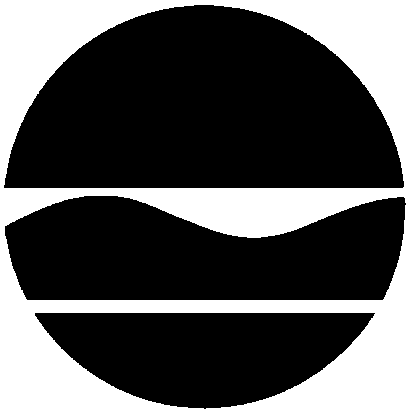
PROPOSED REMEDIAL ACTION PLAN
NYSEG Clark Street - Auburn MGP Site

Auburn, Cayuga County, New York
Site No. 7-06-008

February 2009



Prepared by:

Division of Environmental Remediation
New York State Department of Environmental Conservation

PROPOSED REMEDIAL ACTION PLAN

NYSEG Clark Street -Auburn MGP Site

Auburn (c), Cayuga County New York
Site No. 706008
February 2009

SECTION 1: SUMMARY AND PURPOSE OF THE PROPOSED PLAN

The New York State Department of Environmental Conservation (the Department), in consultation with the New York State Department of Health (NYSDOH), is proposing a remedy for the NYSEG Auburn Clark Street MGP Site. The presence of hazardous waste has created significant threats to human health and the environment that are addressed by this proposed remedy. As more fully described in Sections 3 and 5 of this document, past operation of the former manufactured gas plant (MGP) has resulted in the disposal of hazardous wastes, including volatile organic compounds and polycyclic aromatic hydrocarbons. These wastes have contaminated the soil, groundwater and sediment at the site, and have resulted in:

- a significant threat to human health associated with the potential exposure to soil, sediment and groundwater.

- a significant environmental threat associated with the current and potential impacts of contaminants to groundwater and Owasco Outlet sediment.

To eliminate or mitigate these threats, the Department proposes excavation and off-site disposal of contaminant source material and removal of contaminated sediment.

The proposed remedy, discussed in detail in Section 8, is intended to attain the remediation goals identified for this site in Section 6. The remedy must conform with officially promulgated standards and criteria that are directly applicable, or that are relevant and appropriate. The selection of a remedy must also take into consideration guidance, as appropriate. Standards, criteria and guidance are hereafter called SCGs.

This Proposed Remedial Action Plan (PRAP) identifies the preferred remedy, summarizes the other alternatives considered, and discusses the reasons for this preference. The Department will select a final remedy for the site only after careful consideration of all comments received during the public comment period.

The Department has issued this PRAP as a component of the Citizen Participation Plan developed pursuant to the New York State Environmental Conservation Law and Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York (6 NYCRR) Part 375. This document is a summary of the information that can be found in greater detail in the June 2008 "Supplemental Remedial Investigation (RI) Report, the February 2009 "Feasibility Study" (FS), and other relevant documents. The public is encouraged to review the project documents, which are available at the following repositories:

Seymour Library
176 Genesee Street
Auburn, New York 13201
Stephen Erskine
Library Director
(315) 252-2571
Mon-Wed 10am-9pm
Th-Fr 10am-6pm
Sat 10am-4pm

NYSDEC
625 Broadway
Albany, New York 12233
John Spellman, Project Manager
(518) 402-9662
Call for appointment

The Department seeks input from the community on all PRAPs. A public comment period has been set from February 28, 2009 to March 30, 2009 to provide an opportunity for public participation in the remedy selection process. A public meeting is scheduled for March 12, 2009 at the Cayuga County Office Building beginning at 7:00 pm.

At the meeting, the results of the RI/FS will be presented along with a summary of the proposed remedy. After the presentation, a question-and-answer period will be held, during which verbal or written comments may be submitted on the PRAP. Written comments may also be sent to Mr. Spellman at the above address during the public comment period.

The Department may modify the proposed remedy or select another of the alternatives presented in this PRAP, based on new information or public comments. Therefore, the public is encouraged to review and comment on all of the alternatives identified here.

Comments will be summarized and addressed in the responsiveness summary section of the Record of Decision (ROD). The ROD is the Department's final selection of the remedy for this site.

SECTION 2: SITE LOCATION AND DESCRIPTION

The NYSEG Clark Street - Auburn Former Manufactured Gas Plant Site is located within the city limits of Auburn, Cayuga County, near the US Route 20 corridor (see Figure 1). The three-acre site is currently an active electric substation owned by New York State Electric & Gas Corporation, a subsidiary of Energy East Corporation. Included in the three acres is approximately one acre of the Owasco Outlet, which meanders along the north and east sides of the triangular-shaped site (see Figure 2). The Outlet flows from the southeast to the northwest at the site. Adjacent to the site on the south and west sides is an automobile repair shop. An active CSX freight line abuts the site on the southeast corner. Across the Owasco Outlet to the north of the site land use is residential. The site is flat, and a small portion (less than 1acre) of the upland area is within the regulatory floodway. Water in the area is provided by a municipal water supply. No potable wells were identified within one mile of the site.

Prominent site features are the substation's transformer banks, which are enclosed by fencing, and a natural gas regulator building. There are no structures designed for human occupation on the site. The majority of the site is covered with gravel from the entrance to and around the transformer area, with surrounding areas covered by trees, shrubs and herbaceous vegetation.

The Owasco Outlet, a Class C water body, conveys water from Owasco Lake to the Seneca River. Peak flows of about 1,200 cubic feet per second are carried between banks which vary from 30 to 80 feet apart at the site. Flow at the site can be controlled through an upstream dam.

The site overburden soils are typically 12 to 15 feet thick. Much of the top five feet has been re-worked with sand and gravel fill and includes broken brick, concrete, wood, coal fragments and cinders. A mainly sandy deposit underlies the fill which trends to gravel closer to bedrock. The overburden rests upon the

Onondaga Limestone Formation. The bedrock surface is relatively flat in the vicinity of the site, although a slight depression of possible man-made origin exists in the approximate center of the site. The Owasco Outlet channels its way through the overburden and, as a result, the stream floor is primarily bedrock. Where present, stream sediment consists primarily of hard nested gravel and cobbles.

The depth to groundwater in the overburden soil is approximately four feet. Groundwater flow in the overburden is towards the Owasco Outlet. Groundwater elevations in the bedrock were found to be about four feet lower than the overburden elevations, indicating downward groundwater flow from the overburden into the bedrock. Similar to the overburden, groundwater flow in the bedrock is toward the Owasco Outlet.

The site is located approximately one-half mile west of the Auburn McMaster Street Former MGP Site. The McMaster Street Site is also adjacent to the Owasco Outlet, upstream of the Clark Street Site.

SECTION 3: SITE HISTORY

3.1: Operational/Disposal History

Manufactured gas was produced from coal at the site from approximately 1901 to 1946 by New York State Electric & Gas Corporation and predecessor companies. The gas was produced primarily by the carburetted water gas process, although some coal carbonization may have also taken place. Most MGP structures were demolished in 1961.

During the gas production an oily liquid commonly known as MGP tar would condense from the hot gas and settle in the bottom of gas holders, pipes and other structures. Experience at other MGP Sites have shown that these structures are often the source of contamination in soils, groundwater and sediment, as the structures may have leaked or may have been periodically cleaned without regard to proper disposal. No pipes discharging to the Owasco Outlet were found at the site, and no evidence exists of a direct discharge of contaminants from the site into the stream.

3.2: Remedial History

In 1994 NYSEG entered into an administrative Order on Consent with the Department to investigate and remediate 33 manufactured gas plant sites, including the Auburn Clark Street Site. Between 1992 and 1994, NYSEG conducted an initial investigation of the site which confirmed the plant's location and identified the need for additional investigation and remediation of the site.

In 1995 two attempts were made to install an underground gas main beneath the Owasco Lake Outlet. During each attempt the excavation of sediments produced a sheen which was reported to the Department's Spill Response Hotline. The gas main was installed underground further upstream in 1996 to avoid encountering contamination.

SECTION 4: ENFORCEMENT STATUS

Potentially Responsible Parties (PRPs) are those who may be legally liable for contamination at a site. This may include past or present owners and operators, waste generators, and haulers.

The Department and the New York State Electric & Gas Corporation entered into a multi-site Consent Order on March 30, 1994. The Order (D0-0002-9309) obligates the responsible parties to implement a full remedial program for 33 former MGP sites across the State, including the Auburn Clark Street Site.

SECTION 5: SITE CONTAMINATION

A remedial investigation/feasibility study (RI/FS) has been conducted to evaluate the alternatives for addressing the significant threats to human health and the environment.

5.1: Summary of the Remedial Investigation

The purpose of the RI was to define the nature and extent of any contamination resulting from previous activities at the site. The RI was conducted between November 2003 and June 2008. The field activities and findings of the investigation are described in the RI report.

The RI was conducted in three phases. In the first phase, 29 soil borings were advanced, seven additional monitoring wells were installed and seven test trenches were excavated, with the objective of providing a more comprehensive data set relating to the nature and extent of contamination in soil and groundwater. In addition, a sediment-probing and sampling program was undertaken to characterize contamination in the Owasco Outlet sediment. In the second phase, the investigation developed a better understanding of the bedrock groundwater flow and quality. Additional bedrock monitoring wells were installed, discrete hydraulic conductivity tests were performed, and groundwater samples were collected from isolated zones. In Phase 3, additional bedrock monitoring wells were installed in off-site areas, based on the Phase 2 findings. In addition, sediment probing was conducted further downstream, and soil vapor and indoor air samples were collected.

5.1.1: Standards, Criteria, and Guidance (SCGs)

To determine whether the groundwater, surface water, soil, sediment and soil vapor contain contamination at levels of concern, data from the investigation were compared to the following SCGs:

- Groundwater, drinking water, and surface water SCGs based on the Department's "Ambient Water Quality Standards and Guidance Values" and Part 5 of the New York State Sanitary Code.

- Soil SCGs based on the Department's Soil Cleanup Objectives identified in 6 NYCRR Subpart 375-6 and Technical and Administrative Guidance Memorandum (TAGM) 4046.

- Sediment SCGs based on the Department's "Technical Guidance for Screening Contaminated Sediments."

- Concentrations of VOCs in air were compared to typical background levels of VOCs in indoor and outdoor air using the background levels provided in the NYSDOH guidance document titled "Guidance for Evaluating Soil Vapor Intrusion in the State of New York," dated October 2006. The background levels are not SCGs and are used only as a general tool to assist in data evaluation.

Based on the RI results, in comparison to the SCGs and potential public health and environmental exposure routes, certain media and areas of the site require remediation. These are summarized in Section 5.1.2. More complete information can be found in the RI report.

5.1.2: Nature and Extent of Contamination

This section describes the findings of the investigation for all environmental media that were investigated.

As described in the RI report, many soil, groundwater, bedrock, sediment and surface water samples were collected to characterize the nature and extent of contamination. As shown on Figures 2 through 4, the main categories of contaminants that exceed their SCGs are certain volatile organic compounds (VOCs) and certain semivolatile organic compounds (SVOCs).

Specific volatile organic compounds of concern are benzene, toluene, ethylbenzene and xylenes. These are referred to collectively as BTEX in this document. Specific semivolatile organic compounds of concern are the polycyclic aromatic hydrocarbons (PAHs):

acenaphthene	*benzo(b)fluoranthene*	fluoranthene
acenaphthylene	benzo(g,h,i)perylene	*indeno(1,2,3-cd)pyrene*
anthracene	*benzo(k)fluoranthene*	2-methylnaphthalene
benzo(a)anthracene	pyrene	naphthalene
benzo(a)pyrene	*chrysene*	phenanthrene
	fluorene	*dibenzo(a,h)anthracene*

Total PAH concentrations as referred to in this plan are the sum of the individual PAHs listed above. The italicized PAHs are probable human carcinogens. The sum of the italicized PAHs is referred to in this document as total carcinogenic PAHs (cPAHs).

The primary waste material found at the site is MGP tar, which is typically a reddish brown, oily liquid that does not readily dissolve in water. Materials such as this are commonly referred to as a non-aqueous phase liquid, or NAPL. The terms NAPL and tar are used interchangeably in this document. Although most MGP tars are slightly more dense than water, the difference in density is slight. Consequently, they can either float or sink when in contact with water. MGP tar contains high levels of PAH compounds, often greater than 100,000 parts per million. Tars also exceed SCOs for BTEX by several orders of magnitude. In certain tar samples, enough benzene may be present to require that the material be managed as a hazardous waste.

Polychlorinated Biphenyls (PCBs) are not associated with manufactured gas plant operations. Nonetheless, certain soil samples were analyzed for PCBs. Only one surface soil sample exceeded the unrestricted use SCO of 0.1 ppm, having a PCB concentration of 2.2 ppm. PCBs were not detected in subsurface soil samples. The Department concludes that PCBs are not a concern at the site.

More than fifty soil samples were analyzed for cyanide, which is a contaminant that is found in purifier wastes at some MGP sites. None of the samples exceeded the unrestricted use SCO of 27 ppm total cyanide. Also, no purifier waste was observed during the RI. Groundwater samples did not exceed the SCG for cyanide. Therefore, the Department concludes that cyanide is not a contaminant of concern at the site.

Arsenic, lead and mercury were detected infrequently at levels exceeding their unrestricted SCO values. Arsenic exceeded the SCO in six out of 50 soil samples, ranging in concentration from 0.6 ppm to 22 ppm (SCO: 13 ppm). Mercury exceeded the SCO in six out of 50 soil samples, ranging in concentration from 0.01 ppm to 3.95 ppm (SCO: 0.18 ppm). Lead exceeded the SCO in 5 out of 50 soil samples, ranging in concentration from 1.8 ppm to 1,360 ppm (SCO: 63 ppm). Arsenic and lead were not found in groundwater at levels exceeding their respective SCGs. Mercury was found in one groundwater sample (out of 25 samples) at a concentration of 2.0 ppb, exceeding the SCG of 0.7 ppb. Based on these minor and infrequent exceedances, the Department concludes that metals are not a concern at the site.

5.1.3: Extent of Contamination

This section describes the findings of the investigation for all environmental media that were investigated.

Chemical concentrations are reported in parts per billion (ppb) for groundwater, and parts per million (ppm) for waste, soil, and sediment. For comparison purposes, where applicable, SCGs are provided for each medium.

Initially, the RI targeted the areas near former storage vessels as presumed source areas where the largest quantities of tar or petroleum might be found. These vessels included three gasholders, an oil tank and a suspected tar tank. The oil tank preceded gas holder #1 which was constructed in the same location (see Figure 3). The two oldest gas holders (gas holder #2 and gas holder #3) were reportedly of the water-seal

type, in which any tars that condensed would settle below the ground surface within the holder. A leaking seal, or demolishing the holder without removing the tar provided a reservoir from which tar contamination can migrate into soil and groundwater.

Waste Materials

As shown on Figure 2, MGP tar in the form of NAPL was found in overburden soils throughout the majority of the site. NAPL was not found in the eastern third of the site. NAPL and soils containing high PAH concentrations (greater than 1,000 ppm) were located in the area of the former gas holders #2 and #3. The NAPL was found to extend to the Owasco Outlet to the north and northwest.

NAPL was found in bedrock beneath most of the site, and was found to have extended as far as 400 feet offsite to the east. NAPL was found as deep as 68 feet below ground surface in well MW-04D. The RI found that NAPL is migrating primarily to the east, and NAPL was not found in several borings drilled to the north, south and west. NAPL was found to be accumulating in four on-site bedrock monitoring wells and one off-site monitoring well. The greatest accumulation during the study period occurred in well MW-06B, which accumulated 22 liters over the seven month period.

Waste identified during the RI/FS will be addressed in the remedy selection process.

Surface Soil (0-6")

The majority of the site is covered with imported crushed stone. However, four surface soil samples were collected in vegetated areas from a depth of zero to six inches. Benzo(a)pyrene ranged from 1.5 ppm to 2.7 ppm in three of the samples. These values are slightly above the SCO for unrestricted use (1 ppm) but are comparable to the range of rural soil background values near PAH sources (less than 1 to 3 ppm) (Technical Support Document, New York State Brownfield Cleanup Program, Development of Soil Cleanup Objectives, September 2006, Section 9). In the fourth sample, located about 40 feet west of the gas regulator building, the benzo(a)pyrene concentration was 104 ppm. Off-site soil samples were also collected adjacent to the site. Benzo(a)pyrene in these samples ranged from 0.33 ppm to 2.0 ppm. None of the surface soil samples exceeded the SCOs for unrestricted use for BTEX.

Surface soil contamination identified during the RI/FS will be addressed in the remedy selection process.

Subsurface Soil

BTEX was found exceeding the SCOs for unrestricted use and the protection of groundwater in slightly less than half of the subsurface soil samples analyzed. As examples, benzene exceeded the unrestricted use and protection of groundwater SCO (0.06 ppm) in 15 of 45 subsurface soil samples, and total xylenes exceeded the unrestricted use SCO (0.26 ppm) in 21 of 45 subsurface soil samples. Xylene (total) exceeded the protection of groundwater SCO (1.6 ppm) in 17 of 45 subsurface soil samples. The highest benzene and total xylene concentrations in subsurface soil were 5.6 ppm and 53.7 ppm respectively. In general, the highest concentrations of BTEX were found in samples collected from the areas around the former gasholders, the former tar tank and in the north-central portion of the peninsula in the vicinity of monitoring well cluster MW-04 (See Figure 2). Areas of higher BTEX (greater than 10 ppm) are co-located with areas observed to have NAPL.

The concentrations of total PAHs ranged from not detected to 1,685 ppm, which exceed the TAGM 4046 guidance value of 500 ppm total PAHs. The highest level of total PAH was found along the southern edge of former gas holder #2. Individual PAHs frequently exceeded the unrestricted use SCO. As an example,benzo(a)pyrene exceeded the unrestricted SCO of 1 ppm in 29 out of 45 subsurface soil samples, ranging in concentration from not detected to 37 ppm.

Subsurface soil contamination identified during the RI/FS will be addressed in the remedy selection process.

Groundwater

On-site Groundwater

BTEX concentrations in on-site overburden groundwater ranged from not detected to 3,110 ppb. Benzene concentrations reached 340 ppb, exceeding the SCG of 1ppb in 3 out of 6 wells sampled, all located in the northeastern portion of the site. PAH concentrations in on-site overburden groundwater ranged from not detected to 10,011 ppb. Similar to BTEX, the highest concentrations of PAHs were from monitoring wells all located in the northeastern portion of the site.

Consistent with the widespread presence of NAPL in shallow bedrock, BTEX and PAHs exceeded their respective SCGs in all on-site shallow bedrock monitoring wells. The benzene concentration was greatest in monitoring well MW-04B, located downgradient of gas holder #3. The benzene concentration was the least (11 ppb) in monitoring well MW-02B, located hydraulically upgradient. Two rounds of samples were taken approximately 15 months apart, and no discernable trends in the level of contaminants was observed.

Two deep bedrock wells were installed on-site. One well, MW-04D, exceeded the SCGs for BTEX.

Off-site Groundwater

BTEX was not detected in off-site overburden groundwater. Pyrene and fluoranthene were detected in one off-site well, at concentrations of 4 ppb and 1 ppb respectively, below their SCGs of 50 ppb.

Several bedrock monitoring wells were placed across the Owasco Outlet from the site (Figure 3). Four monitoring wells are located adjacent to the outlet. All four wells exceeded the SCGs for BTEX. During testing, the highest concentration of benzene (1,300 ppb) was found in monitoring well MW-10D, located northwest of gas holder #1. All four wells also exceeded the SCGs for certain individual PAHs. Four additional monitoring wells were placed approximately 200 to 300 feet further from the outlet to determine if contamination had extended this far from the outlet. Three of these four wells, located in a residential area, did not exceed SCGs, except for monitoring well MW-17D which contained toluene at 11 ppb, exceeding its SCG of 5 ppb. The fourth well, MW-12D, contained benzene levels in the shallow bedrock aquifer of 140 ppb, exceeding its SCG of 1 ppb. Well MW-12D is located near or on a joint in the bedrock. NAPL was observed in monitoring wells MW-09D, MW-11D, MW-12D and MW-14D (see Figure 3).

Similar to the shallow bedrock, BTEX and PAHs were found in the off-site deep bedrock wells (greater than 50 feet below ground surface) placed near the Owasco Outlet at levels exceeding their respective SCGs. However, concentrations of these compounds were generally lower as compared to the shallow bedrock. BTEX and PAHs were not detected in monitoring wells located greater than 200 feet from the site, except at MW-12 where BTEX concentrations totalled 3,787 ppb. To further investigate the extent of contaminant migration along the bedrock joint, monitoring well MW-14 was installed approximately 700 feet from the site boundary. The benzene concentration in this deep bedrock well was 66 ppb, above the SCG of 1 ppb, and the total BTEX level was 181 ppb.

Groundwater contamination identified during the RI/FS will be addressed in the remedy selection process.

Surface Water

Ten surface water samples were collected during the RI. No BTEX compounds or PAH compounds were detected.

No site-related surface water contamination of concern was identified during the RI/FS. Therefore, no remedial alternatives need to be evaluated for surface water.

Sediments

The Owasco Outlet sediments were investigated through a combination of probing and chemical analysis. Approximately 106 locations were probed and 26 surficial sediment samples (0-6") were collected for laboratory analyses, from locations approximately 500 feet upstream to 900 feet downstream of the site.

The sediment, where present, is predominantly gravel and cobbles. Sediment thickness was generally less than one foot at the probed locations; a sediment thickness of five feet was measured in the vicinity of the first downstream dam. In some instances the stream was in contact with the bedrock.

NAPL was not seen at any of the probing locations. Sheens were produced by probing subsurface sediments at seven locations adjacent to the site. Five of the seven locations were located at transects T-04 and T-05, positioned across the outlet approximately 100 to 200 feet downstream of former gas holder #3 and gas holder #1. Sheens were also produced at four transects downstream of the site and at two locations upstream of the site.

Except for two samples, BTEX was not detected in site sediments. Sediment samples SED-08 and SED-09, located adjacent to the site, had BTEX concentrations of 198 ppm and 436 ppm respectively, which are below the chronic toxicity criteria for the protection of benthic aquatic life.

Total PAHs immediately upstream of the site ranged from 5.8 ppm to 53 ppm. Total PAHs adjacent to the site ranged from 1.8 ppm to 172 ppm and total PAHs downstream of the site ranged from 3.0 ppm to 335 ppm (see Figure 4). Several outfalls, including a combined sewer outfall, exist upstream of the site that contribute to PAH contamination in the area of concern. Two 24-inch diameter outfalls were also identified downstream of the site, but upstream of the location where 335 ppm total PAHs was identified in the sediment. Another former manufactured gas plant site, the NYSEG Auburn McMaster Street MGP Site, exists approximately one-half mile upstream and lies adjacent to the Owasco Outlet. Sediment quality in the vicinity of the Auburn McMaster Street MGP Site is being evaluated separately by the Department.

Twenty surficial sediment samples were collected from the site and submitted for forensic chemical analysis to provide information on the possible origin of PAH contamination in the samples. Two of the sediment samples, (SED-09 and SED-12), showed some of the characteristics observed in the on-site soil and NAPL samples, as well as impacts from other sources not related to former site operations. Three sediment samples were also collected from the vicinity of the dam located about 1/4 mile downstream of the site and submitted for forensic chemical analysis. This analysis concluded that these three samples were different from site contamination and showed a pattern that was characteristic of urban background sources.

In summary, it appears that MGP-related contamination is present in subsurface sediments that produced a sheen when probed and during the attempted gas main installation discussed in Section 3.2. However, analytical samples were not taken from these sheen-generating subsurface sediments to determine whether the contamination is site-related. In surface sediments, a clear pattern of site-related contamination was only observed in two samples collected adjacent to the site. The remaining surface sediments are impacted to varying degrees by other sources.

Sediment contamination identified during the RI/FS will be addressed in the remedy selection process.

Soil Vapor/Sub-Slab Vapor/Air

Six soil vapor samples were collected in the off-site residential area north of the Owasco Outlet, along with an ambient air sample for comparison. A wide variety of compounds were detected, including BTEX compounds, other fuel-related hydrocarbons and chlorinated hydrocarbons, which are not related to the site. Concentrations of certain volatile compounds were highest near the monitoring well MW-09 cluster.

Indoor air and sub-slab air data were analyzed from two houses. Concentrations of volatile organic compounds were detected at levels that are consistent with levels commonly found in homes that are heated with fuel oil. Based on an evaluation of these results, as well as with the results of environmental sampling in the area, the Department and NYSDOH have determined that no actions are necessary to address exposures to site-related contaminants due to soil vapor intrusion.. No volatile compounds exceeded NYSDOH guidance values. Therefore, no remedial alternatives need to be evaluated for this medium.

5.2: Interim Remedial Measures

There were no IRMs performed at this site during the RI/FS.

5.3: Summary of Human Exposure Pathways:

This section describes the types of human exposures that may present added health risks to persons at or around the site. A more detailed discussion of the human exposure pathways can be found in Section 6 of the RI report. An exposure pathway describes the means by which an individual may be exposed to contaminants originating from a site. An exposure pathway has five elements: [1] a contaminant source, [2] contaminant release and transport mechanisms, [3] a point of exposure, [4] a route of exposure, and [5] a receptor population.

The source of contamination is the location where contaminants were released to the environment (any waste disposal area or point of discharge). Contaminant release and transport mechanisms carry contaminants from the source to a point where people may be exposed. The exposure point is a location where actual or potential human contact with a contaminated medium may occur. The route of exposure is the manner in which a contaminant actually enters or contacts the body (e.g., ingestion, inhalation, or direct contact). The receptor population is the people who are, or may be, exposed to contaminants at a point of exposure.

An exposure pathway is complete when all five elements of an exposure pathway exist. An exposure pathway is considered a potential pathway when one or more of the elements currently does not exist, but could in the future.

No completed exposure pathways have been identified at this site. Groundwater at the site is not used for drinking water purposes since the area is served by public water. Exposures to contaminated soil by the general public are unlikely because the majority of the site is covered with stone and public access is limited. On-site workers who complete ground-intrusive activities on-site or off-site could potentially be exposed through dermal contact and/or incidental ingestion. Similarly, these workers may also be exposed to coal tar in the subsurface and contaminated groundwater. The public may also potentially be exposed as a result of dermal contact with or incidental ingestion of contaminated sediments during recreational use of the Owasco Outlet adjacent to the site. The Department and NYSDOH have determined that no actions are necessary to address exposures to site-related contaminants due to soil vapor intrusion.

5.4: Summary of Environmental Assessment

This section summarizes the assessment of existing and potential future environmental impacts presented by the site. Environmental impacts include existing and potential future exposure pathways to fish and wildlife receptors, as well as damage to natural resources such as aquifers and wetlands.

The Fish and Wildlife Impact Analysis, which is included in the RI report, presents a detailed discussion of the existing and potential impacts from the site to fish and wildlife receptors.

The following environmental exposure pathways and ecological risks have been identified:

- Sediments in the Owasco Outlet at the site contained individual PAHs that exceeded the SCG for benthic aquatic life acute and chronic toxicity. In addition, sediments at the site contained total PAHs which exceed the median effects-based criterion (35 ppm). While these values are also exceeded upstream and downstream of the site, the fingerprinting analysis, the occurrence of agitation-induced sheens, and the pattern of NAPL migration indicate that the MGP site is a contributing source to ecological exposure.

- Erosion and scour of the south and west banks could result in the discharge of NAPL into the Owasco Outlet surface water and sediments, which represents a potential exposure pathway to aquatic life.

Site contamination has also impacted the groundwater resource in the overburden and bedrock aquifers. These aquifers would be useable if not otherwise contaminated.

SECTION 6: SUMMARY OF THE REMEDIATION GOALS

Goals for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375. At a minimum, the remedy selected must eliminate or mitigate all significant threats to public health and/or the environment presented by the hazardous waste disposed at the site through the proper application of scientific and engineering principles. The goals are as follows:

Soil
- Prevent ingestion/direct contact with contaminated soil
- Prevent inhalation of contaminants from the soil
- Prevent migration of contaminants that would result in groundwater or surface water contamination.
- Prevent impacts to biota from ingestion/direct contact with soil causing toxicity or impacts from bioaccumulation through the terrestrial food chain.

Groundwater
- Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards.
- Prevent contact with contaminated groundwater
- Prevent inhalation of contaminants from groundwater
- Prevent discharge of contaminated groundwater to surface water.
- Restore the groundwater aquifer to meet ambient groundwater quality criteria to the extent practicable.

Soil Vapor
- Mitigate impacts to public health resulting from the potential for soil vapor intrusion into future buildings at a site

Sediment
- Prevent direct contact with contaminated sediments
- Prevent releases of MGP-related contaminants from sediment that would result in surface water levels in excess of ambient water quality criteria.
- Prevent impacts to biota from ingestion/direct contact with MGP-related sediments causing toxicity and impacts from bioaccumulation through the aquatic food chain.
- Restore, to the extent practicable, MGP-impacted sediments to site background conditions.

SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES

The selected remedy must be protective of human health and the environment, be cost-effective, comply with other statutory requirements, and utilize permanent solutions, alternative technologies or resource

recovery technologies to the maximum extent practicable. Potential remedial alternatives for the NYSEG Auburn Clark Street MGP Site were identified, screened and evaluated in the FS report which is available at the document repositories established for this site.

A summary of the remedial alternatives that were considered for this site is discussed below. The present worth represents the amount of money invested in the current year that would be sufficient to cover all present and future costs associated with the alternative. This enables the costs of remedial alternatives to be compared on a common basis. As a convention, a time frame of 30 years is used to evaluate present worth costs for alternatives with an indefinite duration. This does not imply that operation, maintenance, or monitoring would cease after 30 years if remediation goals are not achieved.

7.1: Description of Remedial Alternatives

The following potential remedies were considered to address the contaminated soil, groundwater and sediment at the site.

Alternative 1: No Action

The No Action Alternative is evaluated as a procedural requirement and as a basis for comparison. It requires no action at all, allowing the site to remain in an unremediated state. This alternative would leave the site in its present condition and would not provide any additional protection to human health or the environment.

Remedial Elements Common to Alternatives 2 through 5

The following remedial components are included in Alternatives 2 through 5:

- A bedrock NAPL collection program would be undertaken. An estimated fourteen NAPL recovery wells would be designed and strategically placed with the goal of maximizing the recovery of NAPL from the bedrock. A pilot study would be conducted to determine the optimal placement and design features of the well. Additional wells would be installed as needed until the Department determines that additional wells would not be cost effective.

- Approximately 100 cubic yards of sediment would be removed to the bedrock at sample locations SED-9 and SED-12 (see Figures 4 and 5). In addition, a sampling program would be undertaken in the Owasco Outlet to delineate contamination in the sediment area of concern to the bedrock. Sediments which contain visible tar, produce a tar-related sheen when agitated in water, or which contain site-related PAH compounds at levels above upstream background levels would be removed. Removed sediment would be disposed off-site. As an option, a pilot study acceptable to the Department could be undertaken to determine the viability of washing removed sediment with the objective of returning the sediment to the Outlet. Following sediment excavation, the streambed would be restored to 6 NYCRR Part 608 requirements. Where the streambank is disturbed, it would also be restored to 6 NYCRR Part 608 requirements.

- An institutional control, in the form of an environmental easement, that would restrict the use of groundwater, require compliance a site management plan; and require NYSEG to periodically certify that the institutional and engineering controls are still effective. For Alternatives 2 through 4, this would also restrict the use of the site to commercial use.

- For Alternatives 2 through 4, development of a site management plan that would identify requirements for conducting intrusive activities in the project area, handling and disposing of potentially contaminated materials that may be encountered during subsurface activities, monitoring of overburden and bedrock groundwater, notifications and reporting. The SMP

would require an evaluation and mitigation of the potential for vapor intrusion for any buildings developed on the subject properties.

- Periodic certification of the institutional and engineering controls described above.

Alternative 2 : Containment with Overburden Groundwater Collection, Bedrock NAPL Recovery, Sediment Sampling and Removal

Alternative 2 would contain MGP source material in place and would allow the substation to remain in operation. The conceptual layout of this alternative is depicted on Figure 5. In addition to the common remedial elements identified above, the major components of this alternative would be:

- Approximately 1,000 linear feet of a vertical barrier wall would be installed to surround the MGP source material and key into the bedrock. Peripheral areas containing MGP source material, such as at boring TB-09, would be excavated.

- A low permeability cap would cover the contained area (approximately 1 acre). The top foot of soil would be comprised of soil that satisfies the soil cleanup objectives (SCOs) for restricted commercial use and the protection of groundwater. Asphalt paving or stone would be substituted for the uppermost layer as needed to provide access to the substation. An ecological buffer zone along the southern edge of the Owasco Outlet, approximately 25 feet wide measured laterally from the high water level, would be provided as part of the cap. The top two feet of soil in this zone would consist of soils that meet the SCO for protection of ecological resources, and would be vegetated.

- Groundwater would be pumped from the containment area as necessary to maintain an inward hydraulic gradient across the barrier wall. Collected liquid would be treated on-site and/or disposed appropriately off-site;

One construction season would be needed to construct the remedy.

Present Worth: . . . . . $ 5.6 million
Capital Cost: . . . . . $ 3.0 million
Annual Costs: . . . . . $ 170,000

Alternative 3: Soil Solidification, Bedrock NAPL Recovery, Sediment Sampling and Removal

Alternative 3 would treat the source material in place using in-situ solidification. By this method, contaminants would be immobilized by mixing the soil with a cement-bentonite mixture which would chemically bind the contaminants, create a a low permeability mass, and reduce groundwater flow through the soil. Under this alternative the substation would be removed.

In addition to the common remedial elements identified above, the major components of this alternative would be:

- Following removal of the substation, solidification of approximately 17,000 cubic yards of MGP source material in the approximately one acre area to bedrock shown on Figure 5. Portland cement and bentonite would be used as the main solidifying agents. Peripheral areas of source material, such as at boring TB-09, would be excavated. Obstructions, such as remnant subsurface structures, would be removed.

- Soil would cover the solidified area. The top foot of soil would be comprised of soil that satisfies SCOs for restricted commercial use and the protection of groundwater. Asphalt paving or stone could be provided as needed to provide access. An ecological buffer zone along the southern edge

of the Owasco Outlet, approximately 25 feet wide measured laterally from the high water level, would be provided as part of the soil cover. The top two feet of soil in this zone would consist of soils that meet the SCO for protection of ecological resources, and would be vegetated.

- A hydraulic analysis would be conducted to determine if the change in permeability would cause flooding. Conceptually, this alternative includes installation of an upgradient groundwater diversion trench.

One construction season would be needed to construct the remedy.

Present Worth: . . . . . $ 5.2 million
Capital Cost: . . . . . $ 4.5 million
Annual Costs: . . . . . $ 50,000

Alternative 4: Source Removal, Bedrock NAPL Recovery, Sediment Sampling and Removal

In addition to the common remedial elements, Alternative 4 would remove MGP source material from the site, including from beneath the existing substation. The substation would be removed, enabling removal of underlying source material. Similar to Alternative 3 in volume and depth, approximately 17,000 cubic yards of soil containing NAPL or tar or PAHs greater than 500 ppm would be removed from the approximately one-acre area shown on Figure 5. A temporary sheet pile wall would be constructed to support the excavation and reduce the amount of dewatering required.

Soil with no visual indication of NAPL or tar and containing less than 500 ppm PAHs that is excavated to reach the targeted material, could be excavated, stockpiled and re-used as backfill in the excavation below a demarcation layer. Soil imported to the site must satisfy the soil cleanup objectives for restricted commercial use and the protection of groundwater.

The top foot of backfilled soil would be comprised of soil that satisfies the SCOs for restricted commercial use and the protection of groundwater. Asphalt paving or stone could be provided as needed to provide access. An ecological buffer zone along the southern edge of the Owasco Outlet, approximately 25 feet wide measured laterally from the high water level, would be provided as part of the soil cover. The top two feet of soil in this zone would consist of soils that meet the SCO for protection of ecological resources, and would be vegetated.

One construction season would be required to construct the remedy.

This alternative would meet, in a relatively short time, the remedial goals for public health protection. It would also satisfy the remedial goals for environmental protection.

Present Worth: . . . . . $ 7.5 million
Capital Cost: . . . . . $ 6.7 million
Annual Costs: . . . . . $ 50,000

Alternative 5: Source and Soil Removal to Unrestricted Levels, Bedrock NAPL Recovery, Sediment Sampling and Removal

In addition to the common remedial elements, Alternative 5 would remove all soil from the site that exceeds the soil cleanup objectives (SCOs) for unrestricted use. Approximately 18,500 cy of soil would be removed and disposed off-site, including from beneath the existing substation (see Figure 6). The site would be restored to approximately the existing grade using imported fill that meets the SCOs for unrestricted use. This alternative would provide a near pre-disposal condition, however, contamination would still be present within the bedrock. An environmental easement and site management plan would be required to address this remaining contamination.

One construction season would be anticipated to construct the remedy.

This alternative would meet, in a relatively short time, the remedial goals for public health protection. It would also satisfy the remedial goals for environmental protection.

Present Worth: . . . . . $ 8.2 million
Capital Cost: . . . . . $ 7.4 million
Annual Costs: . . . . . $ 50,000

7.2 Evaluation of Remedial Alternatives

The criteria to which potential remedial alternatives are compared are defined in 6 NYCRR Part 375, which governs the remediation of inactive hazardous waste disposal sites in New York A detailed discussion of the evaluation criteria and comparative analysis is included in the FS report.

The first two evaluation criteria are termed "threshold criteria" and must be satisfied in order for an alternative to be considered for selection.

1. Protection of Human Health and the Environment. This criterion is an overall evaluation of each alternative's ability to protect public health and the environment.

2. Compliance with New York State Standards, Criteria, and Guidance (SCGs). Compliance with SCGs addresses whether a remedy will meet environmental laws, regulations, and other standards and criteria. In addition, this criterion includes the consideration of guidance which the Department has determined to be applicable on a case-specific basis.

The next five "primary balancing criteria" are used to compare the positive and negative aspects of each of the remedial strategies.

3. Short-term Effectiveness. The potential short-term adverse impacts of the remedial action upon the community, the workers, and the environment during the construction and/or implementation are evaluated. The length of time needed to achieve the remedial objectives is also estimated and compared against the other alternatives.

4. Long-term Effectiveness and Permanence. This criterion evaluates the long-term effectiveness of the remedial alternatives after implementation. If wastes or treated residuals remain on-site after the selected remedy has been implemented, the following items are evaluated: 1) the magnitude of the remaining risks, 2) the adequacy of the engineering and/or institutional controls intended to limit the risk, and 3) the reliability of these controls.

5. Reduction of Toxicity, Mobility or Volume. Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility or volume of the wastes at the site.

6. Implementability. The technical and administrative feasibility of implementing each alternative are evaluated. Technical feasibility includes the difficulties associated with the construction of the remedy and the ability to monitor its effectiveness. For administrative feasibility, the availability of the necessary personnel and materials is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, institutional controls, and so forth.

7. Cost-Effectivness. Capital costs and annual operation, maintenance, and monitoring costs are estimated for each alternative and compared on a present worth basis. Although cost-effectiveness is the last balancing criterion evaluated, where two or more alternatives have met the requirements of the other criteria, it can be used as the basis for the final decision. The costs for each alternative are presented in Table 1.

This final criterion is considered a "modifying criterion" and is taken into account after evaluating those above. It is evaluated after public comments on the Proposed Remedial Action Plan have been received.

8. Community Acceptance - Concerns of the community regarding the RI/FS reports and the PRAP are evaluated. A responsiveness summary will be prepared that describes public comments received and the manner in which the Department will address the concerns raised. If the selected remedy differs significantly from the proposed remedy, notices to the public will be issued describing the differences and reasons for the changes.

9. Land Use - In proposing and selecting a remedy, the Department may consider the current, intended and reasonably anticipated future land uses of the site and its surroundings, where cleanup to predisposal conditions is determined not feasible.

SECTION 8: SUMMARY OF THE PROPOSED REMEDY

The Department is proposing Alternative 4: Source Removal, Bedrock NAPL Recovery, and Sediment Removal as the remedy for this site. The elements of this remedy are described at the end of this section.

The proposed remedy is based on the results of the RI and the evaluation of alternatives presented in the FS. Alternative 4 is being proposed because, as described below, it satisfies the threshold criteria and provides the best balance of the primary balancing criteria described in Section 7.2. It would achieve the remediation goals for the site by removing the contaminant source materials and soils that threaten human health exposures, threaten the groundwater resource and threaten aquatic life in the Owasco Outlet. Alternatives 2, and 3 would also comply with the threshold selection criteria but to a lesser degree or with lower certainty than Alternative 4. Alternative 1 (no action) does not satisfy the threshold criteria, nor satisfy the remedial goals to a sufficient degree, and thus is rejected as a remedial alternative.

Because Alternatives 2, 3, 4, and 5 would also satisfy the threshold criteria, the five balancing criteria are particularly important in selecting a final remedy for the site.

Alternatives 4 (source removal) and 5 (soil removal to unrestricted SCOs) would provide the best long term effectiveness by permanently removing soil contamination from the site. Alternatives 2 (containment), 3 (in-situ solidification) and 4 would all actively address the same volume of soil. Although containment has been successfully employed at certain other contaminated sites, its long term effectiveness would be compromised at this site by the lack of a naturally occurring low permeability stratum or floor which would prevent potential future migration of NAPL from the overburden soil into the fractures and joint sets in the limestone bedrock and subsequently under the barrier wall. The containment alternative would also require relatively high attention to constantly maintaining an inward hydraulic gradient across the barrier wall. Although Alternative 3 could also be a viable alternative, it would likely be necessary to periodically maintain the low permeability properties of the solidified mass over the long term to be comparable to the permanent removals of Alternatives 4 and 5.

Removal of soil to unrestricted use soil cleanup objectives (Alternative 5) would permanently remove the most contamination from the site and thus it would provide the best reduction of toxicity, mobility and volume. Containment of the source material (Alternative 2) would provide reduction in mobility and eliminate public health exposure, but it would not reduce the volume of contaminated soil from the current conditions. In-place solidification (Alternative 3) would reduce the mobility of the NAPL in the overburden at the site by creating a low permeability mass. Alternative 4 (source removal) permanently removes from the site the same volume of soil as that to be solidified under Alternative 3. Although Alternative 5 provides the best reduction, it provides only a marginal reduction in contaminant mass and toxicity in comparison to Alternative 4; much of the contaminant mass resides in the source area which would be removed under both Alternatives 4 and 5.

Groundwater impacts are attributable to the release of contaminants within the soil and NAPL to the aquifer. By removing the contaminated soil and NAPL, Alternative 5 would best restore the overburden aquifer over time. Alternative 4 would also restore the overburden aquifer over time as the contaminant mass, which contributes the bulk of the groundwater contamination, would be removed. Alternative 3 would eliminate the aquifer through the solidification process. Alternative 2 would not appreciably improve overburden groundwater quality.

Alternatives 2 through 5 are considered implementable. All alternatives have been implemented with success at other MGP sites in New York State. Providing a containment system (Alternative 2) and maintaining hydraulic control without a low permeability stratum as described above would be relatively more challenging. Underground foundations would have to be removed in order to provide the adequate mixing required with the in-situ solidification alternative (Alternative 3), bringing this alternative comparable to the excavations that would be undertaken with Alternatives 4 and 5. The relatively shallow excavations and easy highway access through a non-residential area favor the implementability of Alternatives 4 and 5. Alternative 2 through 5 would each require an environmental easement.

The excavation and off-site disposal components of Alternatives 4 and 5 would result in some increase in short-term impacts as compared to Alternatives 2 and 3. Truck traffic volume and the potential for fugitive dust would be highest with Alternative 5 (soil removal to unrestricted SCOs). Noise levels and other quality of life parameters would be similar for Alternatives 2 through 5 but would be the longest for Alternative 5. The Department would draw upon its experience with implementing MGP-site cleanups and regulatory requirements to minimize the potential for adverse construction impacts regardless of the alternative selected.

A remedy is considered cost-effective if its costs are proportional to its overall effectiveness. In evaluating alternatives, consideration is given to the proportional benefit gained in comparison to the cost, not just the cost alone. Alternative 3 (in-situ solidification) is estimated to have the least present worth cost of the alternatives, and would provide greater benefit than Alternative 2, since Alternative 3 would be more conducive to subsurface construction such as foundation installations or utility line repair. The low permeability cap requirement of Alternative 2 would present some challenge to foundation construction. Alternative 4 (source removal) while estimated to be more costly than Alternative 3, provides greater benefit through greater permanence and certainty in the reduction of toxicity, mobility and volume of the contaminants. Alternative 4 would also facilitate subsurface construction. Alternative 5 (soil removal to unrestricted SCOs) would be the most costly alternative to implement, and although this alternative would permanently remove the most contamination it provides only marginal contaminant removal in comparison to Alternative 4. Thus, Alternative 4 is the most cost effective of the alternatives.

Cleanup to pre-disposal conditions is not feasible at the site primarily because NAPL has migrated into the bedrock a distance of 400 feet and a depth of 68 feet (below ground surface). While there are means to remove the NAPL to a certain degree, removal of NAPL coating the rock fractures and joints is considered cost prohibitive and concluded to be not feasible. The NAPL recovery component included in Alternatives 2 through 5 would not be expected to remove residual NAPL within small fractures. Therefore, the Department has considered land use in the proposal of Alternative 4. There is reasonable certainty that the site will remain commercial, and under the ownership of NYSEG.

The estimated present worth cost to implement the remedy is $ 7.5 million. The cost to construct the remedy is estimated to be $ 6.7 million and the estimated average annual costs for the first 30 years is $50,000.

The elements of the proposed remedy are as follows:

1. A remedial design program would be implemented to provide the details necessary for the construction, operation, maintenance, and monitoring of the remedial program.

2. Excavation to the top of bedrock of all soil containing PAH concentrations greater than 500 ppm or soil containing visual tar or NAPL (approximately 17,000 cubic yards). Prior removal of the substation structures would be necessary in order to accomplish this excavation. Soils exhibiting odors, staining or sheens would not be considered for removal as visual tar or NAPL. Soils exhibiting odors, staining or sheens would however be removed if found to exceed the 500 ppm criteria. Soil with no visual indication of tar or NAPL and containing less than 500 ppm PAHs, located above or between areas meeting the removal criteria, may be stockpiled and reused as backfill below the demarcation layer described in the following paragraph.

3. Excavated soil would be treated or disposed off-site. Following excavation but prior to backfill a fabric "demarcation" layer would be provided to mark the limit of the removal. Imported soil for backfill, including soil returned to the site following appropriate treatment, would satisfy the soil cleanup objectives for the lower of commercial use or the protection of groundwater.

4. The entire site would be covered with at least one foot of backfill material that satisfies the SCOs for restricted commercial use and the protection of groundwater. Asphalt paving or stone could be utilized as needed to provide access. An ecological buffer zone along the southern edge of the Owasco Outlet, approximately 25 feet wide measured laterally from the high water level, would be provided as part of the soil cover. The top two feet of soil in this zone would consist of soils that meet the SCO for protection of ecological resources, and would be vegetated. Prior to the placement of backfilled soil a fabric demarcation layer would be provided to mark the elevation of existing site soils.

5. A bedrock NAPL collection program would be undertaken. An estimated fourteen NAPL recovery wells would be designed and strategically placed with the goal of maximizing the recovery of NAPL from the bedrock. A pilot study would be conducted to determine the optimal placement and design features of the well. Additional wells would be provided as needed until determined that any further wells would only marginally increase NAPL recovery.

6. Approximately 100 cubic yards of sediment would be removed to the bedrock at sample locations SED-9 and SED-12. In addition, a sampling program would be undertaken in the Owasco Outlet to delineate contamination in the sediment area of concern to the bedrock. Sediments which contain visible tar, produce a tar-related sheen when agitated in water, or which contain site-related PAH compounds at levels above upstream background levels would be removed. Removed sediment would be disposed off-site. As an option, a pilot study acceptable to the Department could be undertaken to determine the viability of washing removed sediment with the objective of returning the sediment to the Outlet. Following sediment excavation, the streambed would be restored to 6 NYCRR Part 608 requirements. Where the streambank is disturbed, it would also be restored to 6 NYCRR Part 608 requirements.

7. Imposition of an institutional control in the form of an environmental easement that would require (a) limiting the use and development of the property to commercial use, which would also permit industrial use; (b) compliance with the approved site management plan; (c) restricting the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by NYSDOH; and (d) NYSEG to complete and submit to the Department a periodic certification of institutional and engineering controls.

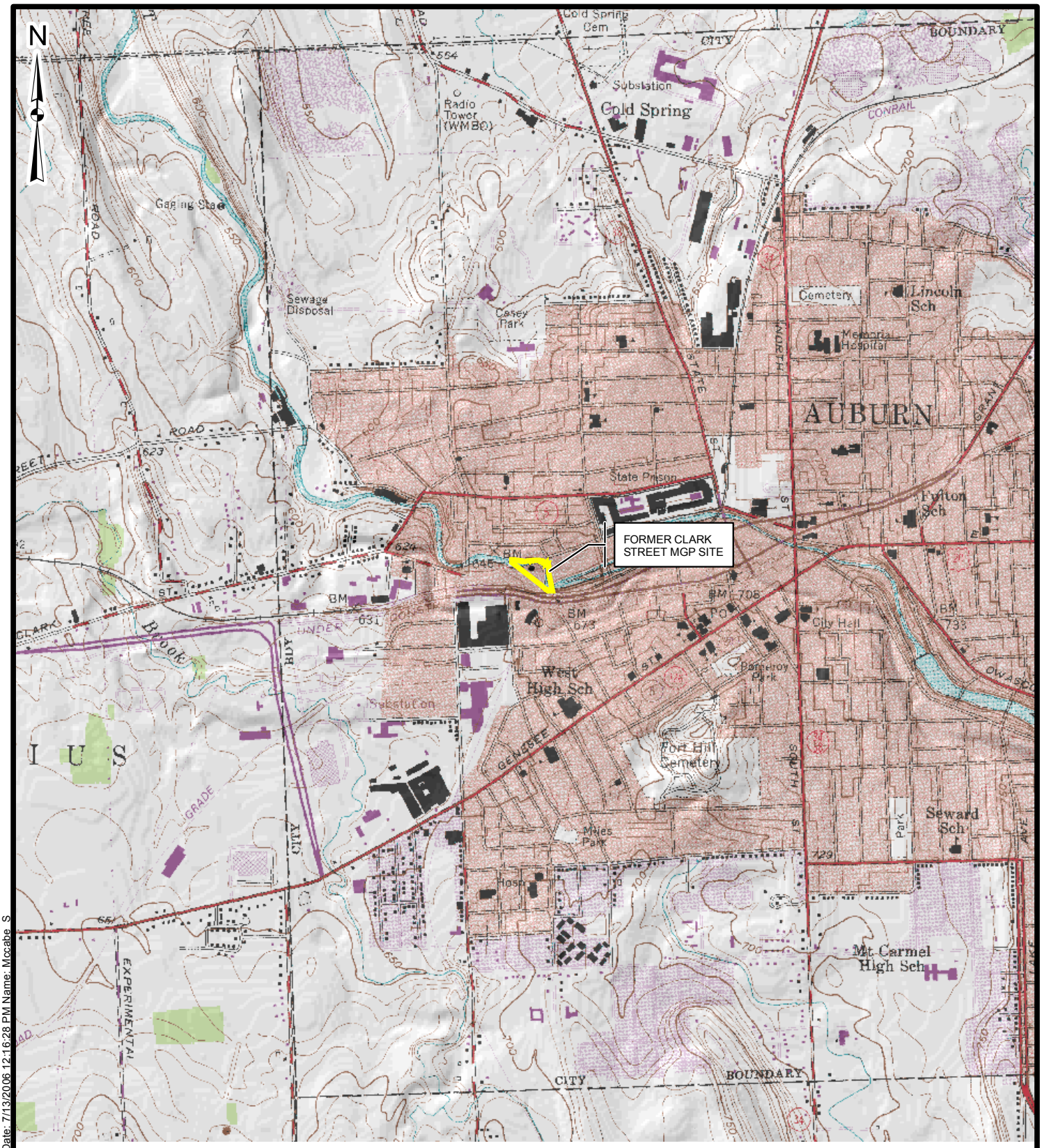
8. Development of a site management plan which would include the following institutional and engineering controls: (a) management of the final cover system to restrict excavation below the soil cover's demarcation layer, pavement, or buildings. Excavated soil would be tested, properly handled to protect the health and safety of workers and the nearby community, and would be properly managed in a manner acceptable to the Department; (b) continued evaluation of the potential for vapor intrusion for any buildings developed on the site, including provision for

mitigation of any impacts identified; (c) monitoring of groundwater; (d) identification of any use restrictions on the site; and (e) fencing or other means to control site access.

9. New York State Electric and Gas Corporation would provide a periodic certification of institutional and engineering controls, prepared and submitted by a professional engineer or such other expert acceptable to the Department, until the Department notifies NYSEG in writing that this certification is no longer needed. This submittal would: (a) contain certification that the institutional controls and engineering controls put in place are still in place and are either unchanged from the previous certification or are compliant with Department-approved modifications; (b) allow the Department access to the site; and (c) state that nothing has occurred that would impair the ability of the control to protect public health or the environment, or constitute a violation or failure to comply with the site management plan unless otherwise approved by the Department.

Table 1
Remedial Alternative Costs

Remedial Alternative	Capital Cost ($)	Annual Costs ($)	Total Present Worth ($)
Alternative 1 (no action)	0	0	0
Alternative 2 (containment)	3.0 million	170,000	5.6 million
Alternative 3 (in-situ solidification)	4.5 million	50,000	5.2 million
Alternative 4 (source removal)	6.7 million	50,000	7.5 million
Alternative 5 (unrestricted use SCOs)	7.4 million	50,000	8.2 million



SOURCE:
USGS 7.5' Quadrangle: Auburn, New York - 1991

0 1,000 2,000 4,000
Feet

URS	NYSEG - FORMER CLARK STREET MGP SITE SITE LOCATION MAP	FIGURE 1

\\A111173291.00000\DB\GIS\sitelocation.mxd Date: 7/13/2006 12:16:28 PM Name: Mccabe, S

N

OWASCO LAKE OUTLET

MW-10S (0)
MW-08S (0)
MW-09S (0)
MW-11S (0)
MW-02 (0)
MW-05 (0)
MW-01 (0)
GB-17 (0)
GB-18 (0)
TT-01 (5)
GB-02 (12.9)
TB-05 (12.2)
TB-01 (12.6)
MW-03 (12)
TP-01 (0)
TB-04 (0)
TT-02 (7)
GB-19 (11)
MW-04 (8)
TT-03 (4)
MW-06 (12.5)
GB-05 (13) [13]
GB-21 (0)
GB-22 (0)
GB-10 (13)
TB-13 (8)
GB-04 (12) [8]
TB-17 (12)
TB-07 (12)
TB-03 (12.6)
TP-02 (0) [2.8]
TT-06 (4)
GB-06 (14.5)
TB-02 (12)
TB-06 (12)
TB-16 (12)
GB-09 (14.4)
TB-15 (4) [6]
GB-11 (11) [8]
GB-01 (0)
TB-12 (12) [10]
TT-07 (4)
TP-03 (0)
GB-20 (8) [10]
TP-07 (3.5)
GB-07 (13) [6]
TB-08 (13.2)
TP-05 (3) [3]
TT-04 (4)
TB-14 (8)
TB-11 (0)
GB-12 (9.5) [10]
TP-04 (3) [3]
GB-08 (13.7)
TP-06 (0)
GB-13 (12.1)
TB-10 (8) [10]
SF-04 (0) [2]
GB-14 (0)
TB-09 (8)
TT-05 (0)
GB-16 (0)
TP-09 (0)
GB-15 (0)
TP-08 (0)

NOTES:

1. As shown on this plan, NAPL-related contamination includes one or more visual observations of coal tar staining, blebs, grain coatings, and NAPL saturation of soil pore space.

2. Limits of MGP-impacted soil are interpreted based on field observations at the nearest adjacent boring. Limits are considered approximate, actual field conditions may vary.

3. Potentially Impacted Soil Volume = 17,000 cy.
   Volume of Soils with PAH > 500 MG/KG = 1200 cy.
   Volume of Soils with PAH > 1000 MG/KG = 430 cy.
   Volume of Soils with VOCs > 10 MG/KG = 500 cy.
   Volume of Tar-Contaminated Soils = 9,600 cy.

Legend

- Soil Sample with VOCs > 10 MG/KG
- Soil Sample Location
- Soil Sample Location Encountering NAPL

Location ID — **TB-15 (4) [6]** — Maximum Depth (ft.) of PAHs > 500 MG/KG
Maximum Depth (ft.) of NAPL-related Contamination

- PAH > 500 MG/KG
- PAH > 1000 MG/KG
- Total VOCs > 10 MG/KG
- NAPL Present

- Fence
- Treeline
- NYSEG Gas Line
- Building
- Site Boundary

50 25 0 50 Feet

NYSEG - CLARK STREET FORMER MGP SITE
IMPACTED SOIL AREAS

URS

FIGURE 2

N:\11173251.00008\GIS\MS_Report_10-01-08\FIG 2-1 Impacted Soil.mxd 9/30/2008 B. Fairster

N

MW-18D

WEST STREET

MW-17D

MW-16D

MW-15D

WEST STREET

WASHINGTON ST

VENICE STREET

MW-04D
VOCs:
Benzene, 2,000
Ethylbenzene, 1,900
Toluene, 82
Xylene (total), 1,300
SVOCs:
Acenaphthene, 220
Acenaphthylene, 52
Benzo(a)anthracene, 2
Benzo(a)pyrene, 0.6
Benzo(b)fluoranthene, 1
Chrysene, 1
Fluorene, 56
Naphthalene, 4,900
Phenanthrene, 76
Phenol, 5

MW-10D
VOCs:
Benzene, 370
Ethylbenzene, 730
Toluene, 8.1
Xylene (total), 190
SVOCs:
Acenaphthene, 76
Naphthalene, 2,700

MW-08D
VOCs:
Benzene, 500
Ethylbenzene, 920
Toluene, 8.9
Xylene (total), 230
SVOCs:
Acenaphthene, 61
Naphthalene, 2,900
Phenol, 2

MW-09D
VOCs:
Benzene, 840
Ethylbenzene, 4,000
Toluene, 180
Xylene (total), 4,300
SVOCs:
Acenaphthene, 450
Benzo(a)anthracene, 2
Benzo(a)pyrene, 1
Benzo(b)fluoranthene, 1
Benzo(k)fluoranthene, 1
Chrysene, 1
Fluorene, 82
Naphthalene, 16,000
Phenanthrene, 120

MW-12D
VOCs:
Benzene, 37
Ethylbenzene, 1,600
Toluene, 150
Xylene (total), 2,000
SVOCs:
Acenaphthene, 1,500
Acenaphthylene, 66
Benzo(a)anthracene, 7
Benzo(a)pyrene, 6
Benzo(b)fluoranthene, 5
Benzo(k)fluoranthene, 1
Chrysene, 5
Fluorene, 360
Indeno(1,2,3-cd)pyrene, 2
Naphthalene, 44,000
Phenanthrene, 680

MW-14D
VOCs:
Benzene, 66
Ethylbenzene, 96
Xylene (total), 19
SVOCs:
Naphthalene, 110

MW-11D
VOCs:
Benzene, 27
Ethylbenzene, 230
Xylene (total), 83
SVOCs:
Acenaphthene, 280
Fluorene, 82
Naphthalene, 1,800
Phenanthrene, 120

OWASCO LAKE OUTLET

MW-02D

MW-01D

Gas Holder #1

Gas Holder #3

Gas Holder # 2

Former Oil Tank

CLARK STREET

ROUTE 5 & 20

Legend

- No Compounds Detected
- No Compounds Exceed Criteria For Individual VOCs or SVOCs
- At Least One Compound Exceeds Criteria For Individual VOCs and/or SVOCs
- Former MGP Structure
- Site Boundary

MW-11D
Ethylbenzene, 230
Location ID
Compound Exceeding Criteria
Concentration (ug/l)

Approximate Extent of Contamination in Bedrock Groundwater

Approximate Extent of Contamination in Overburden Groundwater

100 50 0 100
Feet

NYSEG - CLARK STREET FORMER MGP SITE
DEEP BEDROCK DISSOLVED PHASE GROUNDWATER
VOCs AND SVOCs ABOVE SCGs

URS

FIGURE 3

N:\11173291.00000\DBG\SFS_Report_10-01-08\FIG 2-7 Deep Bedrock Dissolved Phase.mxd 10/29/2008 B. Farster

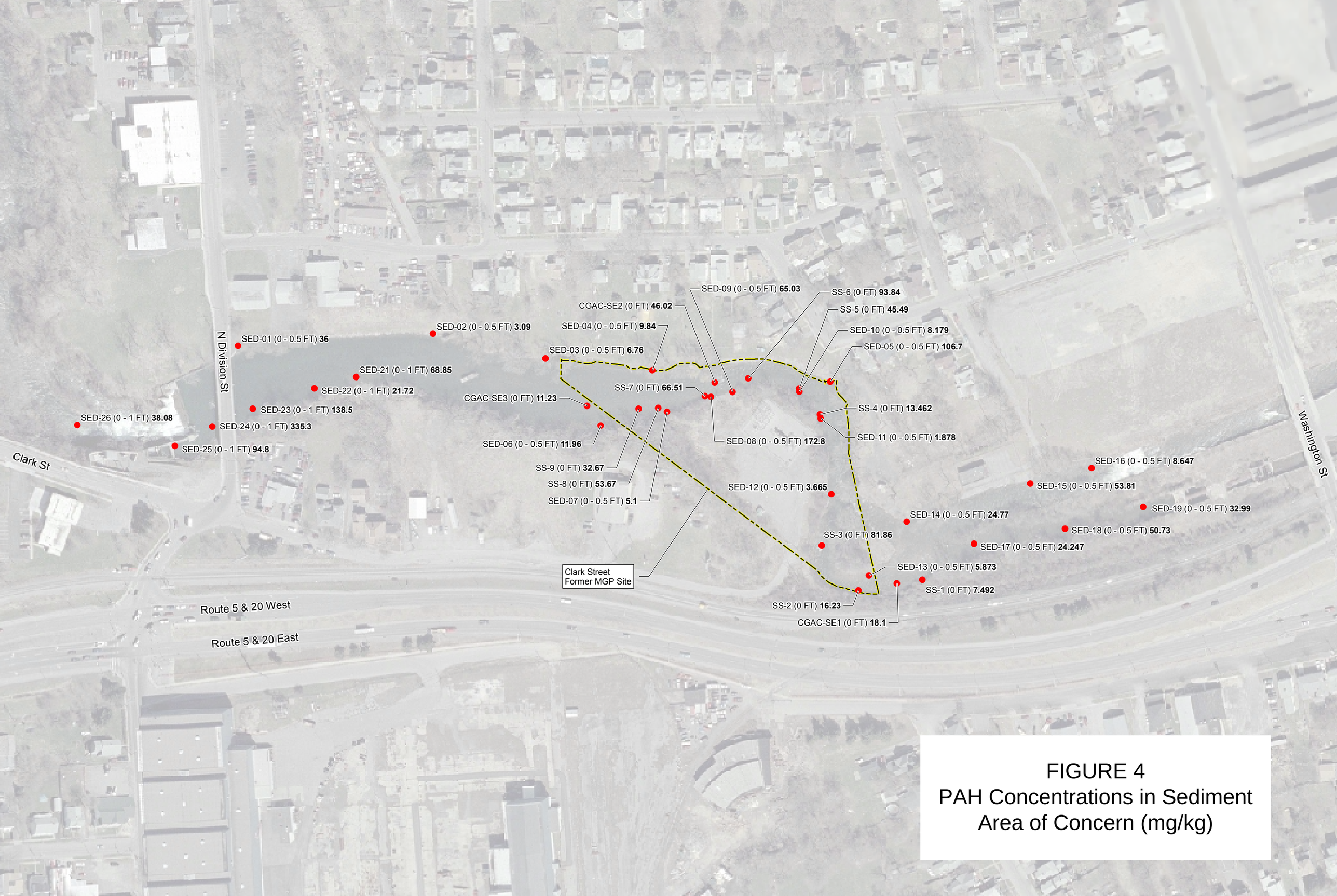


FIGURE 4
PAH Concentrations in Sediment
Area of Concern (mg/kg)

N

MW-18D

WEST STREET

MW-17D

MW-16D

MW-15D

WEST STREET

VENICE STREET

WASHINGTON ST

MW-14D

MW-10D

MW-10S

MW-08D

MW-08S

OWASCO LAKE OUTLET

MW-09S

MW-09D

MW-04

MW-04D

MW-04B

MW-03

MW-03B

MW-06

MW-06B

MW-07B

MW-12D

MW-11D

MW-11S

MW-13B

MW-02D

MW-02B

MW-02

MW-05

MW-05B

MW-01D

MW-01B

MW-01

Legend

- Existing Monitoring Well
- Existing Well for NAPL Recovery
- Proposed NAPL Recovery Well
- NYSEG Gas Line
- Roads/Parcels
- Fence
- Railroad
- Treeline
- Gravity Main to Outlet
- Proposed Treatment Facility
- Sediment Excavation Area
- Permanent Containment Wall
- Containment, Stabilization or Excavation Area
- Soil Excavation Area
- Existing Building
- Site Boundary

100 50 0 100

Feet

NYSEG - CLARK STREET FORMER MGP SITE
CONCEPTUAL LAYOUT FOR ALTERNATIVES 2, 3 AND 4

URS

FIGURE 5

N:\11173291.00000\DBG\GIS\FS_Report_10-01-08\FIG 4-1 ALT 2.mxd 10/29/2008 B. Farster

N

MW-18D

WEST STREET

MW-17D

MW-16D

MW-15D

WEST STREET

VENICE STREET

WASHINGTON ST

MW-14D

MW-10D

MW-10S

MW-08D

MW-08S

OWASCO LAKE OUTLET

MW-09S

MW-09D

MW-12D

MW-11D

MW-11S

MW-13B

MW-01D

MW-01B

MW-01

CLARK STREET

Legend

- Existing Monitoring Well
- Proposed NAPL Recovery Well
- NYSEG Gas Line
- Roads/Parcels
- Railroad
- Treeline
- Gravity Main to Outlet
- Proposed Treatment Facility
- Sediment Excavation Area
- Temporary Containment Wall
- Soil Excavation Area
- Existing Building
- Site Boundary

100 50 0 100

Feet

NYSEG - CLARK STREET FORMER MGP SITE
CONCEPTUAL LAYOUT FOR ALTERNATIVE 5
SOURCE REMOVAL TO PART 375 SCOs

URS

FIGURE 6

N:\11117329\1.00000\DB\GIS\FS_Report_10-01-08\FIG 4-4 ALT 5.mxd 11/17/2008 B. Farster