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New York State Electric & Gas Corporation

Feasibility Study Report

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

February 2010

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

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Table of Contents

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.

<u>Overall Protection of Human Health and the Environment</u>

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.

<u>Overall Protection of Human Health and the Environment</u>

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

<u>Cost Effectiveness</u>

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.

<u>Long-Term Effectiveness and Permanence</u>

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.

<u>Reduction of Toxicity, Mobility, or Volume of Contamination</u>

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.

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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

ARCADIS

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

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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

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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:	Unrestricted	Restricted		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):	Use SCOs	Use SCOs		16 - 18	36 - 38	4 - 6.5	10 - 12	38 - 40	4 - 5	23.4 - 24	38 - 40	7	6.2	6
Date Collected:		Commercial	Units	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														
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: / 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 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: / 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)																
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° 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^{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

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

<u>Remedial Alternative III - IC with Enhanced NA, Installation of Surface Cover, and Removal of</u>

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.

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

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.

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

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.

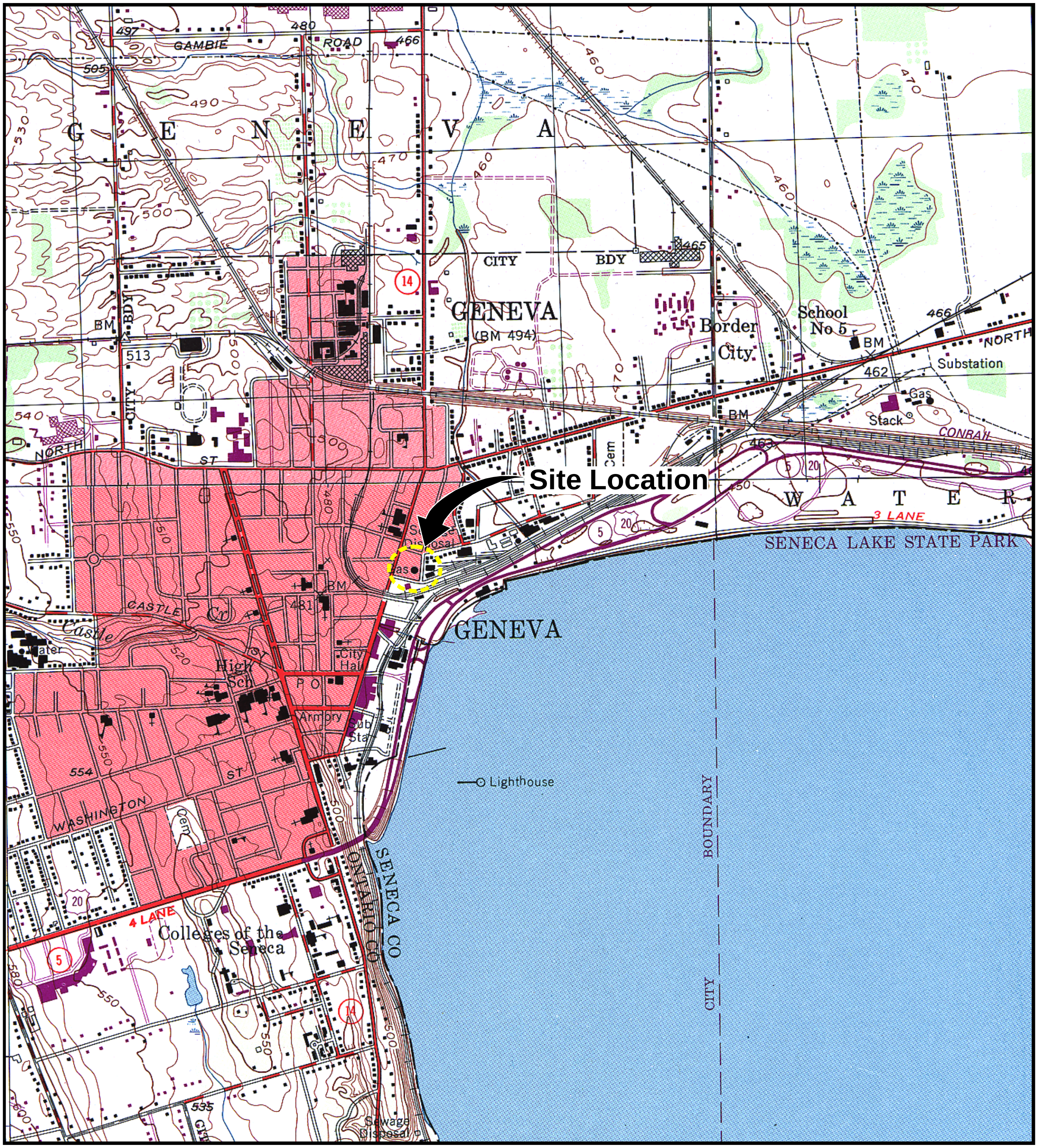
Table 5-6

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.

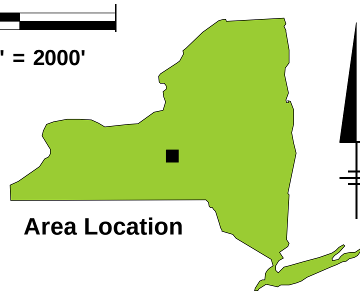
Figures



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

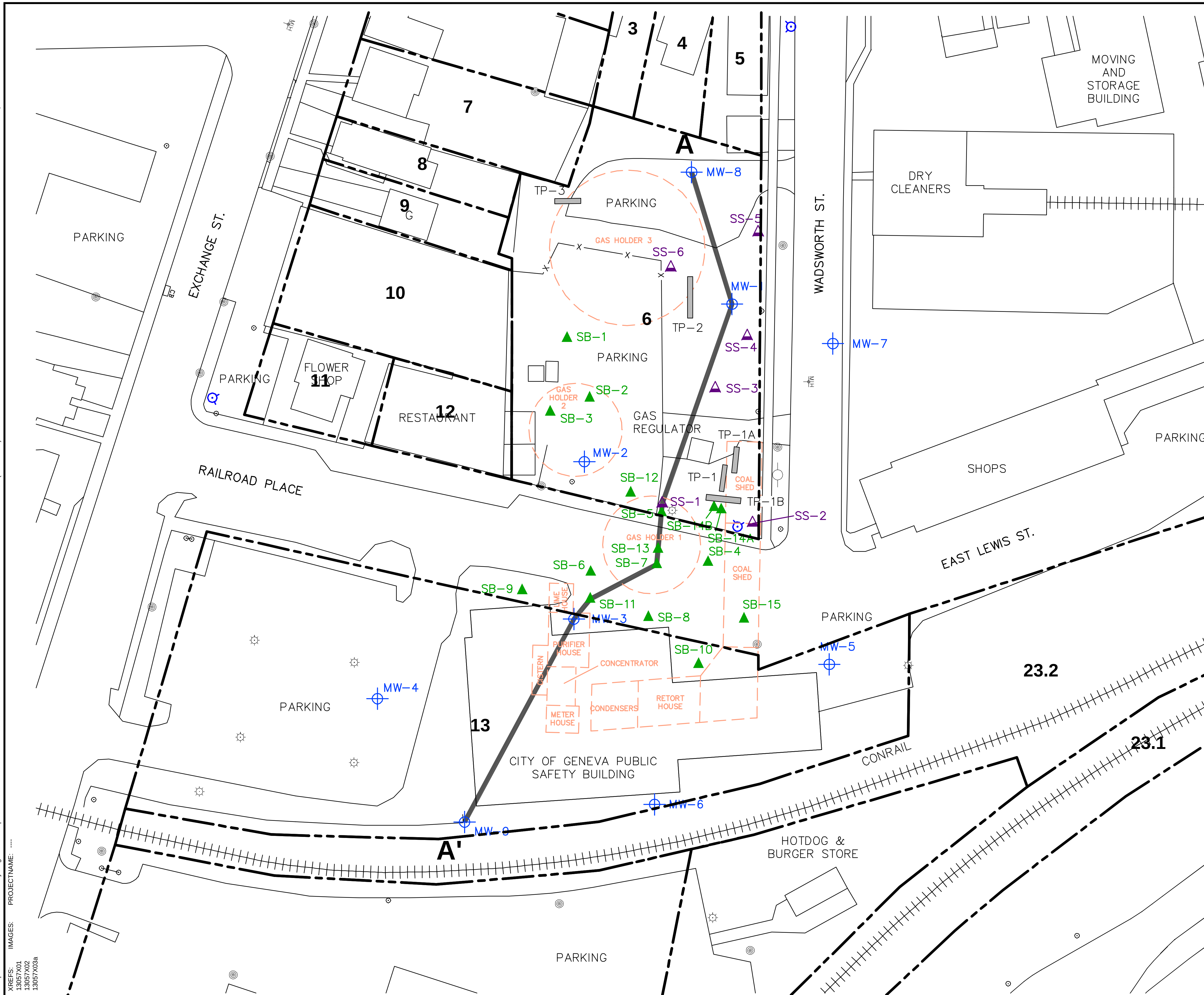
NEW YORK STATE ELECTRIC AND GAS
GENEVA (WADSWORTH ST.) FORMER MGP SITE
FEASIBILITY STUDY

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
- FENCE
- RAILROAD
- PROPERTY BOUNDARY
- UTILITY POLE W/ GUY
- POWER POLE
- LIGHT POLE
- POST, SIGN
- HYDRANT
- FORMER MGP STRUCTURE
- 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'

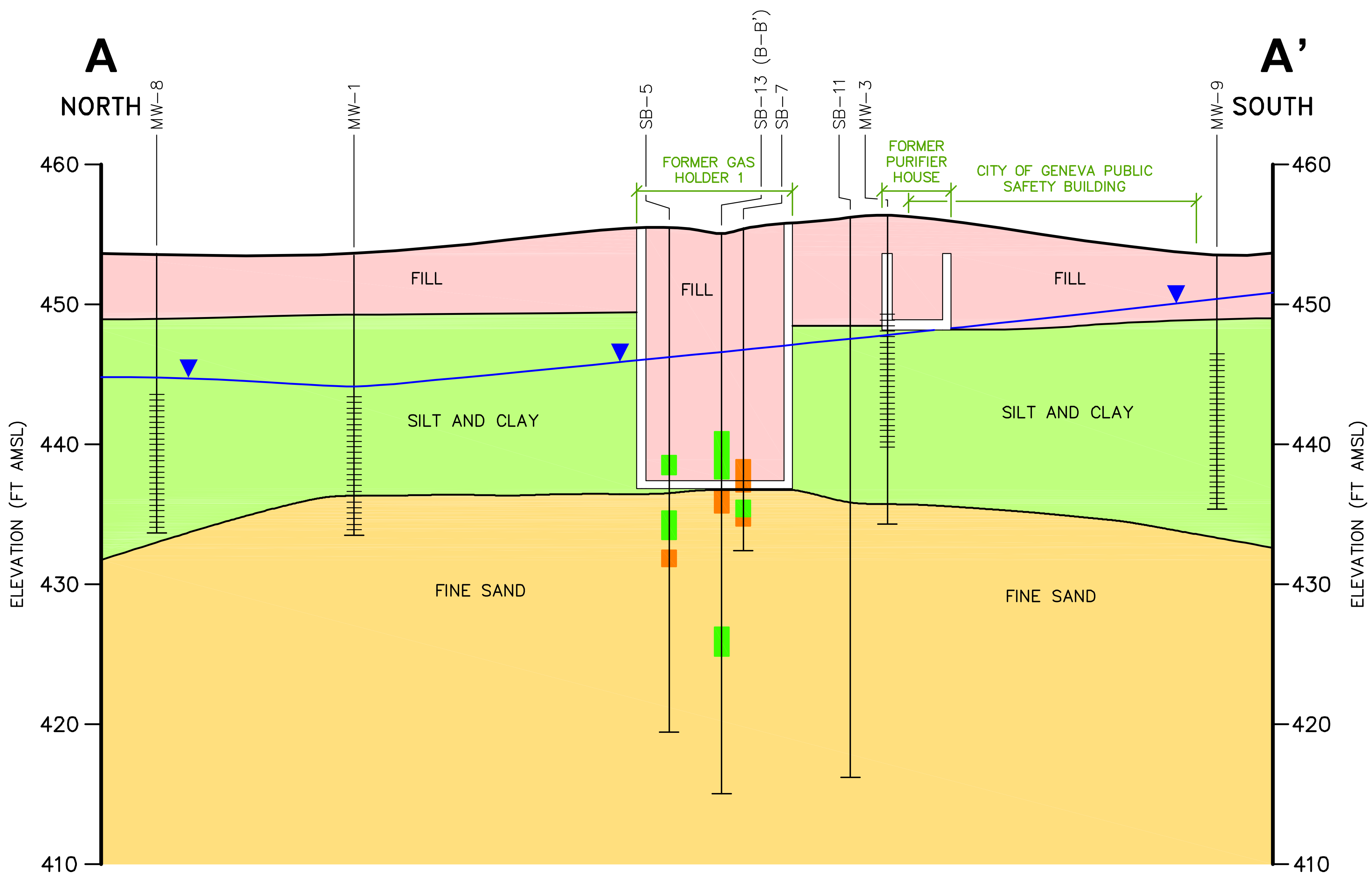
GRAPHIC SCALE

NEW YORK STATE ELECTRIC AND GAS
GENEVA (WADSWORTH ST.) FORMER MGP SITE
FEASIBILITY STUDY

INVESTIGATION LOCATIONS

ARCADIS

FIGURE
2



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

0 10' 20'
VERTICAL SCALE

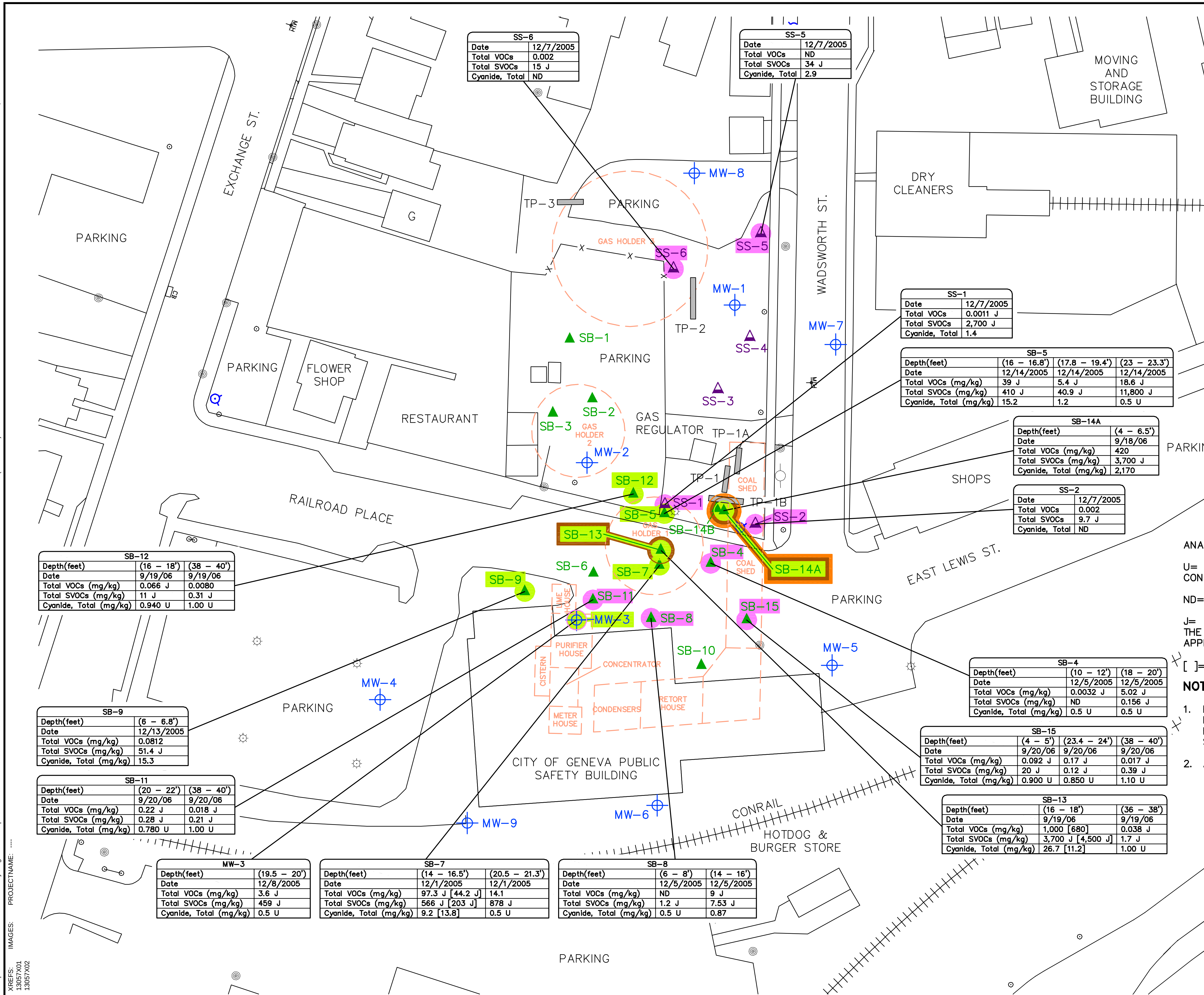
0 60' 120'
HORIZONTAL SCALE

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
- FENCE
- RAILROAD
- UTILITY POLE W/ GUY
- POWER POLE
- LIGHT POLE
- POST, SIGN
- HYDRANT
- FORMER MGP STRUCTURE
- 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

CITY:Syracuse GROUP:ENV-141 DB:AMS PGL PM: A. FALZARANO LYR: ON=*;OFF=REF* (FRZ
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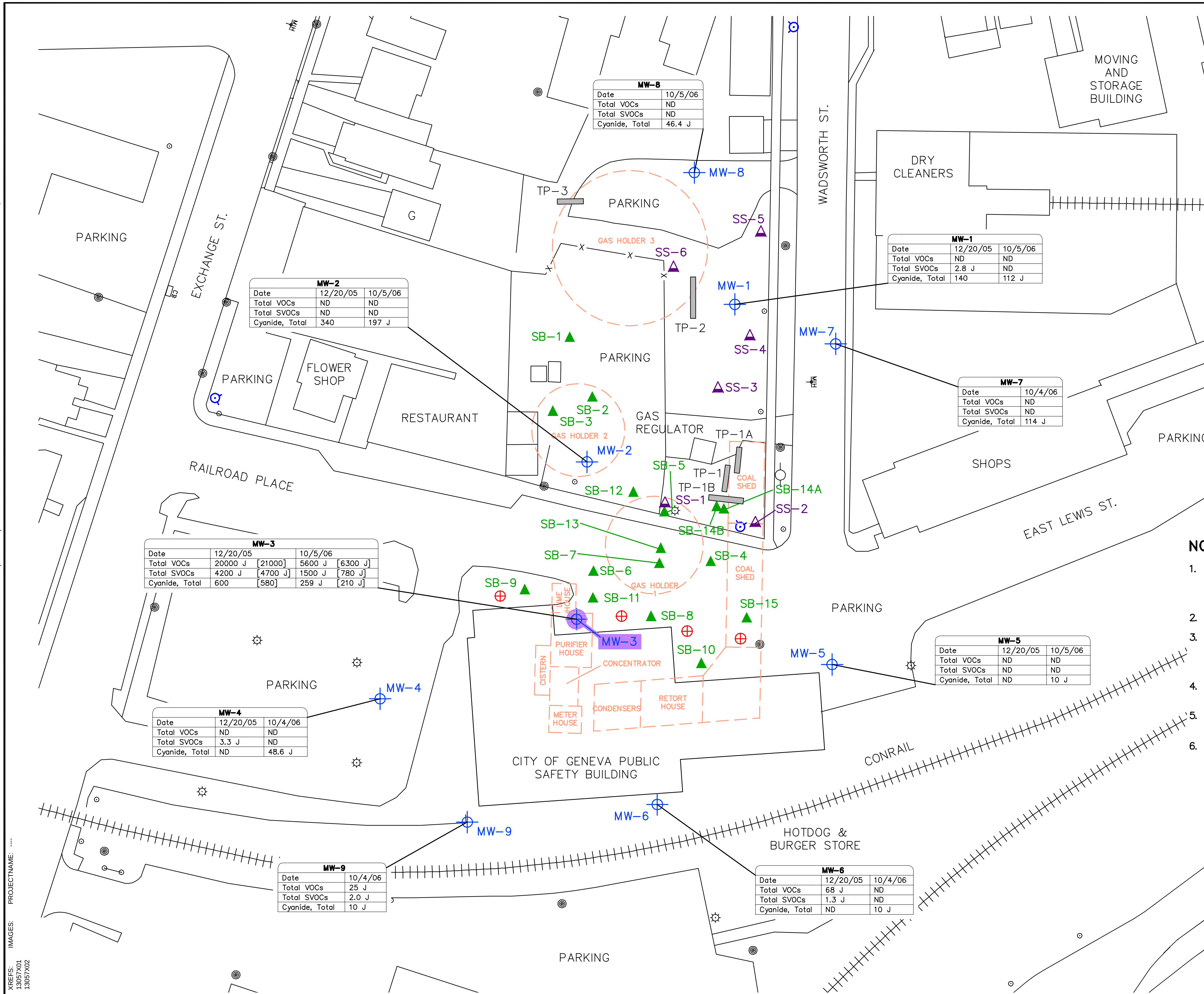


MW-8	
Date	10/5/06
Total VOCs	ND
Total SVOCs	ND
Cyanide, Total	46.4 J

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
- PROPOSED OXYGEN ENHANCEMENT WELLS
- TEST PIT LOCATION
- 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'

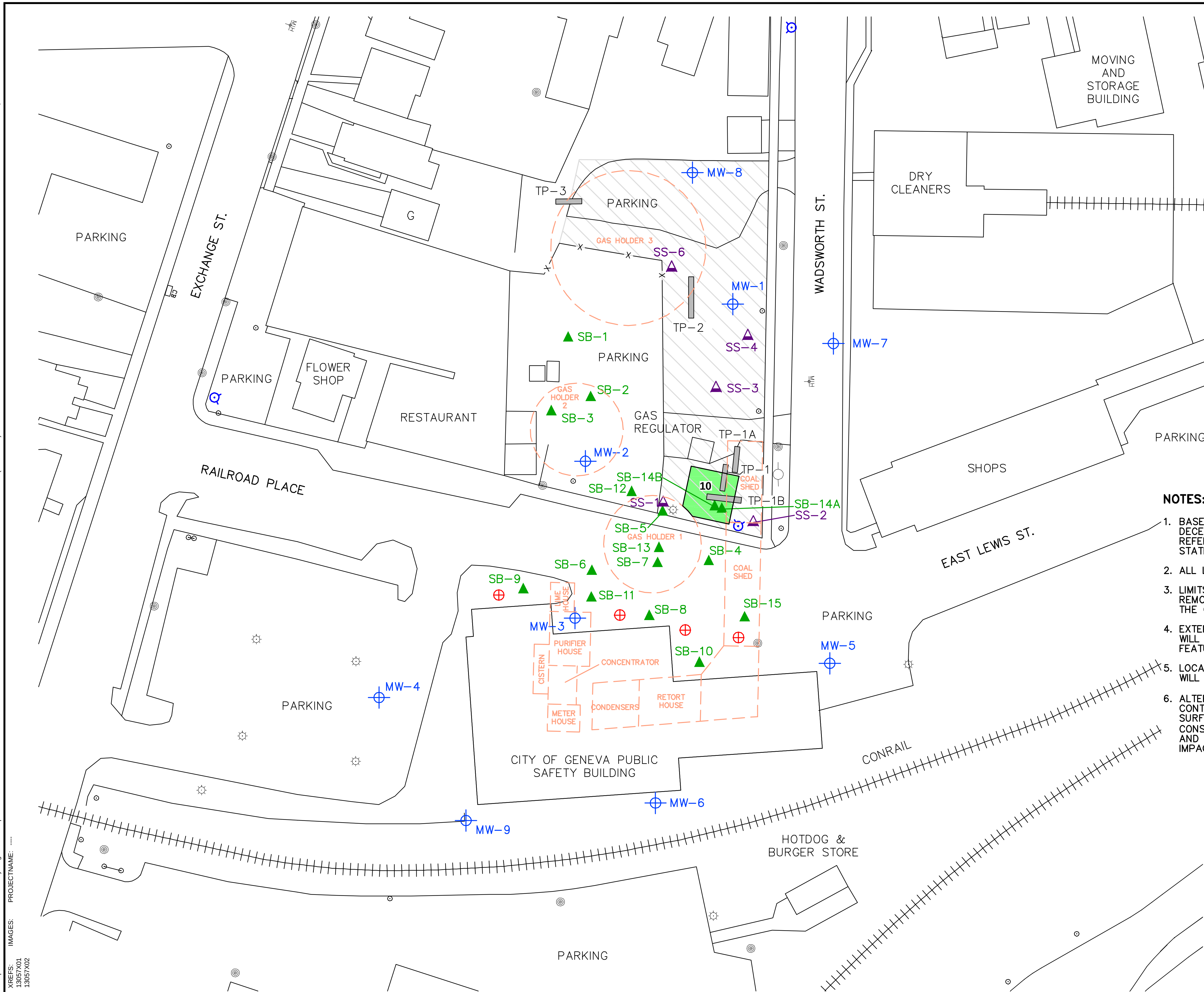
GRAPHIC SCALE

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)
- FENCE
- RAILROAD
- UTILITY POLE W/ GUY
- POWER POLE
- LIGHT POLE
- POST, SIGN
- HYDRANT
- FORMER MGP STRUCTURE
- PROPOSED EXTENT OF ASPHALT SURFACE COVER
- MANHOLE

NOTES:

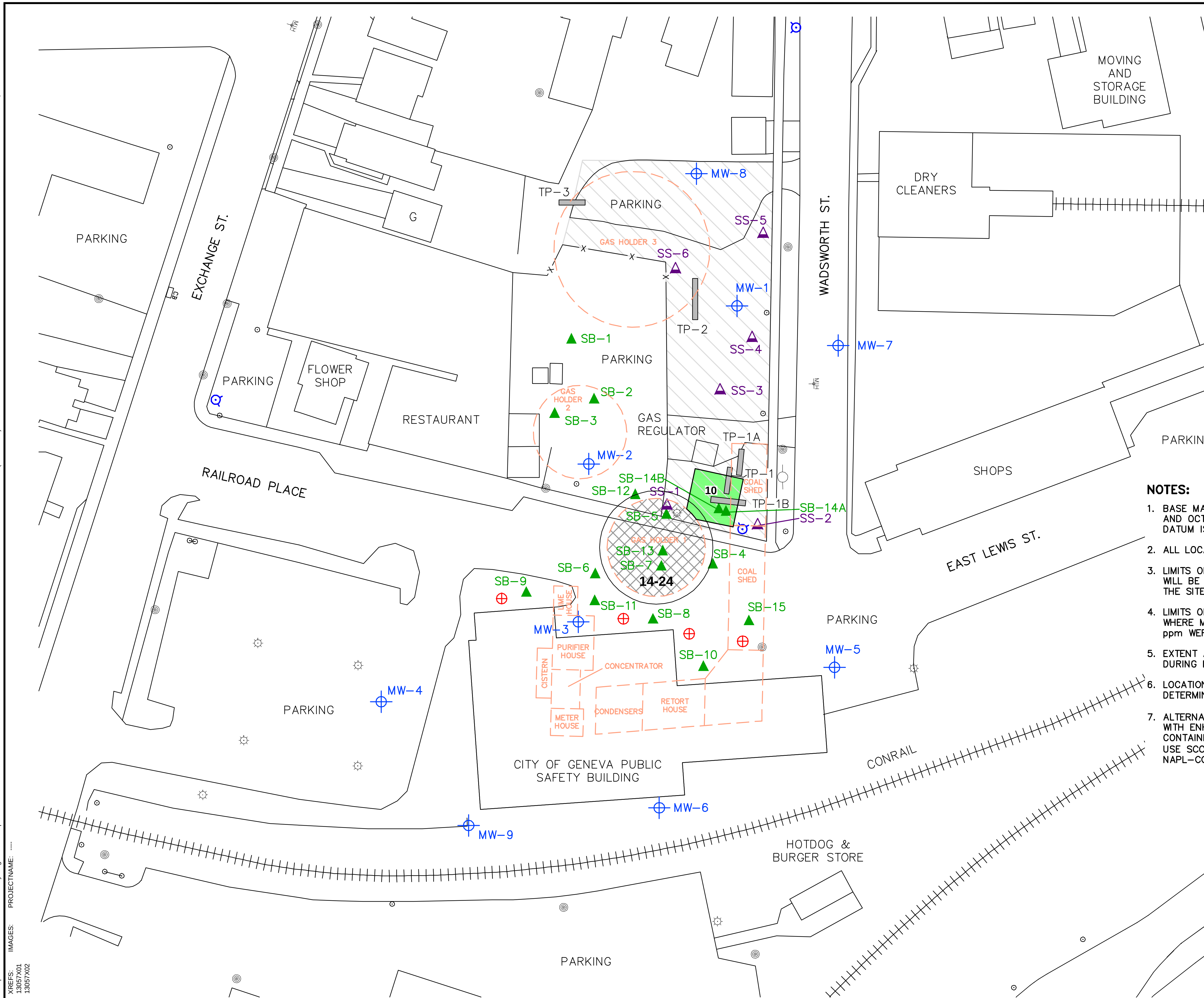
1. BASE MAP BASED ON SURVEYS COMPLETED BY NYSEG ON DECEMBER 14, 2005 AND OCTOBER 2006. ELEVATIONS IN REFERENCE TO NGVD 1929, HORIZONTAL DATUM IS NAD 83 STATEPLANE, NEW YORK CENTRAL.
2. ALL LOCATIONS ARE APPROXIMATE.
3. LIMITS OF SOIL REMOVAL AREAS ARE APPROXIMATE. ACTUAL REMOVAL LIMITS WILL BE DETERMINED AS PART OF THE DESIGN OF THE CHOSEN REMEDY FOR THE SITE.
4. 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.

NEW YORK STATE ELECTRIC AND GAS
GENEVA (WADSWORTH ST.) FORMER MGP SITE
FEASIBILITY STUDY

SITE-WIDE REMEDIAL ALTERNATIVE III

ARCADIS

FIGURE 6



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)
- 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 LAYOUT: 7ASAVED: 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
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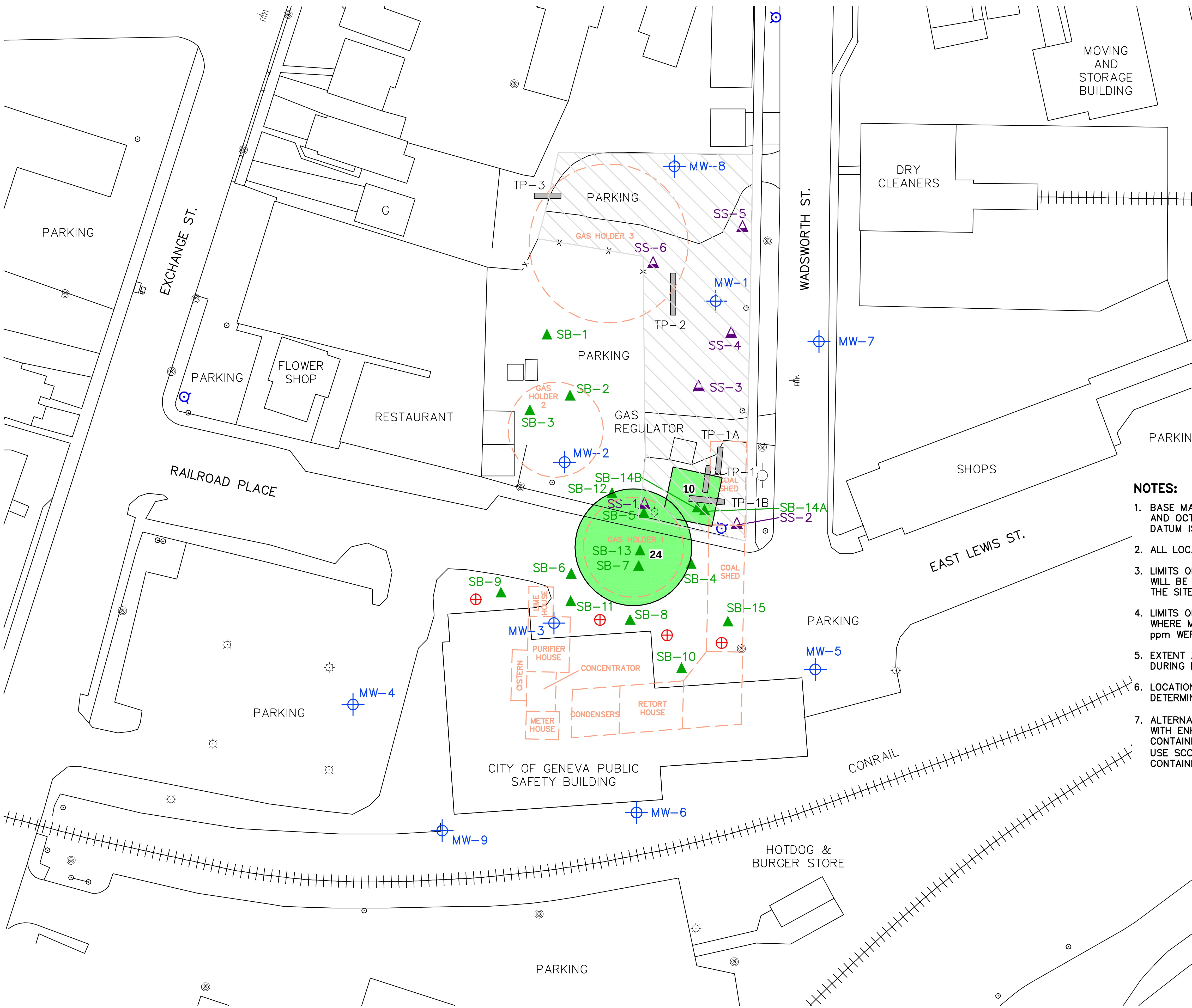


LEGEND:

- MONITORING WELL LOCATION
- SOIL BORING LOCATION
- SURFACE SOIL LOCATION
- PROPOSED OXYGEN ENHANCEMENT WELLS
- TEST PIT LOCATION
- 10 SOIL REMOVAL AREA (DEPTH IN FEET)
- 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 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.

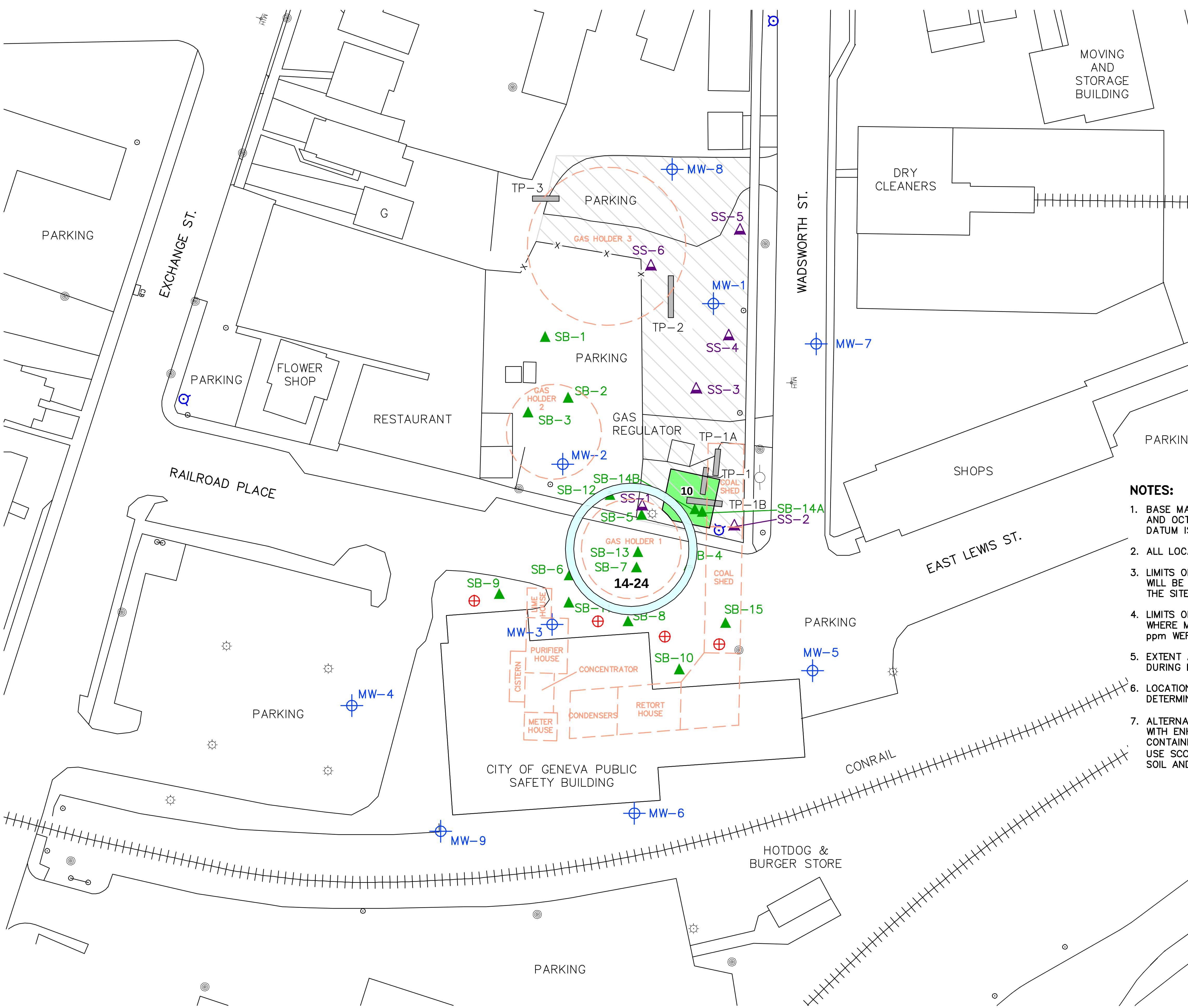
0 60' 120'
GRAPHIC SCALE

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
- 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 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.

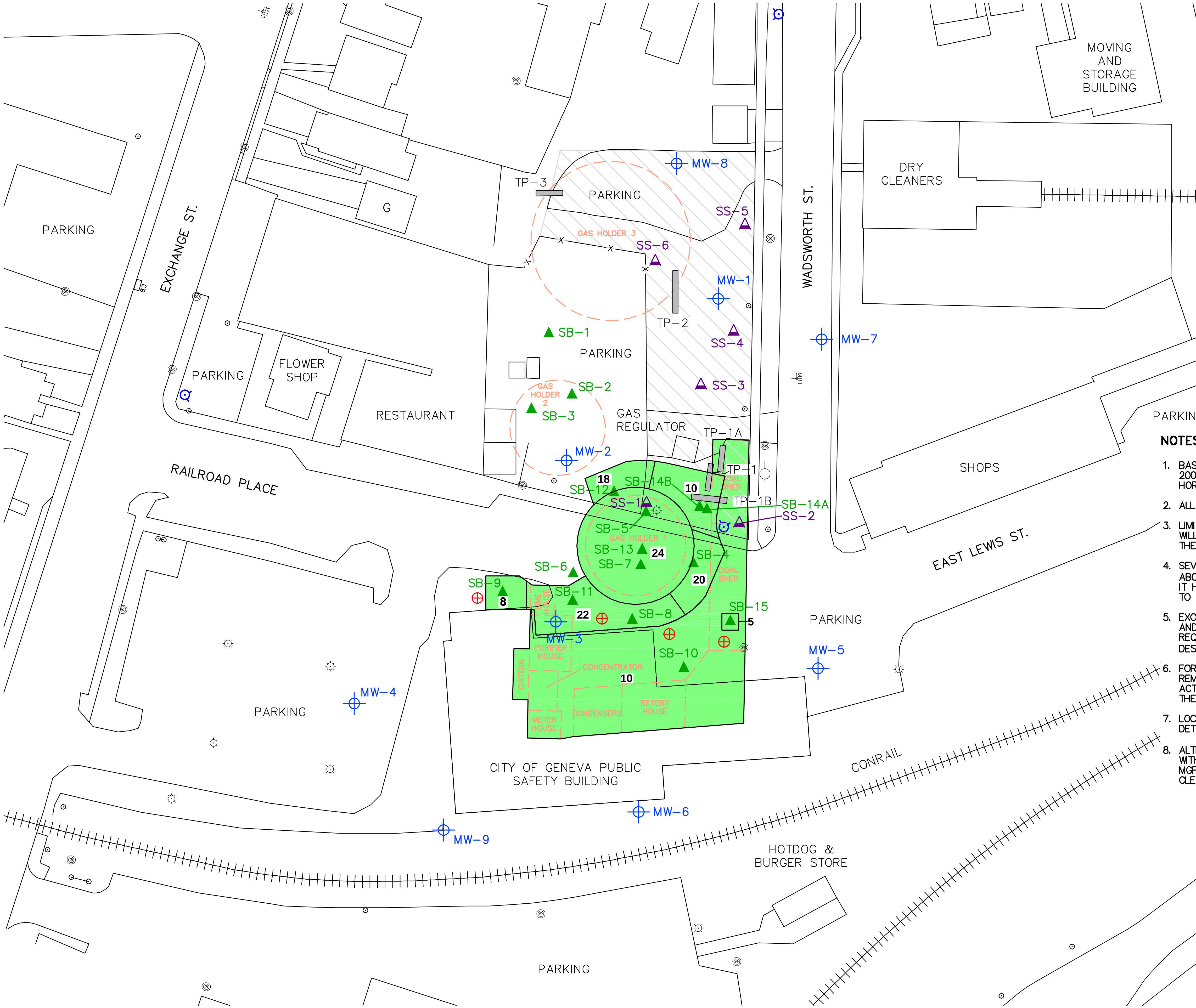
NEW YORK STATE ELECTRIC AND GAS
GENEVA (WADSWORTH ST.) FORMER MGP SITE
FEASIBILITY STUDY

SITE-WIDE REMEDIAL ALTERNATIVE IVC

ARCADIS

FIGURE
7C

CITY:Syracuse GROUP: ENV-141 DB: AMS PGL PM: A. FALZARANO LYR: ON=*;OFF=REF, (FRZ 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
\\corp2archive\CadArchive\ARC-OLD\syrdwg\2008\2008qtr3\B0013057\0001\00001\DWG\13057B11.DWG
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)
- FENCE
- RAILROAD
- UTILITY POLE W/ GUY
- POWER POLE
- LIGHT POLE
- POST, SIGN
- HYDRANT
- FORMER MGP STRUCTURE
- 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