**220 D [260 D]**	1.0 U
Isopropylbenzene	- -	µg/L	NA	1.0 U	1.0 U	NA	1.0 U	1.0 U	NA	**6.4 [7.2]**	1.0 U
Methyl acetate	- -	µg/L	NA	1.0 UJ	1.0 U	NA	1.0 UJ	1.0 U	NA	1.0 UJ [1.0 UJ]	1.0 U
Methyl tert-butyl ether	10	µg/L	5.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	500 U [250 U]	1.0 U [1.0 U]	1.0 U
Methylcyclohexane	- -	µg/L	NA	1.0 U	1.0 U	NA	1.0 U	1.0 U	NA	**3.2 [3.8]**	1.0 U
Methylene Chloride	5	µg/L	3.0 U	1.0 UJ	1.0 U	3.0 U	1.0 UJ	1.0 U	300 U [150 U]	1.0 UJ [1.0 UJ]	1.0 U
Styrene	5	µg/L	5.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	**320 J [360]**	**170 D [160 D]**	1.0 U
Tetrachloroethene	5	µg/L	1.0 UJ	1.0 U	1.0 U	1.0 UJ	1.0 U	1.0 U	100 UJ [50 UJ]	1.0 U [1.0 U]	1.0 U
Toluene	5	µg/L	5.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	**4,300 [4,300]**	**1,400 D [1,400 D]**	**2.9**
trans-1,2-Dichloroethene	5	µg/L	5.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	500 U [250 U]	1.0 U [1.0 U]	1.0 U
trans-1,3-Dichloropropene	0.4	µg/L	5.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	500 U [250 U]	1.0 U [1.0 U]	1.0 U
Trichloroethene	5	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	100 U [50 U]	1.0 U [1.0 U]	1.0 U
Trichlorofluoromethane	- -	µg/L	NA	1.0 U	1.0 U	NA	1.0 U	1.0 U	NA	1.0 U [1.0 U]	1.0 U
Vinyl Chloride	2	µg/L	5.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	500 U [250 U]	1.0 U [1.0 U]	1.0 U
Xylene (Total)	5	µg/L	5.0 U	3.0 U	2.0 U	5.0 U	3.0 U	2.0 U	**7,900 [8,100]**	**2,200 D [2,500 D]**	**16**

Table 1
Historical Groundwater Analytical Results

NYSEG - Wadsworth Street Former MGP Site - Geneva, New York

Location ID:	New York State Class GA Water Quality Standards and Guidance Values		MW-1			MW-2			MW-3		
Date Collected:		Units	12/20/05	10/05/06	03/21/11	12/20/05	10/05/06	03/22/11	12/20/05	10/05/06	03/22/11
SVOCs											
2,4,5-Trichlorophenol	1	µg/L	NA	10 U	4.9 U	NA	10 U	4.8 U	NA	10 U [98 U]	5.0 U
2,4,6-Trichlorophenol	1	µg/L	NA	10 U	4.9 U	NA	10 U	4.8 U	NA	10 U [98 U]	5.0 U
2,4-Dichlorophenol	1	µg/L	NA	10 U	4.9 U	NA	10 U	4.8 U	NA	10 U [98 U]	5.0 U
2,4-Dimethylphenol	1	µg/L	NA	10 U	4.9 U	NA	10 U	4.8 U	NA	**130 [190]**	5.0 U
2,4-Dinitrophenol	1	µg/L	NA	48 U	9.7 U	NA	49 U	9.5 U	NA	48 U [490 U]	9.9 U
2,4-Dinitrotoluene	5	µg/L	2.1 U	10 U	4.9 U	2.1 U	10 U	4.8 U	42 U [41 U]	10 U [98 U]	5.0 U
2,6-Dinitrotoluene	5	µg/L	2.1 U	10 U	4.9 U	2.1 U	10 U	4.8 U	42 U [41 U]	10 U [98 U]	5.0 U
2-Chloronaphthalene	10	µg/L	10 U	10 U	4.9 U	10 U	10 U	4.8 U	210 U [210 U]	10 U [98 U]	5.0 U
2-Chlorophenol	1	µg/L	NA	10 U	4.9 U	NA	10 U	4.8 U	NA	10 U [98 U]	5.0 U
2-Methylnaphthalene	- -	µg/L	10 U	10 U	4.9 U	10 U	10 U	4.8 U	**290 [320]**	**130 [110]**	**0.79 J**
2-Methylphenol	1	µg/L	NA	10 U	4.9 U	NA	10 U	4.8 U	NA	**110 [150]**	5.0 U
2-Nitroaniline	5	µg/L	21 U	48 U	9.7 U	21 U	49 U	9.5 U	420 U [410 U]	48 U [490 U]	9.9 U
2-Nitrophenol	1	µg/L	NA	10 U	4.9 U	NA	10 U	4.8 U	NA	10 U [98 U]	5.0 U
3,3'-Dichlorobenzidine	5	µg/L	21 U	19 U	4.9 U	21 U	20 U	4.8 U	420 U [410 U]	19 U [200 U]	5.0 U
3-Nitroaniline	5	µg/L	21 U	48 U	9.7 U	21 U	49 U	9.5 U	420 U [410 U]	48 U [490 U]	9.9 U
4,6-Dinitro-2-methylphenol	1	µg/L	NA	NA	9.7 U	NA	NA	9.5 U	NA	NA	9.9 U
4-Bromophenyl-phenylether	- -	µg/L	10 U	10 U	4.9 U	10 U	10 U	4.8 U	210 U [210 U]	10 U [98 U]	5.0 U
4-Chloro-3-methylphenol	1	µg/L	NA	10 U	4.9 U	NA	10 U	4.8 U	NA	10 U [98 U]	5.0 U
4-Chloroaniline	5	µg/L	10 U	10 U	4.9 U	10 U	10 U	4.8 U	210 U [210 U]	10 U [98 U]	5.0 U
4-Chlorophenyl-phenylether	- -	µg/L	10 U	10 U	4.9 U	10 U	10 U	4.8 U	210 U [210 U]	10 U [98 U]	5.0 U
4-Methylphenol	1	µg/L	NA	10 U	9.7 U	NA	10 U	9.5 U	NA	**130 [160]**	9.9 U
4-Nitroaniline	5	µg/L	21 U	48 U	9.7 U	21 U	49 U	**7.8 J**	420 U [410 U]	48 U [490 U]	9.9 U
4-Nitrophenol	1	µg/L	NA	48 U	9.7 U	NA	49 U	9.5 U	NA	48 U [490 U]	9.9 U
Acenaphthene	20	µg/L	10 U	10 U	4.9 U	10 U	10 U	4.8 U	**16 J [19 J]**	**6.0 J [6.0 J]**	5.0 U
Acenaphthylene	- -	µg/L	10 U	10 U	4.9 U	10 U	10 U	4.8 U	**54 J [66 J]**	**50 [34 J]**	5.0 U
Acetophenone	- -	µg/L	NA	NA	4.9 U	NA	NA	4.8 U	NA	NA	5.0 U
Anthracene	50	µg/L	10 U	10 U	4.9 U	10 U	10 U	4.8 U	**210 U [11 J]**	**3.0 J [98 U]**	5.0 U
Atrazine	- -	µg/L	NA	NA	4.9 U	NA	NA	4.8 U	NA	NA	5.0 U
Benzaldehyde	- -	µg/L	NA	NA	4.9 U	NA	NA	4.8 U	NA	NA	5.0 U
Benzo(a)anthracene	0.002	µg/L	1.0 U	10 U	4.9 U	1.0 U	10 U	4.8 U	21 U [21 U]	10 U [98 U]	5.0 U
Benzo(a)pyrene	0	µg/L	1.0 U	10 U	4.9 U	1.0 U	10 U	4.8 U	21 U [21 U]	10 U [98 U]	5.0 U
Benzo(b)fluoranthene	0.002	µg/L	1.0 UJ	10 U	4.9 U	1.0 UJ	10 U	4.8 U	21 UJ [21 UJ]	10 U [98 U]	5.0 U
Benzo(g,h,i)perylene	- -	µg/L	10 U	10 U	4.9 U	10 U	10 U	4.8 U	210 U [210 U]	10 U [98 U]	5.0 U
Benzo(k)fluoranthene	0.002	µg/L	1.0 UJ	10 U	4.9 U	1.0 UJ	10 U	4.8 U	21 UJ [21 UJ]	10 U [98 U]	5.0 U
Biphenyl	- -	µg/L	NA	NA	4.9 U	NA	NA	4.8 U	NA	NA	5.0 U
bis(2-Chloroethoxy)methane	5	µg/L	10 U	10 U	4.9 U	10 U	10 U	4.8 U	210 U [210 U]	10 U [98 U]	5.0 U
bis(2-Chloroethyl)ether	1	µg/L	1.0 UJ	10 U	4.9 U	1.0 UJ	10 U	4.8 U	21 UJ [21 UJ]	10 U [98 U]	5.0 U
bis(2-chloroisopropyl)ether	5	µg/L	10 U	10 U	4.9 U	10 U	10 U	4.8 U	210 U [210 U]	10 U [98 U]	5.0 U
bis(2-Ethylhexyl)phthalate	5	µg/L	**2.8 J**	10 U	4.9 U	10 U	10 U	4.8 U	210 U [210 U]	10 U [98 U]	5.0 U
Butylbenzylphthalate	50	µg/L	10 U	10 U	4.9 U	10 U	10 U	4.8 U	210 U [210 U]	10 U [98 U]	5.0 U
Caprolactam	- -	µg/L	NA	NA	4.9 U	NA	NA	4.8 U	NA	NA	5.0 U
Carbazole	- -	µg/L	10 U	10 U	4.9 U	10 U	10 U	4.8 U	**88 J [100 J]**	**20 [7.0 J]**	5.0 U
Chrysene	0.002	µg/L	10 U	10 U	4.9 U	10 U	10 U	4.8 U	210 U [210 U]	10 U [98 U]	5.0 U
Dibenz(a,h)anthracene	- -	µg/L	1.0 U	10 U	4.9 U	1.0 U	10 U	4.8 U	21 U [21 U]	10 U [98 U]	5.0 U
Dibenzofuran	- -	µg/L	10 U	10 U	9.7 U	10 U	10 U	9.5 U	**50 J [55 J]**	**14 [15 J]**	9.9 U
Diethylphthalate	50	µg/L	10 U	10 U	4.9 U	10 U	10 U	4.8 U	210 U [210 U]	10 U [98 U]	5.0 U
Dimethylphthalate	50	µg/L	10 U	10 U	4.9 U	10 U	10 U	4.8 U	210 U [210 U]	10 U [98 U]	5.0 U
Di-n-butylphthalate	50	µg/L	10 U	10 U	4.9 U	10 U	10 U	4.8 U	210 U [210 U]	10 U [98 U]	5.0 U
Di-n-octylphthalate	50	µg/L	10 U	10 U	4.9 U	10 U	10 U	4.8 U	210 U [210 U]	10 U [98 U]	5.0 U

Table 1
Historical Groundwater Analytical Results

NYSEG - Wadsworth Street Former MGP Site - Geneva, New York

Location ID:	New York State Class GA Water Quality Standards and Guidance Values		**MW-1**			**MW-2**			**MW-3**		
Date Collected:		**Units**	**12/20/05**	**10/05/06**	**03/21/11**	**12/20/05**	**10/05/06**	**03/22/11**	**12/20/05**	**10/05/06**	**03/22/11**
SVOCs (continued)											
Fluoranthene	50	µg/L	10 U	10 U	4.9 U	10 U	10 U	4.8 U	210 U [210 U]	**1.0 J [98 U]**	5.0 U
Fluorene	50	µg/L	10 U	10 U	4.9 U	10 U	10 U	4.8 U	**48 J [55 J]**	**15 [15 J]**	5.0 U
Hexachlorobenzene	0.04	µg/L	1.0 U	10 U	4.9 U	1.0 U	10 U	4.8 U	21 U [21 U]	10 U [98 U]	5.0 U
Hexachlorobutadiene	0.5	µg/L	2.1 U	10 U	4.9 U	2.1 U	10 U	4.8 U	42 U [41 U]	10 U [98 U]	5.0 U
Hexachlorocyclopentadiene	5	µg/L	10 UJ	43 U	4.9 U	10 UJ	44 U	4.8 U	210 UJ [210 UJ]	43 U [440 U]	5.0 U
Hexachloroethane	5	µg/L	1.0 U	10 U	4.9 U	1.0 U	10 U	4.8 U	21 U [21 U]	10 U [98 U]	5.0 U
Indeno(1,2,3-cd)pyrene	0.002	µg/L	1.0 U	10 U	4.9 U	1.0 U	10 U	4.8 U	21 U [21 U]	10 U [98 U]	5.0 U
Isophorone	50	µg/L	10 U	10 U	4.9 U	10 U	10 U	4.8 U	210 U [210 U]	10 U [98 U]	5.0 U
Naphthalene	10	µg/L	10 U	10 U	4.9 U	10 U	10 U	4.8 U	**3,600 [4,000]**	**1,200 DJ [580 J]**	**7.7**
Nitrobenzene	0.4	µg/L	1.0 U	10 U	4.9 U	1.0 U	10 U	4.8 U	21 U [21 U]	10 U [98 U]	5.0 U
N-Nitroso-di-n-propylamine	- -	µg/L	1.0 U	10 U	4.9 U	1.0 U	10 U	4.8 U	21 U [21 U]	10 U [98 U]	5.0 U
N-Nitrosodiphenylamine	50	µg/L	10 U	10 U	4.9 U	10 U	10 U	4.8 U	210 U [210 U]	10 U [98 U]	5.0 U
Pentachlorophenol	1	µg/L	NA	48 U	9.7 U	NA	49 U	9.5 U	NA	48 U [490 U]	9.9 U
Phenanthrene	50	µg/L	10 U	10 U	4.9 U	10 U	10 U	4.8 U	**28 J [30 J]**	**9.0 J [8.0 J]**	5.0 U
Phenol	1	µg/L	NA	10 U	4.9 U	NA	10 U	4.8 U	NA	**38 [59 J]**	5.0 U
Pyrene	50	µg/L	10 U	10 U	4.9 U	10 U	10 U	4.8 U	210 U [210 U]	**1.0 J [98 U]**	5.0 U
Inorganics											
Cyanide, Total	200	µg/L	**140**	**112 J**	**66 ***	**340**	**197 J**	**290**	**600 [580]**	**259 J [210 J]**	**330**

Table 1
Historical Groundwater Analytical Results

NYSEG - Wadsworth Street Former MGP Site - Geneva, New York

Location ID:	New York State Class GA Water Quality Standards and Guidance Values		MW-4			MW-5			MW-6			MW-7	
Date Collected:		**Units**	**12/20/05**	**10/04/06**	**03/22/11**	**12/20/05**	**10/05/06**	**03/22/11**	**12/20/05**	**10/04/06**	**03/23/11**	**10/04/06**	**03/22/11**
VOCs													
1,1,1-Trichloroethane	5	µg/L	5.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	5.0 U	1.0 U	5.0 U	1.0 U	1.0 U
1,1,2,2-Tetrachloroethane	5	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U
1,1,2-Trichloro-1,2,2-trifluoroethane	- -	µg/L	NA	NA	1.0 U	NA	NA	1.0 U	NA	NA	5.0 U	NA	1.0 U
1,1,2-Trichloroethane	1	µg/L	3.0 U	1.0 U	1.0 U	3.0 U	1.0 U	1.0 U	3.0 U	1.0 U	5.0 U	1.0 U	1.0 U
1,1-Dichloroethane	5	µg/L	5.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	5.0 U	1.0 U	5.0 U	1.0 U	1.0 U
1,1-Dichloroethene	5	µg/L	2.0 U	1.0 U	1.0 U	2.0 U	1.0 U	1.0 U	2.0 U	1.0 U	5.0 U	1.0 U	1.0 U
1,2,4-Trichlorobenzene	5	µg/L	NA	1.0 U	1.0 U	NA	1.0 U	1.0 U	NA	1.0 U	5.0 U	1.0 U	1.0 U
1,2-Dibromo-3-chloropropane	0.04	µg/L	NA	1.0 UJ	1.0 U	NA	1.0 UJ	1.0 U	NA	1.0 UJ	5.0 U	1.0 UJ	1.0 U
1,2-Dibromoethane	5	µg/L	NA	1.0 U	1.0 U	NA	1.0 U	1.0 U	NA	1.0 U	5.0 U	1.0 U	1.0 U
1,2-Dichlorobenzene	3	µg/L	NA	1.0 U	1.0 U	NA	1.0 U	1.0 U	NA	1.0 U	5.0 U	1.0 U	1.0 U
1,2-Dichloroethane	0.6	µg/L	2.0 U	1.0 U	1.0 U	2.0 U	1.0 U	1.0 U	2.0 U	1.0 U	5.0 U	1.0 U	1.0 U
1,2-Dichloropropane	1	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U
1,3-Dichlorobenzene	3	µg/L	NA	1.0 U	1.0 U	NA	1.0 U	1.0 U	NA	1.0 U	5.0 U	1.0 U	1.0 U
1,4-Dichlorobenzene	3	µg/L	NA	1.0 U	1.0 U	NA	1.0 U	1.0 U	NA	1.0 U	5.0 U	1.0 U	1.0 U
2-Butanone	50	µg/L	5.0 U	5.0 U	10 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	50 U	5.0 U	10 U
2-Hexanone	50	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	25 U	5.0 U	5.0 U
4-Methyl-2-Pentanone	- -	µg/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	25 U	5.0 U	5.0 U
Acetone	50	µg/L	5.0 UJ	5.0 U	10 U	5.0 UJ	5.0 U	10 U	**68 J**	5.0 U	50 U	5.0 U	10 U
Benzene	1	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U
Bromodichloromethane	50	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U
Bromoform	50	µg/L	4.0 U	1.0 UJ	1.0 U	4.0 U	1.0 UJ	1.0 U	4.0 U	1.0 UJ	5.0 U	1.0 UJ	1.0 U
Bromomethane	5	µg/L	5.0 U	1.0 UJ	1.0 U	5.0 U	1.0 UJ	1.0 U	5.0 U	1.0 UJ	5.0 U	1.0 UJ	1.0 U
Carbon Disulfide	60	µg/L	5.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	5.0 U	1.0 U	5.0 U	1.0 U	1.0 U
Carbon Tetrachloride	5	µg/L	2.0 U	1.0 U	1.0 U	2.0 U	1.0 U	1.0 U	2.0 U	1.0 U	5.0 U	1.0 U	1.0 U
Chlorobenzene	5	µg/L	5.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	5.0 U	1.0 U	5.0 U	1.0 U	1.0 U
Chloroethane	5	µg/L	5.0 U	1.0 UJ	1.0 U	5.0 U	1.0 UJ	1.0 U	5.0 U	1.0 UJ	5.0 U	1.0 UJ	1.0 U
Chloroform	7	µg/L	5.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	5.0 U	1.0 U	5.0 U	1.0 U	1.0 U
Chloromethane	5	µg/L	5.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	5.0 U	1.0 U	5.0 U	1.0 U	1.0 U
cis-1,2-Dichloroethene	5	µg/L	5.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	5.0 U	1.0 U	5.0 U	1.0 U	1.0 U
cis-1,3-Dichloropropene	0.4	µg/L	5.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	5.0 U	1.0 U	5.0 U	1.0 U	1.0 U
Cyclohexane	- -	µg/L	NA	1.0 U	1.0 U	NA	1.0 U	1.0 U	NA	1.0 U	5.0 U	1.0 U	1.0 U
Dibromochloromethane	50	µg/L	5.0 U	1.0 UJ	1.0 U	5.0 U	1.0 UJ	1.0 U	5.0 U	1.0 UJ	5.0 U	1.0 UJ	1.0 U
Dichlorodifluoromethane	- -	µg/L	NA	1.0 U	1.0 U	NA	1.0 U	1.0 U	NA	1.0 U	5.0 U	1.0 U	1.0 U
Ethylbenzene	5	µg/L	4.0 U	1.0 U	1.0 U	4.0 U	1.0 U	1.0 U	4.0 U	1.0 U	5.0 U	1.0 U	1.0 U
Isopropylbenzene	- -	µg/L	NA	1.0 U	1.0 U	NA	1.0 U	1.0 U	NA	1.0 U	5.0 U	1.0 U	1.0 U
Methyl acetate	- -	µg/L	NA	1.0 UJ	1.0 U	NA	1.0 UJ	1.0 U	NA	1.0 UJ	5.0 U	1.0 UJ	1.0 U
Methyl tert-butyl ether	10	µg/L	5.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	5.0 U	1.0 U	5.0 U	1.0 U	1.0 U
Methylcyclohexane	- -	µg/L	NA	1.0 U	1.0 U	NA	1.0 U	1.0 U	NA	1.0 U	5.0 U	1.0 U	1.0 U
Methylene Chloride	5	µg/L	3.0 U	1.0 UJ	1.0 U	3.0 U	1.0 UJ	1.0 U	3.0 U	1.0 UJ	5.0 U	1.0 UJ	1.0 U
Styrene	5	µg/L	5.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	5.0 U	1.0 U	5.0 U	1.0 U	1.0 U
Tetrachloroethene	5	µg/L	1.0 UJ	1.0 U	1.0 U	1.0 UJ	1.0 U	1.0 U	1.0 UJ	1.0 U	5.0 U	1.0 U	1.0 U
Toluene	5	µg/L	5.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	5.0 U	1.0 U	5.0 U	1.0 U	1.0 U
trans-1,2-Dichloroethene	5	µg/L	5.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	5.0 U	1.0 U	5.0 U	1.0 U	1.0 U
trans-1,3-Dichloropropene	0.4	µg/L	5.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	5.0 U	1.0 U	5.0 U	1.0 U	1.0 U
Trichloroethene	5	µg/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U
Trichlorofluoromethane	- -	µg/L	NA	1.0 U	1.0 U	NA	1.0 U	1.0 U	NA	1.0 U	5.0 U	1.0 U	1.0 U
Vinyl Chloride	2	µg/L	5.0 U	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	5.0 U	1.0 U	5.0 U	1.0 U	1.0 U
Xylene (Total)	5	µg/L	5.0 U	3.0 U	2.0 U	5.0 U	3.0 U	2.0 U	5.0 U	3.0 U	10 U	3.0 U	2.0 U

Table 1
Historical Groundwater Analytical Results

NYSEG - Wadsworth Street Former MGP Site - Geneva, New York

Location ID:	New York State Class GA Water Quality Standards and Guidance Values		MW-4			MW-5			MW-6			MW-7	
Date Collected:		Units	12/20/05	10/04/06	03/22/11	12/20/05	10/05/06	03/22/11	12/20/05	10/04/06	03/23/11	10/04/06	03/22/11
SVOCs													
2,4,5-Trichlorophenol	1	µg/L	NA	10 U	4.9 U	NA	10 U	4.9 U	NA	10 U	4.9 U	10 U	4.9 U
2,4,6-Trichlorophenol	1	µg/L	NA	10 U	4.9 U	NA	10 U	4.9 U	NA	10 U	4.9 U	10 U	4.9 U
2,4-Dichlorophenol	1	µg/L	NA	10 U	4.9 U	NA	10 U	4.9 U	NA	10 U	4.9 U	10 U	4.9 U
2,4-Dimethylphenol	1	µg/L	NA	10 U	4.9 U	NA	10 U	4.9 U	NA	10 U	4.9 U	10 U	4.9 U
2,4-Dinitrophenol	1	µg/L	NA	49 U	9.7 U	NA	48 U	9.8 U	NA	49 U	9.9 U	50 U	9.8 U
2,4-Dinitrotoluene	5	µg/L	2.1 U	10 U	4.9 U	2.1 U	10 U	4.9 U	2.0 U	10 U	4.9 U	10 U	4.9 U
2,6-Dinitrotoluene	5	µg/L	2.1 U	10 U	4.9 U	2.1 U	10 U	4.9 U	2.0 U	10 U	4.9 U	10 U	4.9 U
2-Chloronaphthalene	10	µg/L	10 U	10 U	4.9 U	10 U	10 U	4.9 U	10 U	10 U	4.9 U	10 U	4.9 U
2-Chlorophenol	1	µg/L	NA	10 U	4.9 U	NA	10 U	4.9 U	NA	10 U	4.9 U	10 U	4.9 U
2-Methylnaphthalene	- -	µg/L	10 U	10 U	4.9 U	10 U	10 U	4.9 U	10 U	10 U	4.9 U	10 U	4.9 U
2-Methylphenol	1	µg/L	NA	10 U	4.9 U	NA	10 U	4.9 U	NA	10 U	4.9 U	10 U	4.9 U
2-Nitroaniline	5	µg/L	21 U	49 U	9.7 U	21 U	48 U	9.8 U	20 U	49 U	9.9 U	50 U	9.8 U
2-Nitrophenol	1	µg/L	NA	10 U	4.9 U	NA	10 U	4.9 U	NA	10 U	4.9 U	10 U	4.9 U
3,3'-Dichlorobenzidine	5	µg/L	21 U	20 U	4.9 U	21 U	19 U	4.9 U	20 U	20 U	4.9 U	20 U	4.9 U
3-Nitroaniline	5	µg/L	21 U	49 U	9.7 U	21 U	48 U	9.8 U	20 U	49 U	9.9 U	50 U	9.8 U
4,6-Dinitro-2-methylphenol	1	µg/L	NA	NA	9.7 U	NA	NA	9.8 U	NA	NA	9.9 U	NA	9.8 U
4-Bromophenyl-phenylether	- -	µg/L	10 U	10 U	4.9 U	10 U	10 U	4.9 U	10 U	10 U	4.9 U	10 U	4.9 U
4-Chloro-3-methylphenol	1	µg/L	NA	10 U	4.9 U	NA	10 U	4.9 U	NA	10 U	4.9 U	10 U	4.9 U
4-Chloroaniline	5	µg/L	10 U	10 U	4.9 U	10 U	10 U	4.9 U	10 U	10 U	4.9 U	10 U	4.9 U
4-Chlorophenyl-phenylether	- -	µg/L	10 U	10 U	4.9 U	10 U	10 U	4.9 U	10 U	10 U	4.9 U	10 U	4.9 U
4-Methylphenol	1	µg/L	NA	10 U	9.7 U	NA	10 U	9.8 U	NA	10 U	9.9 U	10 U	9.8 U
4-Nitroaniline	5	µg/L	21 U	49 U	9.7 U	21 U	48 U	9.8 U	20 U	49 U	9.9 U	50 U	9.8 U
4-Nitrophenol	1	µg/L	NA	49 U	9.7 U	NA	48 U	9.8 U	NA	49 U	9.9 U	50 U	9.8 U
Acenaphthene	20	µg/L	10 U	10 U	4.9 U	10 U	10 U	4.9 U	10 U	10 U	4.9 U	10 U	4.9 U
Acenaphthylene	- -	µg/L	10 U	10 U	4.9 U	10 U	10 U	4.9 U	10 U	10 U	4.9 U	10 U	4.9 U
Acetophenone	- -	µg/L	NA	NA	4.9 U	NA	NA	4.9 U	NA	NA	4.9 U	NA	4.9 U
Anthracene	50	µg/L	10 U	10 U	4.9 U	10 U	10 U	4.9 U	10 U	10 U	4.9 U	10 U	4.9 U
Atrazine	- -	µg/L	NA	NA	4.9 U	NA	NA	4.9 U	NA	NA	4.9 U	NA	4.9 U
Benzaldehyde	- -	µg/L	NA	NA	4.9 U	NA	NA	4.9 U	NA	NA	4.9 U	NA	4.9 U
Benzo(a)anthracene	0.002	µg/L	1.0 U	10 U	4.9 U	1.0 U	10 U	4.9 U	1.0 U	10 U	4.9 U	10 U	4.9 U
Benzo(a)pyrene	0	µg/L	1.0 U	10 U	4.9 U	1.0 U	10 U	4.9 U	1.0 U	10 U	4.9 U	10 U	4.9 U
Benzo(b)fluoranthene	0.002	µg/L	1.0 UJ	10 U	4.9 U	1.0 UJ	10 U	4.9 U	1.0 UJ	10 U	4.9 U	10 U	4.9 U
Benzo(g,h,i)perylene	- -	µg/L	10 U	10 U	4.9 U	10 U	10 U	4.9 U	10 U	10 U	4.9 U	10 U	4.9 U
Benzo(k)fluoranthene	0.002	µg/L	1.0 UJ	10 U	4.9 U	1.0 UJ	10 U	4.9 U	1.0 UJ	10 U	4.9 U	10 U	4.9 U
Biphenyl	- -	µg/L	NA	NA	4.9 U	NA	NA	4.9 U	NA	NA	4.9 U	NA	4.9 U
bis(2-Chloroethoxy)methane	5	µg/L	10 U	10 U	4.9 U	10 U	10 U	4.9 U	10 U	10 U	4.9 U	10 U	4.9 U
bis(2-Chloroethyl)ether	1	µg/L	1.0 UJ	10 U	4.9 U	1.0 UJ	10 U	4.9 U	1.0 UJ	10 U	4.9 U	10 U	4.9 U
bis(2-chloroisopropyl)ether	5	µg/L	10 U	10 U	4.9 U	10 U	10 U	4.9 U	10 U	10 U	4.9 U	10 U	4.9 U
bis(2-Ethylhexyl)phthalate	5	µg/L	**3.3 J**	10 U	4.9 U	10 U	10 U	4.9 U	10 U	10 U	4.9 U	10 U	4.9 U
Butylbenzylphthalate	50	µg/L	10 U	10 U	4.9 U	10 U	10 U	4.9 U	10 U	10 U	4.9 U	10 U	4.9 U
Caprolactam	- -	µg/L	NA	NA	4.9 U	NA	NA	4.9 U	NA	NA	4.9 U	NA	4.9 U
Carbazole	- -	µg/L	10 U	10 U	4.9 U	10 U	10 U	4.9 U	10 U	10 U	4.9 U	10 U	4.9 U
Chrysene	0.002	µg/L	10 U	10 U	4.9 U	10 U	10 U	4.9 U	10 U	10 U	4.9 U	10 U	4.9 U
Dibenz(a,h)anthracene	- -	µg/L	1.0 U	10 U	4.9 U	1.0 U	10 U	4.9 U	1.0 U	10 U	4.9 U	10 U	4.9 U
Dibenzofuran	- -	µg/L	10 U	10 U	9.7 U	10 U	10 U	9.8 U	10 U	10 U	9.9 U	10 U	9.8 U
Diethylphthalate	50	µg/L	10 U	10 U	4.9 U	10 U	10 U	4.9 U	10 U	10 U	4.9 U	10 U	4.9 U
Dimethylphthalate	50	µg/L	10 U	10 U	4.9 U	10 U	10 U	4.9 U	10 U	10 U	4.9 U	10 U	4.9 U
Di-n-butylphthalate	50	µg/L	10 U	10 U	4.9 U	10 U	10 U	4.9 U	10 U	10 U	4.9 U	10 U	4.9 U
Di-n-octylphthalate	50	µg/L	10 U	10 U	4.9 U	10 U	10 U	4.9 U	10 U	10 U	4.9 U	10 U	4.9 U

Table 1
Historical Groundwater Analytical Results

NYSEG - Wadsworth Street Former MGP Site - Geneva, New York

Location ID:	**New York State Class GA Water Quality Standards and Guidance Values**		**MW-4**			**MW-5**			**MW-6**			**MW-7**	
Date Collected:		**Units**	**12/20/05**	**10/04/06**	**03/22/11**	**12/20/05**	**10/05/06**	**03/22/11**	**12/20/05**	**10/04/06**	**03/23/11**	**10/04/06**	**03/22/11**
SVOCs (continued)													
Fluoranthene	50	µg/L	10 U	10 U	4.9 U	10 U	10 U	4.9 U	10 U	10 U	4.9 U	10 U	4.9 U
Fluorene	50	µg/L	10 U	10 U	4.9 U	10 U	10 U	4.9 U	10 U	10 U	4.9 U	10 U	4.9 U
Hexachlorobenzene	0.04	µg/L	1.0 U	10 U	4.9 U	1.0 U	10 U	4.9 U	1.0 U	10 U	4.9 U	10 U	4.9 U
Hexachlorobutadiene	0.5	µg/L	2.1 U	10 U	4.9 U	2.1 U	10 U	4.9 U	2.0 U	10 U	4.9 U	10 U	4.9 U
Hexachlorocyclopentadiene	5	µg/L	10 UJ	44 U	4.9 U	10 UJ	43 U	4.9 U	10 UJ	44 U	4.9 U	44 U	4.9 U
Hexachloroethane	5	µg/L	1.0 U	10 U	4.9 U	1.0 U	10 U	4.9 U	1.0 U	10 U	4.9 U	10 U	4.9 U
Indeno(1,2,3-cd)pyrene	0.002	µg/L	1.0 U	10 U	4.9 U	1.0 U	10 U	4.9 U	1.0 U	10 U	4.9 U	10 U	4.9 U
Isophorone	50	µg/L	10 U	10 U	4.9 U	10 U	10 U	4.9 U	10 U	10 U	4.9 U	10 U	4.9 U
Naphthalene	10	µg/L	10 U	10 U	4.9 U	10 U	10 U	4.9 U	**1.3 J**	10 U	4.9 U	10 U	4.9 U
Nitrobenzene	0.4	µg/L	1.0 U	10 U	4.9 U	1.0 U	10 U	4.9 U	1.0 U	10 U	4.9 U	10 U	4.9 U
N-Nitroso-di-n-propylamine	- -	µg/L	1.0 U	10 U	4.9 U	1.0 U	10 U	4.9 U	1.0 U	10 U	4.9 U	10 U	4.9 U
N-Nitrosodiphenylamine	50	µg/L	10 U	10 U	4.9 U	10 U	10 U	4.9 U	10 U	10 U	4.9 U	10 U	4.9 U
Pentachlorophenol	1	µg/L	NA	49 U	9.7 U	NA	48 U	9.8 U	NA	49 U	9.9 U	50 U	9.8 U
Phenanthrene	50	µg/L	10 U	10 U	4.9 U	10 U	10 U	4.9 U	10 U	10 U	4.9 U	10 U	4.9 U
Phenol	1	µg/L	NA	10 U	4.9 U	NA	10 U	4.9 U	NA	10 U	4.9 U	10 U	4.9 U
Pyrene	50	µg/L	10 U	10 U	4.9 U	10 U	10 U	4.9 U	10 U	10 U	4.9 U	10 U	4.9 U
Inorganics													
Cyanide, Total	200	µg/L	10.0 U	**48.6 J**	10.0 U	10.0 U	10.0 UJ	10.0 U	10.0 U	10.0 UJ	10.0 U	114 J	**31.0**

Table 1
Historical Groundwater Analytical Results

NYSEG - Wadsworth Street Former MGP Site - Geneva, New York

Location ID:	**New York State Class GA Water Quality Standards and Guidance Values**		**MW-8**		**MW-9**		**MW-10**
Date Collected:		**Units**	**10/05/06**	**03/22/11**	**10/04/06**	**03/23/11**	**03/21/11**
VOCs							
1,1,1-Trichloroethane	5	µg/L	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
1,1,2,2-Tetrachloroethane	5	µg/L	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
1,1,2-Trichloro-1,2,2-trifluoroethane	- -	µg/L	NA	1.0 U	NA	1.0 U [1.0 U]	1.0 U
1,1,2-Trichloroethane	1	µg/L	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
1,1-Dichloroethane	5	µg/L	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
1,1-Dichloroethene	5	µg/L	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
1,2,4-Trichlorobenzene	5	µg/L	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
1,2-Dibromo-3-chloropropane	0.04	µg/L	1.0 UJ	1.0 U	1.0 UJ	1.0 U [1.0 U]	1.0 U
1,2-Dibromoethane	5	µg/L	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
1,2-Dichlorobenzene	3	µg/L	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
1,2-Dichloroethane	0.6	µg/L	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
1,2-Dichloropropane	1	µg/L	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
1,3-Dichlorobenzene	3	µg/L	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
1,4-Dichlorobenzene	3	µg/L	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
2-Butanone	50	µg/L	5.0 U	10 U	**22**	10 U [10 U]	10 U
2-Hexanone	50	µg/L	5.0 U	5.0 U	5.0 U	5.0 U [5.0 U]	5.0 U
4-Methyl-2-Pentanone	- -	µg/L	5.0 U	5.0 U	5.0 U	5.0 U [5.0 U]	5.0 U
Acetone	50	µg/L	5.0 U	10 U	**3.4 J**	10 U [10 U]	**3.3 J**
Benzene	1	µg/L	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	**14**
Bromodichloromethane	50	µg/L	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
Bromoform	50	µg/L	1.0 UJ	1.0 U	1.0 UJ	1.0 U [1.0 U]	1.0 U
Bromomethane	5	µg/L	1.0 UJ	1.0 U	1.0 UJ	1.0 U [1.0 U]	1.0 U
Carbon Disulfide	60	µg/L	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
Carbon Tetrachloride	5	µg/L	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
Chlorobenzene	5	µg/L	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
Chloroethane	5	µg/L	1.0 UJ	1.0 U	1.0 UJ	1.0 U [1.0 U]	1.0 U
Chloroform	7	µg/L	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
Chloromethane	5	µg/L	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
cis-1,2-Dichloroethene	5	µg/L	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
cis-1,3-Dichloropropene	0.4	µg/L	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
Cyclohexane	- -	µg/L	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
Dibromochloromethane	50	µg/L	1.0 UJ	1.0 U	1.0 UJ	1.0 U [1.0 U]	1.0 U
Dichlorodifluoromethane	- -	µg/L	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
Ethylbenzene	5	µg/L	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
Isopropylbenzene	- -	µg/L	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
Methyl acetate	- -	µg/L	1.0 UJ	1.0 U	1.0 UJ	1.0 U [1.0 U]	1.0 U
Methyl tert-butyl ether	10	µg/L	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
Methylcyclohexane	- -	µg/L	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
Methylene Chloride	5	µg/L	1.0 UJ	1.0 U	1.0 UJ	1.0 U [1.0 U]	1.0 U
Styrene	5	µg/L	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
Tetrachloroethene	5	µg/L	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
Toluene	5	µg/L	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	**0.81 J**
trans-1,2-Dichloroethene	5	µg/L	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
trans-1,3-Dichloropropene	0.4	µg/L	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
Trichloroethene	5	µg/L	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
Trichlorofluoromethane	- -	µg/L	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
Vinyl Chloride	2	µg/L	1.0 U	1.0 U	1.0 U	1.0 U [1.0 U]	1.0 U
Xylene (Total)	5	µg/L	3.0 U	2.0 U	3.0 U	2.0 U [2.0 U]	2.0 U

Table 1
Historical Groundwater Analytical Results

NYSEG - Wadsworth Street Former MGP Site - Geneva, New York

Location ID:	New York State Class GA Water Quality Standards and Guidance Values		MW-8		MW-9		MW-10
Date Collected:		**Units**	**10/05/06**	**03/22/11**	**10/04/06**	**03/23/11**	**03/21/11**
SVOCs							
2,4,5-Trichlorophenol	1	µg/L	10 U	5.4 U	10 U	4.7 U [4.8 U]	4.8 U
2,4,6-Trichlorophenol	1	µg/L	10 U	5.4 U	10 U	4.7 U [4.8 U]	4.8 U
2,4-Dichlorophenol	1	µg/L	10 U	5.4 U	10 U	4.7 U [4.8 U]	4.8 U
2,4-Dimethylphenol	1	µg/L	10 U	5.4 U	10 U	4.7 U [4.8 U]	4.8 U
2,4-Dinitrophenol	1	µg/L	49 U	11 U	51 U	9.4 U [9.5 U]	9.5 U
2,4-Dinitrotoluene	5	µg/L	10 U	5.4 U	10 U	4.7 U [4.8 U]	4.8 U
2,6-Dinitrotoluene	5	µg/L	10 U	5.4 U	10 U	4.7 U [4.8 U]	4.8 U
2-Chloronaphthalene	10	µg/L	10 U	5.4 U	10 U	4.7 U [4.8 U]	4.8 U
2-Chlorophenol	1	µg/L	10 U	5.4 U	10 U	4.7 U [4.8 U]	4.8 U
2-Methylnaphthalene	- -	µg/L	10 U	5.4 U	10 U	4.7 U [4.8 U]	4.8 U
2-Methylphenol	1	µg/L	10 U	5.4 U	10 U	4.7 U [4.8 U]	4.8 U
2-Nitroaniline	5	µg/L	49 U	11 U	51 U	9.4 U [9.5 U]	9.5 U
2-Nitrophenol	1	µg/L	10 U	5.4 U	10 U	4.7 U [4.8 U]	4.8 U
3,3'-Dichlorobenzidine	5	µg/L	20 U	5.4 U	20 U	4.7 U [4.8 U]	4.8 U
3-Nitroaniline	5	µg/L	49 U	11 U	51 U	9.4 U [9.5 U]	9.5 U
4,6-Dinitro-2-methylphenol	1	µg/L	NA	11 U	NA	9.4 U [9.5 U]	9.5 U
4-Bromophenyl-phenylether	- -	µg/L	10 U	5.4 U	10 U	4.7 U [4.8 U]	4.8 U
4-Chloro-3-methylphenol	1	µg/L	10 U	5.4 U	10 U	4.7 U [4.8 U]	4.8 U
4-Chloroaniline	5	µg/L	10 U	5.4 U	10 U	4.7 U [4.8 U]	4.8 U
4-Chlorophenyl-phenylether	- -	µg/L	10 U	5.4 U	10 U	4.7 U [4.8 U]	4.8 U
4-Methylphenol	1	µg/L	10 U	11 U	10 U	9.4 U [9.5 U]	**0.88 J**
4-Nitroaniline	5	µg/L	49 U	11 U	51 U	9.4 U [9.5 U]	9.5 U
4-Nitrophenol	1	µg/L	49 U	11 U	51 U	9.4 U [9.5 U]	9.5 U
Acenaphthene	20	µg/L	10 U	5.4 U	10 U	4.7 U [4.8 U]	4.8 U
Acenaphthylene	- -	µg/L	10 U	5.4 U	10 U	4.7 U [4.8 U]	4.8 U
Acetophenone	- -	µg/L	NA	5.4 U	NA	4.7 U [4.8 U]	4.8 U
Anthracene	50	µg/L	10 U	5.4 U	10 U	4.7 U [4.8 U]	4.8 U
Atrazine	- -	µg/L	NA	5.4 U	NA	4.7 U [4.8 U]	4.8 U
Benzaldehyde	- -	µg/L	NA	5.4 U	NA	4.7 U [4.8 U]	4.8 U
Benzo(a)anthracene	0.002	µg/L	10 U	5.4 U	10 U	4.7 U [4.8 U]	4.8 U
Benzo(a)pyrene	0	µg/L	10 U	5.4 U	10 U	4.7 U [4.8 U]	4.8 U
Benzo(b)fluoranthene	0.002	µg/L	10 U	5.4 U	10 U	4.7 U [4.8 U]	4.8 U
Benzo(g,h,i)perylene	- -	µg/L	10 U	5.4 U	10 U	4.7 U [4.8 U]	4.8 U
Benzo(k)fluoranthene	0.002	µg/L	10 U	5.4 U	10 U	4.7 U [4.8 U]	4.8 U
Biphenyl	- -	µg/L	NA	5.4 U	NA	4.7 U [4.8 U]	4.8 U
bis(2-Chloroethoxy)methane	5	µg/L	10 U	5.4 U	10 U	4.7 U [4.8 U]	4.8 U
bis(2-Chloroethyl)ether	1	µg/L	10 U	5.4 U	10 U	4.7 U [4.8 U]	4.8 U
bis(2-chloroisopropyl)ether	5	µg/L	10 U	5.4 U	10 U	4.7 U [4.8 U]	4.8 U
bis(2-Ethylhexyl)phthalate	5	µg/L	10 U	5.4 U	10 U	4.7 U [4.8 U]	4.8 U
Butylbenzylphthalate	50	µg/L	10 U	5.4 U	10 U	4.7 U [4.8 U]	4.8 U
Caprolactam	- -	µg/L	NA	5.4 U	NA	4.7 U [4.8 U]	4.8 U
Carbazole	- -	µg/L	10 U	5.4 U	10 U	4.7 U [4.8 U]	4.8 U
Chrysene	0.002	µg/L	10 U	5.4 U	10 U	4.7 U [4.8 U]	4.8 U
Dibenz(a,h)anthracene	- -	µg/L	10 U	5.4 U	10 U	4.7 U [4.8 U]	4.8 U
Dibenzofuran	- -	µg/L	10 U	11 U	10 U	9.4 U [9.5 U]	9.5 U
Diethylphthalate	50	µg/L	10 U	5.4 U	10 U	4.7 U [4.8 U]	4.8 U
Dimethylphthalate	50	µg/L	10 U	5.4 U	10 U	4.7 U [4.8 U]	4.8 U
Di-n-butylphthalate	50	µg/L	10 U	5.4 U	**2.0 J**	4.7 U [4.8 U]	**0.44 JB**
Di-n-octylphthalate	50	µg/L	10 U	5.4 U	10 U	4.7 U [4.8 U]	4.8 U

Table 1
Historical Groundwater Analytical Results

NYSEG - Wadsworth Street Former MGP Site - Geneva, New York

Location ID:	New York State Class GA Water Quality Standards and Guidance Values		MW-8		MW-9		MW-10
Date Collected:		**Units**	**10/05/06**	**03/22/11**	**10/04/06**	**03/23/11**	**03/21/11**
SVOCs (continued)							
Fluoranthene	50	µg/L	10 U	5.4 U	10 U	4.7 U [4.8 U]	4.8 U
Fluorene	50	µg/L	10 U	5.4 U	10 U	4.7 U [4.8 U]	4.8 U
Hexachlorobenzene	0.04	µg/L	10 U	5.4 U	10 U	4.7 U [4.8 U]	4.8 U
Hexachlorobutadiene	0.5	µg/L	10 U	5.4 U	10 U	4.7 U [4.8 U]	4.8 U
Hexachlorocyclopentadiene	5	µg/L	44 U	5.4 U	46 U	4.7 U [4.8 U]	4.8 U
Hexachloroethane	5	µg/L	10 U	5.4 U	10 U	4.7 U [4.8 U]	4.8 U
Indeno(1,2,3-cd)pyrene	0.002	µg/L	10 U	5.4 U	10 U	4.7 U [4.8 U]	4.8 U
Isophorone	50	µg/L	10 U	5.4 U	10 U	4.7 U [4.8 U]	4.8 U
Naphthalene	10	µg/L	10 U	5.4 U	10 U	4.7 U [4.8 U]	4.8 U
Nitrobenzene	0.4	µg/L	10 U	5.4 U	10 U	4.7 U [4.8 U]	4.8 U
N-Nitroso-di-n-propylamine	- -	µg/L	10 U	5.4 U	10 U	4.7 U [4.8 U]	4.8 U
N-Nitrosodiphenylamine	50	µg/L	10 U	5.4 U	10 U	4.7 U [4.8 U]	4.8 U
Pentachlorophenol	1	µg/L	49 U	11 U	51 U	9.4 U [9.5 U]	9.5 U
Phenanthrene	50	µg/L	10 U	5.4 U	10 U	4.7 U [4.8 U]	4.8 U
Phenol	1	µg/L	10 U	5.4 U	10 U	4.7 U [4.8 U]	4.8 U
Pyrene	50	µg/L	10 U	5.4 U	10 U	4.7 U [4.8 U]	4.8 U
Inorganics							
Cyanide, Total	200	µg/L	**46.4 J**	**37.0**	10.0 UJ	10.0 U [10.0 U]	**160 ***

Table 1
Historical Groundwater Analytical Results

NYSEG - Wadsworth Street Former MGP Site - Geneva, New York

Notes:
1. Samples collected by ARCADIS on the dates indicated.
2. Samples analyzed by TestAmerica located in Buffalo, NY.
3. µg/L - micrograms per liter.
4. J - Indicates that the associated numerical value is an estimated concentration.
5. U - Indicates that the compound was analyzed for but not detected. The associated value is the compound quantitation limit.
6. * - Indicates that the Laboratory Control Spike or Laboratory Control Spike Duplicate exceeds the control limits.
7. B - Indicates that the analyte was also detected in the associated method blank.
8. B7 - Indicates that the target analyte was detected in method blank at or above method reporting limit. Concentration found in the sample at least 10 times greater than the concentration found in the blank.
9. D - Indicates that the compound was quantitated using a secondary dilution.
10. Field duplicate sample results are shown in brackets.
11. Bold indicates a detectable concentration.
12. Shaded indicates concentration exceeds New York State Class GA Ambient Water Quality Standards and Guidance Values.

Table 2
Groundwater Biogeochemical Data - March 2011

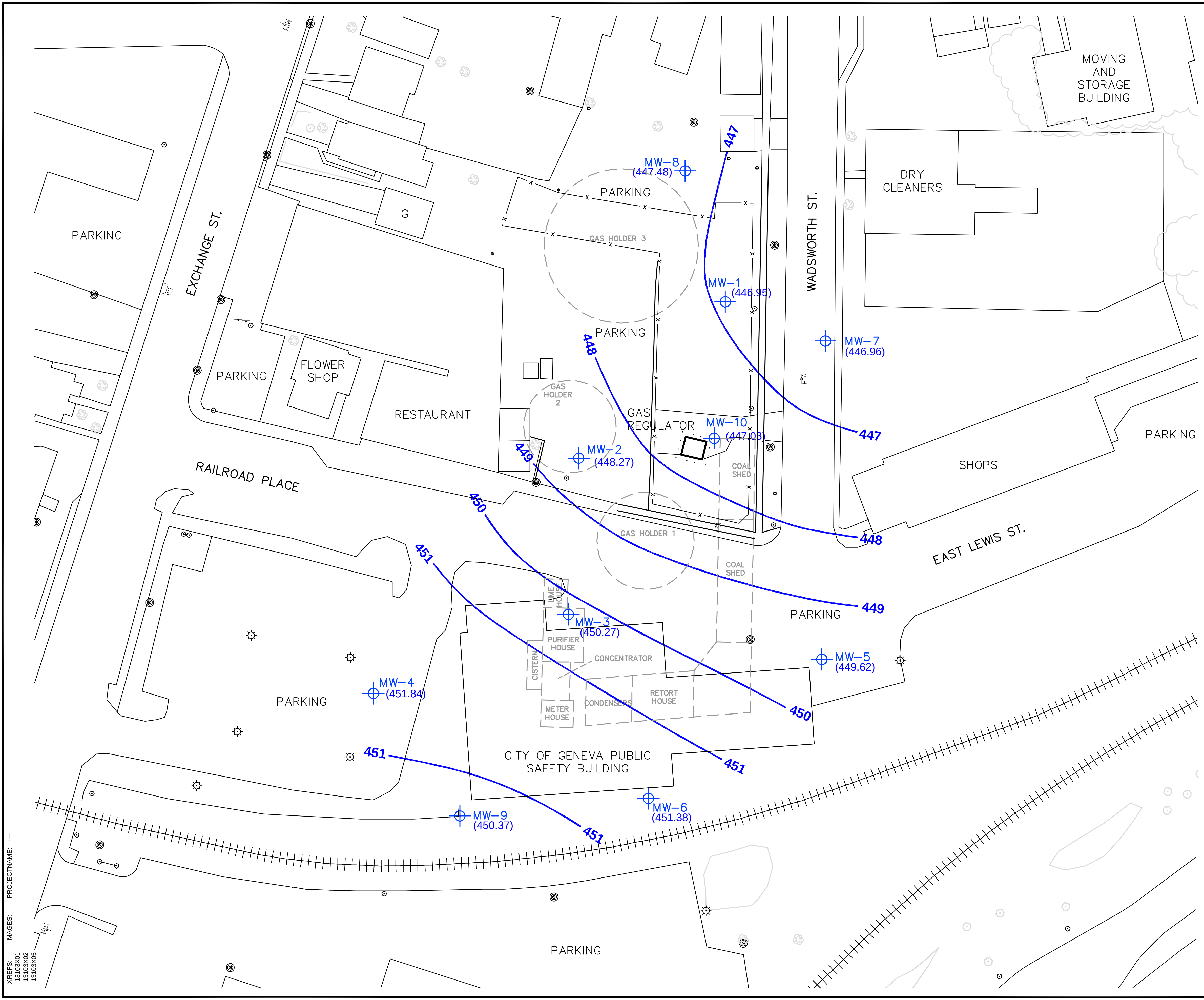
NYSEG - Wadsworth Street Former MGP Site - Geneva, New York

Location ID:		**MW-1**	**MW-2**	**MW-3**	**MW-4**	**MW-5**	**MW-6**	**MW-7**	**MW-8**	**MW-9**	**MW-10**
Date Collected:	**Units**	**03/21/11**	**03/22/11**	**03/22/11**	**03/22/11**	**03/22/11**	**03/23/11**	**03/22/11**	**03/22/11**	**03/23/11**	**03/21/11**
Total Organic Carbon	mg/L	1.6	2	1 U	6.5	1 U	7.5	1.9	1 U	2.4 [2.3]	3.4
Total Alkalinity	mg/L	389	351	216	452	458	415	413	496	333 [333]	278
pH	S.U.	7.44	7.39	7.71	7.06	7.08	6.92	7.44	7.13	7.30	6.86
Oxidation-Reduction Potential (field measured)	mV	46	284	254	-36	-60	197	236	159	16	-44
Dissolved Oxygen (field measured)	mg/L	0.0	0.00	1.04	0.00	3.17	0.10	0.00	0.00	0.00	0.00
Nitrate/Nitrite as N	mg/L	0.580	5.20	3.70	0.0500 U	0.0500 U	2.00	0.0500 U	0.0480 J	0.0500 U [0.0500 U]	0.0500 U
Total Manganese	mg/L	0.130 B7	1.60 B	0.0110 B	6.20 B	2.90 B	0.480	0.210 B	0.140 B	1.70 [1.80]	1.20 B7
Dissolved Manganese	mg/L	0.0740	0.770 B	0.0160 B	5.80 B	2.80 B	0.260	0.0470 B	0.120 B	1.80 [1.80]	1.20
Ferric Iron	mg/L	0.100 U	0.990	0.260	25.8	2.50	0.680	1.00	0.200	0.520 [0.400]	1.20
Dissolved Iron	mg/L	0.120	0.140	0.150	7.40	1.50	0.0500 U	0.0260 J	0.0370 J	0.130 [0.130]	1.50
Sulfate	mg/L	143 B	85.8 B	168 B	116 B	31.0	76.7 B	189 B	188 B	62.5 B [60.5]	1,180 B
Sulfide (S)	mg/L	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.0760 J [0.100 U]	0.100 U
Dissolved Gases											
Carbon Dioxide	mg/L	38	42	8.6	110	63	88	51	81	53	43
Methane	µg/L	0.68	0.46	0.11	150	19	1.9	3	0.11	7.3	16
Microbial Populations											
Toluene Dioxygenase (qTOD)	cells/mL	6,490,000	5,660,000	2,100,000	1,980,000	2,410,000	74,300	705,000	2,760,000	50,400	17,100,000
Naphthalene Dioxygenase (qNAH)	cells/mL	37,800	45,900	34,700	40,200	19,700	50,800	14,200	30,200	27,700	46,200

Notes:
1. Samples collected by ARCADIS on the dates indicated.
2. Samples analyzed by TestAmerica located in Buffalo, NY; Microseeps in Pittsburgh, PA; and Microbial Insights in Rockford, TN. Dissolved gases analyses completed by Microseeps. qNAH and qTOD analyses completed by Microbial Insights. All other analyses completed by TestAmerica.
3. µg/L - micrograms per liter.
4. mg/L - milligrams per liter.
5. mV - millivolts.
6. cells/mL - cells per milliliter.
7. J - Indicates that the associated numerical value is an estimated concentration.
8. U - Indicates that the compound was analyzed for but not detected. The associated value is the compound quantitation limit.
9. B - Indicates that the analyte was also detected in the associated method blank.
10. B7 - Indicates that the target analyte was detected in method blank at or above method reporting limit. Concentration found in the sample at least 10 times above the concentration found in the blank.
11. Field duplicate sample results are shown in brackets.

ARCADIS

Figures



LEGEND:

⌖ MONITORING WELL LOCATION
—x— FENCE
┼┼┼┼┼ RAILROAD
◉ POWER POLE
☼ LIGHT POLE
○ ○○ POST, SIGN
HYDRANT
– – – FORMER MGP STRUCTURE
MH MANHOLE
(449.62) GROUNDWATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL (FT, AMSL)
447 —— WATER TABLE ELEVATION CONTOUR (FT, AMSL)

NOTES:

1. BASE MAP BASED ON SURVEYS COMPLETED BY NYSEG ON DECEMBER 14, 2005, OCTOBER 2006, AND BY PAUL J. OLSZEWSKI, PLS, PLLC ON MARCH 14 AND 23, 2011. ELEVATIONS IN REFERENCE TO NGVD 1929, HORIZONTAL DATUM IS NAD 83 STATEPLANE, NEW YORK CENTRAL.
2. ALL LOCATIONS ARE APPROXIMATE.
3. PROPERTY BOUNDARIES WERE DIGITIZED FROM CITY OF GENEVA, ONTARIO COUNTY, NEW YORK TAX MAP [104.35], DATED MAY 1, 2008.

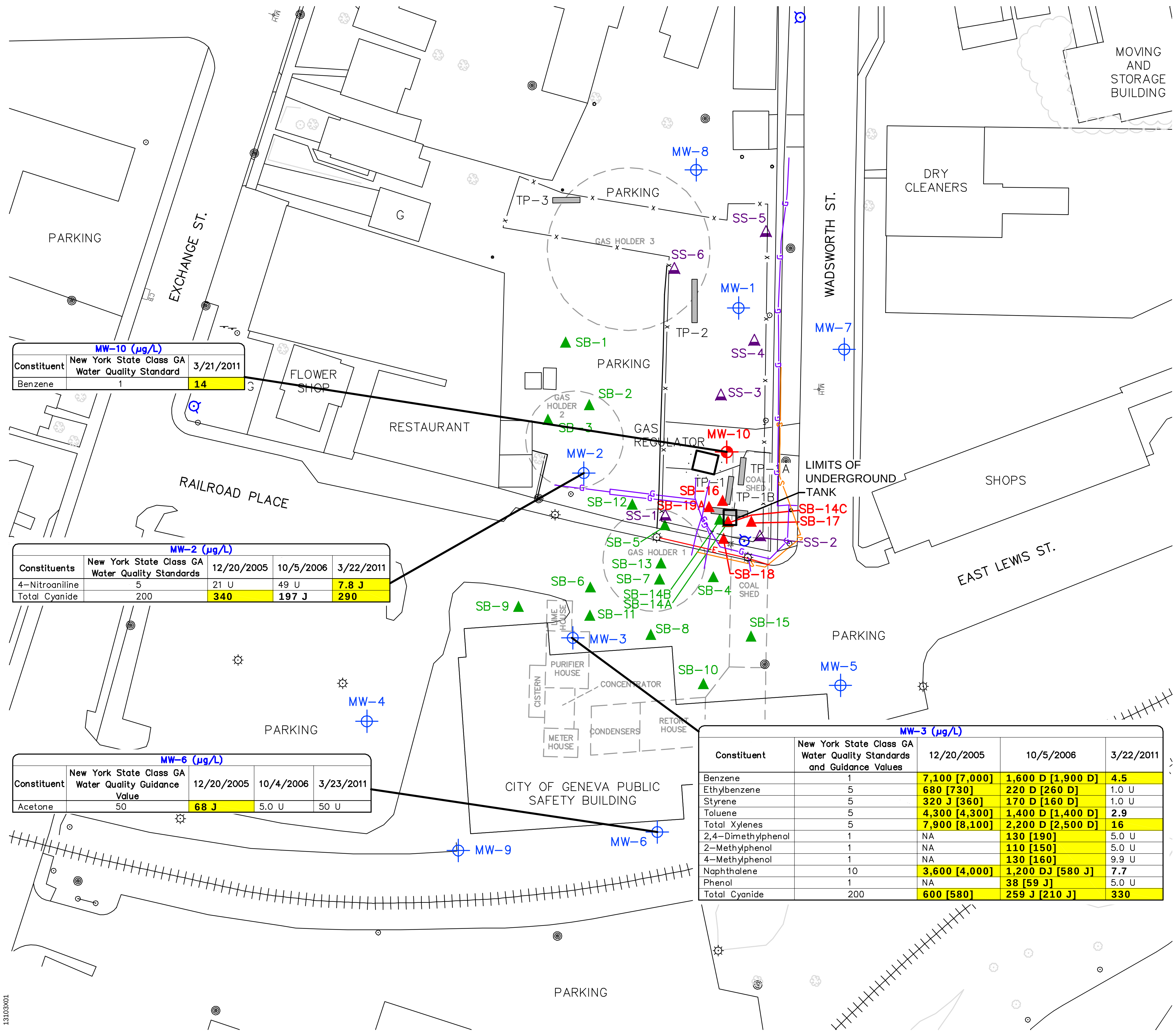
0 60' 120'
GRAPHIC SCALE

NYSEG
WADSWORTH STREET FORMER MGP SITE
GENEVA, NEW YORK
NATURAL ATTENUATION EVALUATION

WATER TABLE CONTOUR MAP - MARCH 21, 2011

ARCADIS

FIGURE
1



MW−10 (µg/L)

Constituent	New York State Class GA Water Quality Standard	3/21/2011
Benzene	1	**14**

MW−2 (µg/L)

Constituents	New York State Class GA Water Quality Standards	12/20/2005	10/5/2006	3/22/2011
4−Nitroaniline	5	21 U	49 U	**7.8 J**
Total Cyanide	200	**340**	**197 J**	**290**

MW−6 (µg/L)

Constituent	New York State Class GA Water Quality Guidance Value	12/20/2005	10/4/2006	3/23/2011
Acetone	50	**68 J**	5.0 U	50 U

MW−3 (µg/L)

Constituent	New York State Class GA Water Quality Standards and Guidance Values	12/20/2005	10/5/2006	3/22/2011
Benzene	1	**7,100 [7,000]**	**1,600 D [1,900 D]**	**4.5**
Ethylbenzene	5	**680 [730]**	**220 D [260 D]**	1.0 U
Styrene	5	**320 J [360]**	**170 D [160 D]**	1.0 U
Toluene	5	**4,300 [4,300]**	**1,400 D [1,400 D]**	**2.9**
Total Xylenes	5	**7,900 [8,100]**	**2,200 D [2,500 D]**	**16**
2,4−Dimethylphenol	1	NA	**130 [190]**	5.0 U
2−Methylphenol	1	NA	**110 [150]**	5.0 U
4−Methylphenol	1	NA	**130 [160]**	9.9 U
Naphthalene	10	**3,600 [4,000]**	**1,200 DJ [580 J]**	**7.7**
Phenol	1	NA	**38 [59 J]**	5.0 U
Total Cyanide	200	**600 [580]**	**259 J [210 J]**	**330**

LEGEND:

⌖	RI MONITORING WELL LOCATION
▲	RI SOIL BORING LOCATION
△	RI SURFACE SOIL LOCATION
▬	RI TEST PIT LOCATION
—x—	FENCE
┼┼┼┼┼	RAILROAD
◎	POWER POLE
☼	LIGHT POLE
⊙ ⊙⊙	POST, SIGN
⊙	HYDRANT
—S—	SEWER LINE
—G—	GAS LINE
—E—	ELECTRIC LINE
— — —	FORMER MGP STRUCTURE
MH	MANHOLE
▲	PDI SOIL BORING
⌖	PDI MONITORING WELL

NOTES:

1. BASE MAP BASED ON SURVEYS COMPLETED BY NYSEG ON DECEMBER 14, 2005, OCTOBER 2006, AND BY PAUL J. OLSZEWSKI, PLS, PLLC ON MARCH 14 AND 23, 2011. ELEVATIONS IN REFERENCE TO NGVD 1929, HORIZONTAL DATUM IS NAD 83 STATEPLANE, NEW YORK CENTRAL.
2. ALL LOCATIONS ARE APPROXIMATE.
3. PROPERTY BOUNDARIES WERE DIGITIZED FROM CITY OF GENEVA, ONTARIO COUNTY, NEW YORK TAX MAP [104.35], DATED MAY 1, 2008.
4. µg/L – MICROGRAMS PER LITER.
5. J – INDICATES THAT THE ASSOCIATED NUMERICAL VALUE IS AN ESTIMATED CONCENTRATION.
6. U – INDICATES THAT THE COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE ASSOCIATED VALUE IS THE COMPOUND QUANTITATION LIMIT.
7. D – INDICATES THAT THE COMPOUND WAS QUANTITATED USING A SECONDARY DILUTION.
8. FIELD DUPLICATE SAMPLE RESULTS ARE SHOWN IN BRACKETS.
9. BOLD INDICATES A DETECTABLE CONCENTRATION.
10. SHADED INDICATES CONCENTRATION EXCEEDS NEW YORK STATE CLASS GA AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES.

0 60' 120'
GRAPHIC SCALE

NYSEG
WADSWORTH STREET FORMER MGP SITE
GENEVA, NEW YORK
NATURAL ATTENUATION EVALUATION

GROUNDWATER RESULTS EXCEEDING NEW YORK STATE CLASS GA AMBIENT WATER QUALITY STANDARDS AND GUIDANCE VALUES

ARCADIS

FIGURE
2

CITY: SYRACUSE, NY DIV/GROUP: ENV/CADD DB: A. SCHILLING, W. JONES, P. LISTER PM/TM: J. BRIEN TR: L. ZURANSKI LYR: ON=*;OFF=REF, (FRZ) PAGESETUP: ---- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 6/29/2011 11:29 AM BY: JONES, WENDY
G:\ENVCAD\SYRACUSE\ACT\B0013103\0000\00005\DWG\13103B08.DWG LAYOUT: 2 SAVED: 6/29/2011 11:29 AM ACADVER: 18.0S (LMS TECH)
XREFS: 13103X05 13103X02 13103X01 IMAGES: PROJECTNAME: ----

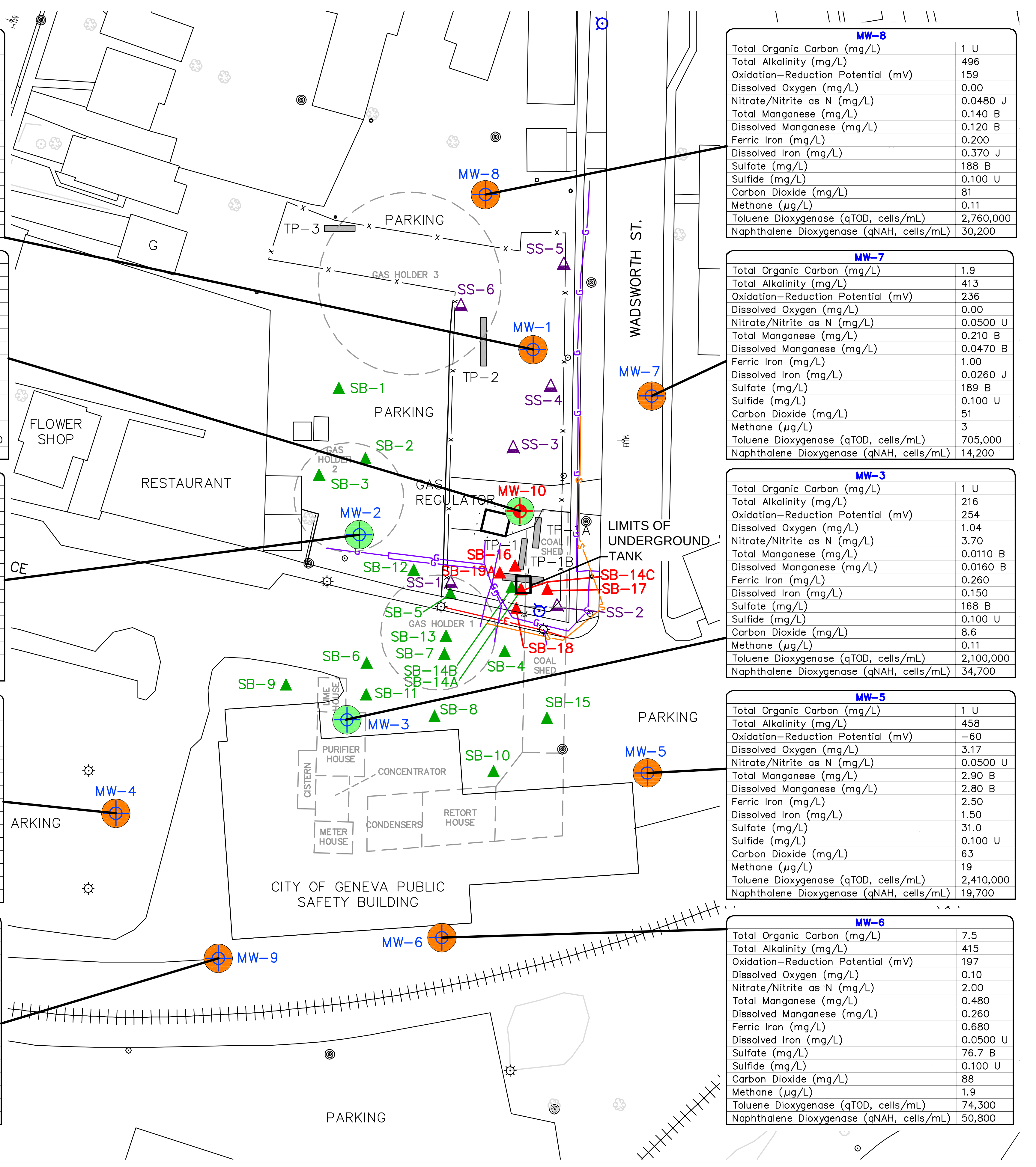
MW-1	
Total Organic Carbon (mg/L)	1.6
Total Alkalinity (mg/L)	389
Oxidation–Reduction Potential (mV)	46
Dissolved Oxygen (mg/L)	0.00
Nitrate/Nitrite as N (mg/L)	0.580
Total Manganese (mg/L)	0.130 B7
Dissolved Manganese (mg/L)	0.0740
Ferric Iron (mg/L)	0.100 U
Dissolved Iron (mg/L)	0.120
Sulfate (mg/L)	143 B
Sulfide (mg/L)	0.100 U
Carbon Dioxide (mg/L)	38
Methane (µg/L)	0.68
Toluene Dioxygenase (qTOD, cells/mL)	6,490,000
Naphthalene Dioxygenase (qNAH, cells/mL)	37,800

MW-10	
Total Organic Carbon (mg/L)	3.4
Total Alkalinity (mg/L)	278
Oxidation–Reduction Potential (mV)	–44
Dissolved Oxygen (mg/L)	0.00
Nitrate/Nitrite as N (mg/L)	0.0500 U
Total Manganese (mg/L)	1.20 B7
Dissolved Manganese (mg/L)	1.20 B
Ferric Iron (mg/L)	1.20
Dissolved Iron (mg/L)	1.50
Sulfate (mg/L)	1,180 B
Sulfide (mg/L)	0.100 U
Carbon Dioxide (mg/L)	43
Methane (µg/L)	16
Toluene Dioxygenase (qTOD, cells/mL)	17,100,000
Naphthalene Dioxygenase (qNAH, cells/mL)	46,200

MW-2	
Total Organic Carbon (mg/L)	2
Total Alkalinity (mg/L)	351
Oxidation–Reduction Potential (mV)	284
Dissolved Oxygen (mg/L)	0.00
Nitrate/Nitrite as N (mg/L)	5.20
Total Manganese (mg/L)	1.60 B
Dissolved Manganese (mg/L)	0.770 B
Ferric Iron (mg/L)	0.990
Dissolved Iron (mg/L)	0.140
Sulfate (mg/L)	85.8 B
Sulfide (mg/L)	0.100 U
Carbon Dioxide (mg/L)	42
Methane (µg/L)	0.46
Toluene Dioxygenase (qTOD, cells/mL)	5,660,000
Naphthalene Dioxygenase (qNAH, cells/mL)	45,900

MW-4	
Total Organic Carbon (mg/L)	6.5
Total Alkalinity (mg/L)	452
Oxidation–Reduction Potential (mV)	–36
Dissolved Oxygen (mg/L)	0.00
Nitrate/Nitrite as N (mg/L)	0.0500 U
Total Manganese (mg/L)	6.20 B
Dissolved Manganese (mg/L)	5.80 B
Ferric Iron (mg/L)	25.8
Dissolved Iron (mg/L)	7.40
Sulfate (mg/L)	116 B
Sulfide (mg/L)	0.100 U
Carbon Dioxide (mg/L)	110
Methane (µg/L)	150
Toluene Dioxygenase (qTOD, cells/mL)	1,980,000
Naphthalene Dioxygenase (qNAH, cells/mL)	40,200

MW-9	
Total Organic Carbon (mg/L)	2.4
Total Alkalinity (mg/L)	333
Oxidation–Reduction Potential (mV)	16
Dissolved Oxygen (mg/L)	0.00
Nitrate/Nitrite as N (mg/L)	0.0500 U
Total Manganese (mg/L)	1.70
Dissolved Manganese (mg/L)	1.80
Ferric Iron (mg/L)	0.520
Dissolved Iron (mg/L)	0.130
Sulfate (mg/L)	62.5 B
Sulfide (mg/L)	0.0760 J
Carbon Dioxide (mg/L)	53
Methane (µg/L)	7.3
Toluene Dioxygenase (qTOD, cells/mL)	50,400
Naphthalene Dioxygenase (qNAH, cells/mL)	27,700



MW-8	
Total Organic Carbon (mg/L)	1 U
Total Alkalinity (mg/L)	496
Oxidation–Reduction Potential (mV)	159
Dissolved Oxygen (mg/L)	0.00
Nitrate/Nitrite as N (mg/L)	0.0480 J
Total Manganese (mg/L)	0.140 B
Dissolved Manganese (mg/L)	0.120 B
Ferric Iron (mg/L)	0.200
Dissolved Iron (mg/L)	0.370 J
Sulfate (mg/L)	188 B
Sulfide (mg/L)	0.100 U
Carbon Dioxide (mg/L)	81
Methane (µg/L)	0.11
Toluene Dioxygenase (qTOD, cells/mL)	2,760,000
Naphthalene Dioxygenase (qNAH, cells/mL)	30,200

MW-7	
Total Organic Carbon (mg/L)	1.9
Total Alkalinity (mg/L)	413
Oxidation–Reduction Potential (mV)	236
Dissolved Oxygen (mg/L)	0.00
Nitrate/Nitrite as N (mg/L)	0.0500 U
Total Manganese (mg/L)	0.210 B
Dissolved Manganese (mg/L)	0.0470 B
Ferric Iron (mg/L)	1.00
Dissolved Iron (mg/L)	0.0260 J
Sulfate (mg/L)	189 B
Sulfide (mg/L)	0.100 U
Carbon Dioxide (mg/L)	51
Methane (µg/L)	3
Toluene Dioxygenase (qTOD, cells/mL)	705,000
Naphthalene Dioxygenase (qNAH, cells/mL)	14,200

MW-3	
Total Organic Carbon (mg/L)	1 U
Total Alkalinity (mg/L)	216
Oxidation–Reduction Potential (mV)	254
Dissolved Oxygen (mg/L)	1.04
Nitrate/Nitrite as N (mg/L)	3.70
Total Manganese (mg/L)	0.0110 B
Dissolved Manganese (mg/L)	0.0160 B
Ferric Iron (mg/L)	0.260
Dissolved Iron (mg/L)	0.150
Sulfate (mg/L)	168 B
Sulfide (mg/L)	0.100 U
Carbon Dioxide (mg/L)	8.6
Methane (µg/L)	0.11
Toluene Dioxygenase (qTOD, cells/mL)	2,100,000
Naphthalene Dioxygenase (qNAH, cells/mL)	34,700

MW-5	
Total Organic Carbon (mg/L)	1 U
Total Alkalinity (mg/L)	458
Oxidation–Reduction Potential (mV)	–60
Dissolved Oxygen (mg/L)	3.17
Nitrate/Nitrite as N (mg/L)	0.0500 U
Total Manganese (mg/L)	2.90 B
Dissolved Manganese (mg/L)	2.80 B
Ferric Iron (mg/L)	2.50
Dissolved Iron (mg/L)	1.50
Sulfate (mg/L)	31.0
Sulfide (mg/L)	0.100 U
Carbon Dioxide (mg/L)	63
Methane (µg/L)	19
Toluene Dioxygenase (qTOD, cells/mL)	2,410,000
Naphthalene Dioxygenase (qNAH, cells/mL)	19,700

MW-6	
Total Organic Carbon (mg/L)	7.5
Total Alkalinity (mg/L)	415
Oxidation–Reduction Potential (mV)	197
Dissolved Oxygen (mg/L)	0.10
Nitrate/Nitrite as N (mg/L)	2.00
Total Manganese (mg/L)	0.480
Dissolved Manganese (mg/L)	0.260
Ferric Iron (mg/L)	0.680
Dissolved Iron (mg/L)	0.0500 U
Sulfate (mg/L)	76.7 B
Sulfide (mg/L)	0.100 U
Carbon Dioxide (mg/L)	88
Methane (µg/L)	1.9
Toluene Dioxygenase (qTOD, cells/mL)	74,300
Naphthalene Dioxygenase (qNAH, cells/mL)	50,800

LEGEND:

⊕	RI MONITORING WELL LOCATION
▲	RI SOIL BORING LOCATION
△	RI SURFACE SOIL LOCATION
▬	RI TEST PIT LOCATION
—x—	FENCE
┼┼┼┼┼┼┼┼	RAILROAD
◎	POWER POLE
☼	LIGHT POLE
○ ○○	POST, SIGN
⊙	HYDRANT
—S—	SEWER LINE
—G—	GAS LINE
—E—	ELECTRIC LINE
— — —	FORMER MGP STRUCTURE
M/H	MANHOLE
▲	PDI SOIL BORING
⊕	PDI MONITORING WELL
🟢	COC CONCENTRATIONS EXCEEDING NEW YORK STATE CLASS GA WATER QUALITY STANDARDS AND GUIDANCE VALUES
🟠	COC CONCENTRATIONS LESS THAN NEW YORK STATE CLASS GA WATER QUALITY STANDARDS AND GUIDANCE VALUES

NOTES:

1. BASE MAP BASED ON SURVEYS COMPLETED BY NYSEG ON DECEMBER 14, 2005, OCTOBER 2006, AND BY PAUL J. OLSZEWSKI, PLS, PLLC ON MARCH 14 AND 23, 2011. ELEVATIONS IN REFERENCE TO NGVD 1929, HORIZONTAL DATUM IS NAD 83 STATEPLANE, NEW YORK CENTRAL.
2. ALL LOCATIONS ARE APPROXIMATE.
3. PROPERTY BOUNDARIES WERE DIGITIZED FROM CITY OF GENEVA, ONTARIO COUNTY, NEW YORK TAX MAP [104.35], DATED MAY 1, 2008.
4. µg/L – MICROGRAMS PER LITER.
5. mg/L – MILLIGRAMS PER LITER.
6. mV – MILLIVOLTS.
7. cells/mL – CELLS PER MILLILITER.
8. J – INDICATES THAT THE ASSOCIATED NUMERICAL VALUE IS AN ESTIMATED CONCENTRATION.
9. U – INDICATES THAT THE COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE ASSOCIATED VALUE IS THE COMPOUND QUANTITATION LIMIT.
10. B – INDICATES THAT THE ANALYTE WAS ALSO DETECTED IN THE ASSOCIATED METHOD BLANK.
11. B7 – INDICATES THAT THE TARGET ANALYTE WAS DETECTED IN METHOD BLANK AT OR ABOVE METHOD REPORTING LIMIT. CONCENTRATION FOUND IN THE SAMPLE AT LEAST 10 TIMES ABOVE THE CONCENTRATION FOUND IN THE BLANK.

0 60' 120'
GRAPHIC SCALE

NYSEG
WADSWORTH STREET FORMER MGP SITE
GENEVA, NEW YORK
NATURAL ATTENUATION EVALUATION

GROUNDWATER BIOGEOCHEMICAL DATA - MARCH 2011

ARCADIS

FIGURE
3