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ABBREVIATIONS AND ACRONYMS

ARARs	Applicable or Relevant and Appropriate Requirements
ACO	Administrative Consent Order
BGS	Below Ground Surface
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COCs	Constituents of Concern
COPCs	Constituents of Potential Concern
DER	Division of Environmental Remediation
GRAs	General Response Actions
HHRA	Human Health Exposure Assessment
IC/EC	Institutional Control and Engineering Control
MGP	Manufactured Gas Plant
MNA	Monitored Natural Attenuation
NAPL	Non-Aqueous Phase Liquid
NCP	National Contingency Plan
NYCRR	Codes, Rules and Regulations of the State of New York
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYSEG	New York State Electric & Gas
O&M	Operation and Maintenance
OM&M	Operation, Monitoring, and Maintenance
PAHs	Polycyclic Aromatic Hydrocarbons
PRAP	Proposed Remedial Action Plan
RAOs	Remedial Action Objectives
SCGs	Standards, Criteria, and Guidance
SCOs	Soil Cleanup Objectives
SMP	Site Soils and Groundwater Management Plan or Site Management Plan
TAGM	Technical Administrative Guidance Memorandum
TOGS	Technical and Operational Guidance Series
USEPA	United States Environmental Protection Agency

FEASIBILITY STUDY REPORT
Jackson Street Former Manufactured Gas Plant (MGP) Site
(NYSDEC Site # 862008)
Penn Yan, New York

EXECUTIVE SUMMARY

BACKGROUND

AMEC Geomatrix, Inc. (AMEC) prepared this Feasibility Study (FS) Report on behalf of New York State Electric & Gas Corporation (NYSEG) for the Former Jackson Street Manufactured Gas Plant (MGP) Site (NYSDEC Site No: 862008) located in Penn Yan, New York. The FS was conducted pursuant to an Administrative Order on Consent Index Number D0-0002-9309 (the "Order") between NYSEG and the New York State Department of Environmental Conservation ("NYSDEC") dated March 30, 1994. The results of this FS will be used by the NYSDEC to select a remedial alternative for the Site.

The Site is a former MGP located on Linden Street (formerly known as Jackson Street) in the Village of Penn Yan, New York. The Site is owned by NYSEG and encompasses approximately 0.7 acres. It is bordered by residential property to the north, the Yates County Correctional Facility to the south, Linden Street to the west, and Jacobs Brook to the east. The Site is situated near the northern edge of the downtown business district of the Village of Penn Yan. The land use transitions from residential to commercial in a southerly direction. The property is currently zoned as "General Residential (R-2)" which is established for single or two-family residential development. Properties north, east, and west of the Site are residential.

SITE GEOLOGY AND HYDROGEOLOGY

A layer of fill material consisting of silty sand and gravel containing C&D debris with ash and cinder-like material extends across a majority of the Site. The fill materials were likely placed following MGP decommissioning as the Site was developed into residential property during the early 1900s. The fill material is unsaturated. Coal tar was not found to be present on the ground surface or in the fill material. Native soil below the fill is glacial till composed of materials having variable grain size and density. Overall, the bulk composition of the till material is dense and consists of a fine-grained matrix; however, portions of the till have uniform grain size, are less dense, and occasionally include coarse sand size material.

The water table is present approximately 9 to 13 feet below the ground surface of the Site. As a result, the majority of fill material is unsaturated. Groundwater flows through till in an eastward direction toward Jacobs Brook with a horizontal hydraulic gradient of approximately 0.016. Hydraulic conductivity values are considered low to moderate ranging from 1.0×10^{-6} cm/s (MW-5) to 5.4×10^{-3} cm/s (MW-2). As would be expected, the wide range of values is reflective of the heterogeneity of till composition. Shallow groundwater at the Site discharges to Jacobs Brook. Groundwater that discharges to the Brook will flow with surface water to the south for approximately 1/2 mile to the Brook's confluence with the Keuka Lake Outlet.

NATURE AND EXTENT OF IMPACTS

Investigations conducted at the Site identified constituents of potential concern (COPCs) namely BTEX, PAHs, and total cyanide in Site media. These constituents are typical of MGP sites. Impacts in Site media are summarized below.

Surface and Shallow Soil: PAHs and certain metals were detected at slightly elevated concentrations relative to Unrestricted Use SCOs in surface soil samples collected from the Site. Metals were not detected above Restricted Use SCOs for commercial property. Supplemental sampling was conducted and results indicate that the elevated metals concentrations, above the Unrestricted Use SCOs, are attributed to the historic fill placed during the early 1900s.

Subsurface Soil: Elevated concentrations of BTEX and PAHs were detected in some soil samples collected from subsurface soils in the area of the former MGP buildings and the gas holder foundation. Impacted soils as evidenced by sheens and/or elevated PID readings (volatile compounds detected at 20 ppm or higher) were identified in the saturated zone at boring locations BH-1, BH-2, BH-7, BH-10, BH-11, BH-17, BH-22, and BH-24. Among these locations, total BTEX concentrations were detected above 10 mg/kg at borings BH-1, BH-2, and BH-7. Individual BTEX compounds were not detected above Restricted Use SCOs for commercial property in subsurface soil. Total PAHs were detected above 500 mg/kg at boring BH-2. No other samples contained total PAHs above 500 mg/kg. Individual PAH compounds were present at concentrations above Restricted Use SCOs for commercial property at only a few boring and test pit locations.

Groundwater: Organic compounds (BTEX, styrene, and several PAHs) and total cyanide were detected in groundwater above groundwater standards at some well locations. The highest concentrations were detected at well MW-4S located downgradient from the former refuse wells and MGP buildings. The groundwater impacts were substantially less in the deeper well at that location indicating groundwater impacts near the Brook are limited primarily to the upper 20 to 30 feet of the saturated zone. Dissolved oxygen concentrations are sufficiently high to indicate biodegradation of petroleum compounds in groundwater is likely occurring.

Jacobs Brook Sediment and Surface Water: Sampling results of Jacobs Brook surface water and sediment, the receptor of groundwater discharge from the Site, indicate no significant impact from the Site.

Soil Vapor: The SVI investigation of the adjacent home indicated that no actions were necessary to reduce exposure to volatile Site-related COPCs via inhalation of vapors.

HUMAN HEALTH EXPOSURE ASSESSMENT

A qualitative human health exposure assessment was performed to identify potential exposure pathways associated with impacted media for current and future receptors at the Site. Current on-Site commercial/maintenance workers and trespassers may potentially be exposed to COPCs in surface soil via dermal contact and inhalation of particles under certain activities that disturb surface soils. However; the exposure duration by a worker or trespasser would be short and the potential for exposure is considered to be low. A future on-Site construction worker involved with subsurface soil excavation for utilities was considered. Although potential exposure pathways were considered complete under this scenario, worker exposure could be minimized through implementation of a Construction Soils Handling and Management Plan

REMEDIAL ACTION OBJECTIVES

Remedial action objectives (RAOs) were developed in the FS for impacted media identified at the Site which are protective of human health and the environment.

The RAOs for the Site are to eliminate or reduce, to the extent practicable:

- Ingestion of MGP-related COCs in soil and groundwater
- Contact with or inhalation of MGP-related COCs in soil and groundwater

The RAOs above are consistent with media specific remedial action objectives identified in remedy selection methods presented in NYSDEC DER-10 (NYSDEC, 2010) and New York State's Approach to the Remediation of Former MGP Sites (NYSDEC, www.dec.ny.gov/chemical/8430.html)

DEVELOPMENT OF REMEDIAL ALTERNATIVES

In consideration of technological-, site-, medium-, and contaminant-specific factors, remedial alternatives for soil and groundwater were developed to address RAOs. The alternatives are identified and described below.

SOIL REMEDIAL ALTERNATIVES

Alternative S-1 – No Further Action: No remedial activities beyond the RI/FS would be conducted at the Site.

Alternative S-2 – Institutional Controls: This alternative would implement institutional controls to provide special protocols for any excavation and soil use at the Site. An Institutional Control and Engineering Control (IC/EC) Plan would be prepared with a formalized deed restriction for the Site property. The IC/EC would include procedures for handling residual contaminated soils that may be excavated from the Site during future activities.

Alternative S-3 – Remove Soil Above 6NYCRR Part 375 Unrestricted Use Soil Cleanup Objectives: This alternative involves the excavation and removal of soil containing COCs above Part 375 Unrestricted Use SCOs. Under this alternative, the approximately 10,000 cubic yards of soil would be removed containing constituents at concentrations above Part 375 Unrestricted Use SCOs.

GROUNDWATER REMEDIAL ALTERNATIVES

Alternative GW-1 – No Further Action: Under this alternative, no active remedial activities would be conducted.

Alternative GW-2 – Institutional Controls: This alternative would require the implementation of institutional controls in the form of governmental, proprietary, enforcement, or permit controls to restrict groundwater usage.

Alternative GW-3 – Monitored Natural Attenuation: Naturally occurring chemical, biological, and/or physical processes that degrade MGP-related COCs in groundwater would be monitored under this alternative. Institutional controls as described above for Alternative GW-2 would also be included in Alternative GW-3.

RECOMMENDED REMEDIAL ALTERNATIVES

Recommended Soil Remedial Alternative

Alternative S-3 is not considered a reasonable alternative given the current and future Site use and the significant disruption to the community that would result from implementation of this alternative. The RI showed that COCs present in soils at the Site have not resulted in off-Site impacts to groundwater. Therefore, it is unlikely these soils represent a continuing source of potential offsite groundwater impacts. The environmental benefit associated with Site excavations is therefore marginal. Alternative S-2 would provide protocols for excavation or use of soil on Site without unnecessary Site disturbance and community disruption and is therefore recommended as the preferred alternative. The estimated cost to implement Alternative S-2 is $140,000.

Recommended Groundwater Remedial Alternative

Alternative GW-1 would not be considered fully protective of human health and the environment. Alternative GW-2 would protect human health and the environment from exposure to impacted groundwater. Alternative GW-3 provides long term monitoring of groundwater; however, the alternative provides little additional benefit since steady state (or receding) groundwater plume conditions exist following 70 years of Site inactivity and investigation data shows no off-site impacts. Alternative GW-2 is therefore recommended as the preferred alternative. The estimated cost to implement Alternative GW-2 is $30,000.

FEASIBILITY STUDY REPORT
Jackson Street Former Manufactured Gas Plant (MGP) Site
(NYSDEC Site # 862008)
Penn Yan, New York

1.0 INTRODUCTION

1.1 GENERAL

This Feasibility Study (FS) Report has been prepared by AMEC Geomatrix, Inc. (AMEC) on behalf of New York State Electric & Gas Corporation (NYSEG) for the Former Jackson Street Manufactured Gas Plant (MGP) Site (NYSDEC Site No: 862008) located in Penn Yan, New York (Figure 1). The FS was conducted in accordance with the requirements of Administrative Order on Consent Index Number D0-0002-9309 (the "Order") between NYSEG and the New York State Department of Environmental Conservation ("NYSDEC") dated March 30, 1994. This FS report has been prepared consistent with applicable guidance pursuant to the following:

- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, the National Contingency Plan (NCP), and the United States Environmental Protection Agency (USEPA)
- DER-10 Technical Guidance for Site Investigation and Remediation (NYSDEC, 2010)
- Environmental Remediation Programs, NYSDEC 6NYCRR Part 375

1.2 PURPOSE AND REPORT ORGANIZATION

The results of this FS will be used by the NYSDEC to select a final remedial alternative for the Site. This FS Report is organized in accordance with DER-10 Remedy Selection Reporting Requirements and CERCLA guidance and includes the following sections:

- Section 1 presents the purpose and regulatory framework governing the preparation of this FS Report and describes relevant background information
- Section 2 presents Remedial Investigation findings
- Section 3 identifies chemical-, action-, and location-specific standards, criteria, and guidelines
- Section 4 identifies constituents of concern and remedial action objectives
- Section 5 describes general response actions, conducts a technology screening and develops remedial action alternatives

- Section 6 presents the evaluation of remedial alternatives
- Section 7 presents a comparative analysis of remedial alternatives
- Section 8 provides a recommendation of a preferred alternative

1.3 BACKGROUND

This section provides background information regarding the Site setting, current/historical uses of the Site and Site features.

1.3.1 Site Setting and Property Usage

The subject property is a former MGP located on Linden Street (formerly known as Jackson Street) in the Village of Penn Yan, New York (see Figure 1). The Site is owned by NYSEG and encompasses approximately 0.7 acres. It is bordered by residential property to the north, the Yates County Correctional Facility to the south, Linden Street to the west, and Jacobs Brook to the east (Figure 2). The Site is situated near the northern edge of the downtown business district of the Village of Penn Yan. The land use transitions from residential to commercial in a southerly direction. The property is currently zoned as "General Residential (R-2)" which is established for single or two-family residential development. Properties north, east, and west of the Site are residential.

The property is readily accessible to the general public from Linden Street. A split rail wood fence demarcates the northern property boundary with the adjacent residential property. Jacobs Brook is accessible to the general public through private residential and commercial properties situated on the east side of the Brook. The recreational use of the Brook by the general public is expected to be limited based on limited access (requires traversing private property) and the heavily wooded nature of the area paralleling both sides of the Brook. It is possible that older children and adolescents could play, on occasion, in the area of the Brook. The Brook could also be used for fishing (non-game fish). The Brook is not sufficiently deep to support boating/canoeing/tubing or swimming. Figure 3 shows existing and previous Site features and Site topography

1.3.2 Site Structures

The Site is a grass-covered, unoccupied residential lot with several large trees and two garages (wood-construction). A recent aerial photograph (Figure 2) shows current Site features. NYSEG currently uses the rear garage for storage of small service equipment. The garage closest to Linden Street is used for household storage and vehicle parking by a nearby resident. At this time NYSEG has no plans for Site divestiture or Site development.

2.0 REMEDIAL INVESTIGATION FINDINGS

This section summarizes the findings of remedial investigations conducted at the Site and describes the nature and extent of MGP impacts in Site media. Investigations were conducted by Atlantic (1991 – 1993), and AMEC Geomatrix (2007-2008). The RI Report was approved by the NYSDEC on March 5, 2009.

RI soil and groundwater sampling locations are shown on Figure 4. RI stream sediment and surface water sampling locations are shown on Figure 5.

2.1 SITE GEOLOGY AND HYDROGEOLOGY

Site geology and hydrogeology were characterized during scope of work implementation. The deepest soil borings penetrated through 42 feet of overburden material. Bedrock was not encountered during the investigation. The overburden was found to consist of fill materials which overlie heterogeneous glacial till.

The fill is composed of brick fragments, clinker, ash, coal, and lime in a matrix of silt, sand, and gravel and is covered by a thin layer (generally a few inches thick) of topsoil and sod. The thickness of the fill ranges from less than 2 feet to approximately 16 feet in on-Site borings with fill thickness increasing in the eastern portion of the Site (above the stream bank). Native soil below the fill is glacial till composed of materials having variable grain size and density. The overall bulk composition of the till material is dense and consists of a fine-grained matrix; however, portions of the till have uniform grain size, are less dense, and occasionally include coarse sand size material.

The water table is present approximately 9 to 13 feet below the ground surface of the Site. As a result, the majority of fill material is unsaturated. As shown on Figure 6, groundwater flows through the till in an eastward direction toward Jacobs Brook with a horizontal hydraulic gradient of approximately 0.016. Hydraulic conductivity values are considered low to moderate ranging from 1.0×10^{-6} cm/s (MW-5) to 5.4×10^{-3} cm/s (MW-2). As would be expected, the wide range of values is reflective of the heterogeneity of till composition. Shallow groundwater at the Site discharges to Jacobs Brook. Groundwater that discharges to the Brook will flow with surface water to the south for approximately 1/2 mile to the Brook's confluence with the Keuka Lake Outlet.

2.2 OBSERVATIONS OF MGP-RELATED SOURCE MATERIALS

MGP-related source materials (i.e., tars, soil saturated with tar, purifier waste materials) were not observed on the ground surface at any area of Site. In the subsurface, potential source materials associated with former MGP structures were investigated through inspection of bulk

soil observed during test pit excavation and in soil samples and drill cuttings obtained from soil borings. Former MGP structures investigated for MGP-related source materials included: the gas holder foundation and the locations of former MGP process areas that included the former gas purifier house, retort, coal storage and machine shop area, naphtha storage tank area, and refuse wells. Possible MGP-related source material was identified by: PID readings at or above 20 ppm (which at this Site frequently resulted in laboratory soil sample analytical results for total BTEX concentrations approaching or exceeding 10 mg/kg), soil with a noted coal tar- or petroleum-like odor and/or soil where black-brown tar-like material was observed.

Fill and soil exhibiting MGP impacts, noted as coal tar-like odors and PID readings at or above 20 ppm, were identified at soil borings completed near the former retort (BH-2) and the former gas purifier house (BH-10, BH-24). In addition, a coal tar like odor and elevated PID readings (20 ppm) were identified in native soil from 19 to 22 feet below ground surface at BH-7 which is situated northeast of the gas holder and immediately south of the former coal shed. Borings and test pits completed in other locations on the Site did not exhibit significant MGP impact.

Sediment probing in Jacobs Brook did not find evidence of MGP impact. No tars or sheens were produced when probing stream sediments. The 1993 Atlantic Task II investigation identified gas purifier residual materials (typically Prussian blue stained soil with wood chips) on the stream bank near the southeast corner of the Site. The visual extent of those materials was removed using hand tools at the time of that investigation. Soil borings completed in the area, BH-13 through BH-16, showed no evidence of purifier residual materials.

2.3 NATURE AND EXTENT OF IMPACTS

Investigations conducted at the Site identified constituents of potential concern (COPCs) namely BTEX, PAHs, and total cyanide in subsurface soil and groundwater above regulatory criteria. These constituents are typical of MGP sites.

The subsections below describe the sample analytical results and investigation findings for surface and subsurface soil, groundwater, Jacobs Brook sediment and surface water, and residential ambient air. The analytical results were compared to the regulatory criteria as follows:

- Comparison criteria for surface and subsurface soil samples are the 6NYCRR Subpart 375-6, Remedial Program Soil Cleanup Objectives (SCOs) for Unrestricted Property Use and Restricted Use SCOs for Commercial Property (December 14, 2006), herein referred to as Unrestricted Use SCOs and Restricted Use SCOs, respectively. The Restricted Use SCOs for

commercial property were included for comparison based on current property use by NYSEG as a storage facility for small equipment and supplies.

- Comparison criteria for groundwater and surface water samples are the NYSDEC Ambient Water Quality Standards and Guidance in Technical and Operational Guidance Series (TOGS) 1.1.1 (June 1998) and 6NYCRR Part 703: Surface Water and Groundwater Quality Standards and Effluent Limitations.

- Analytes detected in sediment samples were compared to the NYSDEC Technical Guidance for Screening Contaminated Sediments (1994, 1999) and site-specific background concentrations.

- Analytes detected in ambient air samples were compared to the 75th percentile NYSDOH guidance values presented in Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006).

Constituents detected above comparison criteria are summarized in Table 1.

2.3.1 Surface Soil

Surface soil sampling locations and results are shown on Figure 7. Surface soil samples collected during the RI were analyzed for TCL SVOCs, TAL metals, and total cyanide. With the exception of DSS10, analyses of each surface soil sample detected two or more individual PAH compounds at concentrations above Unrestricted Use SCOs. Comparison to Restricted Use SCOs for commercial property indicates only benzo(a)pyrene and dibenzo(a,h)anthracene were present in some samples at concentrations above the comparison soil criteria. All Total PAH compound concentrations were well below 500 mg/kg. The highest total PAH compound concentration in a discrete soil sample was detected at DSS2 (73.6 mg/kg). That surface soil sample was collected from a location near the southern Site boundary, within 10 feet of the asphalt paved parking lot for the Yates County Correctional Facility. Figure 7B identifies sample locations where PAHs were detected above Unrestricted Use SCOs.

Lead and mercury were detected above Unrestricted Use SCOs in each of the 11 surface soil samples. Zinc was detected above the Unrestricted Use SCO in all samples except DSS3. Copper and arsenic were also detected above Unrestricted Use SCOs in one or more samples. However, none of the samples contained metals at concentrations above the Restricted Use SCOs for commercial property. The highest metals concentrations were

detected in sample DSS2. Figure 7C identifies sample locations where metals were detected above Unrestricted Use SCOs.

Supplemental surface soil samples were collected on June 22, 2009 from six locations for TCL SVOCs and TAL Metals including total cyanide. These locations are considered to be representative of background soil locations. Constituent concentrations detected in the on-Site surface soil samples are similar to those in supplemental surface soil samples collected from areas considered to be representative of background.

Total cyanide was not detected above Unrestricted Use SCOs in any surface soil samples.

2.3.2 Subsurface Soil

Subsurface soil sampling locations and results are shown on Figure 8. Subsurface soil samples collected from borings and test pits during the RI were analyzed for MGP constituents of concern (BTEX, PAH compounds, and total cyanide). Chemical impacts in soil were primarily BTEX and, to a lesser degree, PAH compounds in the area of the gas holder foundation and former MGP buildings and structures. Individual VOCs exceeded their respective Unrestricted Use SCOs at several locations; none of the soil samples exceeded the Restricted Use SCOs for commercial property. Similarly, while individual PAHs exceeded their respective Unrestricted Use SCOs at two on-Site boring locations, the limit of 500 mg/kg for PAHs was not exceeded at any on-Site or off-Site location samples taken during the RI, and the number of individual PAHs present above Restricted Use SCOs was limited to four or fewer compounds. Soil samples collected from off-Site locations (MW-2 {9.2 – 10.8 feet}, MW-3A {24 – 26 feet} and MW-5 {18 – 22 feet}) were not elevated with respect to Unrestricted Use SCOs. Figure 8B identifies sample locations where PAHs were detected above Unrestricted Use SCOs. Detections of BTEX above Unrestricted Use SCOs are shown on Figure 8C.

Total cyanide was not detected above Unrestricted Use SCOs in any of the subsurface soil samples.

2.3.3 Jacobs Brook Side Slope Soil

Surface soil and subsurface soil samples were collected from the side slope west of Jacobs Brook near the southeastern Site boundary. Soil samples were analyzed for TCL SVOCs and total cyanide. PAH concentrations detected in soil are similar to concentrations detected in the grass-covered area of the Site. While some individual PAH compounds exceeded their respective Unrestricted Use SCOs and Restricted Use SCOs for commercial property, no samples exceeded the 6NYCRR Subpart 375-6 total PAH limit of 500 mg/kg. Total cyanide was not elevated in soil, indicating 1993 soil removal actions were successful in removing impacts from purifier residuals.

2.3.4 Groundwater

Groundwater samples collected from each of the 8 monitoring wells were analyzed for TCL VOCs, TCL SVOCs, TAL metals, and total cyanide. Analytical results for groundwater samples are summarized on Figure 9. VOCs associated with petroleum hydrocarbon compounds were detected above applicable groundwater standards in samples collected from monitoring wells MW-1 (upgradient edge of Site), MW-3A (cross gradient to Site), and well pair MW-4S and MW-4D.

PAHs were detected above groundwater standards in three samples: MW-4S, MW-4D (located adjacent to the former Refuse Wells), and MW-5. Consistent with VOC results, the highest concentrations were detected in sample MW-4S; seven individual PAH compounds were detected above groundwater standards. Naphthalene was the only PAH detected at a concentration above the groundwater standard in MW-4D. The concentration in MW-4D was approximately 100 times lower than the concentration detected in the shallow well. Four individual PAH compounds were detected in MW-5 at concentrations marginally above standards. Figure 9B identifies sample locations where benzene and SVOCs were detected above groundwater standards.

The majority of samples contained iron, manganese, and sodium at concentrations above groundwater standards. The samples are unfiltered and the analysis is sensitive to suspended solids in the sample. These metals at the detected concentrations are common in unfiltered groundwater samples collected from glacial soils

Total cyanide was detected marginally above groundwater standards in samples analyzed from wells MW-1 and MW-4S.

The highest concentrations were detected at well MW-4S located downgradient from the former refuse wells and MGP buildings. The groundwater impacts were substantially less in the deeper well at that location (MW-4D) indicating groundwater impacts near the Brook extend are limited primarily to the upper 20 to 30 feet of the saturated zone.

The presence of benzene in MW-1 (upgradient) and MW-3A (cross-gradient) suggests the presence of an off-Site source of that compound that may be contributing in part to the benzene concentrations detected in on-Site wells.

Dissolved oxygen concentrations are sufficiently high to indicate biodegradation of aromatic hydrocarbon compounds in groundwater is likely occurring.

2.3.5 Jacobs Brook Sediment

Jacobs Brook sediment sampling results above the sediment criteria and the background ranges are summarized on Figure 10. Sediment samples were collected upstream and downstream from the Site. Samples collected upstream (background samples) were analyzed for PAHs and TAL metals. Sediment samples collected: immediately upstream from the Site (one sample), adjacent to the Site (2 samples), and downstream from the Site (1 sample) were analyzed for TCL VOCs, TCL SVOCs, TAL metals, and total cyanide.

Several individual PAH compounds were detected in background sediment samples and some at concentrations above sediment criteria. The range of Total PAH concentrations was 0.44 to 30.0 mg/kg. The NYSDEC sediment criterion for the lowest effect level for Total PAHs is 4 mg/Kg. Nickel was the only metal detected in background samples above sediment criteria. Background sediment sample results indicate point source discharges from numerous storm sewer discharge outfall pipe affect sediment quality in Jacobs Brook. VOCs were not detected in any of the sediment samples. SVOCs, metals, and total cyanide were not detected above sediment criteria in samples SED-DWNSTRM2 and SED-DWNSTRM3 which were collected from sediment in Jacobs Brook adjacent to the Site.

Several individual PAHs, Total PAHs, and nickel were detected above sediment criteria in sediment collected from sample location SED-DWNSTRM1 which is located farther downstream behind the Yates County Correctional Facility. Benzo(a)pyrene and dibenzo(a,h)anthracene were detected at a concentration above both the sediment criteria and above the background range of individual PAH compound detections. Total PAHs were also detected slightly above the range of values detected as background. The sediment sample location is downstream from an outfall pipe that is assumed to discharge storm water from the parking area of the Yates County Correctional Facility.

The detected concentrations in samples collected adjacent to and downstream from the Site were typically within the range of PAHs detected in upstream samples (background). The majority of sediment samples are dominated by concentrations of pyrene, benzo(b)fluoranthene, chrysene, and fluoranthene and are fairly diverse with respect to the relative concentrations. MGP impacts in soils exhibit a more consistent pattern and are generally dominated by concentrations of naphthalene, phenanthrene, anthracene, and fluoranthene. The comparison of sediment sample PAH fingerprints and PAH fingerprints of MPG impacted soil show no discernable influence on the PAH chemistry of downstream sediment samples from on-Site PAHs.

2.3.6 Jacobs Brook Surface Water

Surface water samples were collected upstream, directly across from the Site and downstream from the Site and analyzed for TCL VOCs, TCL SVOCs, TAL metals, and total cyanide. VOCs, SVOCs, and total cyanide were not detected in surface water samples. Detected metals concentrations were similar in each of the four samples analyzed. Iron concentrations were detected above surface water criteria in each of the four samples.

2.3.7 Residential Indoor Air

Indoor air samples were collected at five locations and one outdoor ambient air sample was collected at the Linden St. Residence. Sample locations are shown on Figure 11. Compounds detected above background concentrations appearing in the NYSDOH database in the samples from the living quarters and crawl space areas are chlorinated hydrocarbons. In the air sample collected from the basement, chlorinated hydrocarbons and naphthalene, a non-chlorinated hydrocarbon, were detected.

Chlorinated hydrocarbon compounds are not typical compounds encountered at former MGP sites and the compounds detected are not uncommon for homes utilizing household products such as cleaning supplies, glues, paints, air deodorizers and other products containing volatile hydrocarbon-based chemicals. Napthalene is a compound commonly associated with byproducts from former MGP sites, but it is also used as a common household fumigant for moths and other pests (i.e. mothballs).

2.4 HUMAN HEALTH EXPOSURE ASSESSMENT

A qualitative human health exposure assessment was completed following the guidelines presented in the *NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation* (NYSDEC, 2010) to identify potential exposure pathways associated with impacted media for current and future receptors at the Site. Current on-Site commercial/maintenance workers and trespassers may potentially be exposed to COPCs in surface soil via dermal contact and inhalation of particles under certain activities that disturb surface soils. However; the exposure duration by a worker or trespasser would be short and the potential for exposure is considered to be low. A future on-Site construction worker involved with subsurface soil excavation for utilities was considered. Although potential exposure pathways were considered complete under this scenario, worker exposure could be minimized through implementation of a Construction Soils Handling and Management Plan.

The SVI investigation of the adjacent home indicated that no actions were necessary to reduce exposure to volatile Site-related COPCs via inhalation of vapors. While several non-MGP-related VOCs were detected in ambient air above air guidelines in the living quarters,

naphthalene or other COPCs were not detected above NYSDOH air guidelines in the living quarters of the home.

2.5 ECOLOGICAL RISK ASSESSMENT – FISH AND WILDLIFE IMPACT ANALYSIS

A NYSDEC Fish and Wildlife Impact Analysis (FWIA) was conducted in support of the remedial investigation. The FWIA was conducted using the FWIA Analysis Decision Key outlined in "*DER-10 Technical guidance for Site Investigation and Remediation*" (Effective May 2010) and the steps described in "*NYSDEC Division of Fish and Wildlife, Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites (FWIA)*", dated October 1994, (NYSDEC, 1994). The environmental sampling results suggest constituent concentrations detected in Site media pose a low risk fish and wildlife. Potential adverse impacts to ecological resources were not identified at the Site.

3.0 IDENTIFICATION OF STANDARDS, CRITERIA, AND GUIDELINES

This section provides a summary of the regulations that are considered applicable or relevant and appropriate requirements (ARARs) to remediation of the Site and establishes the potential standards, criteria, and guidelines (SCGs) that have been identified for the Site. The SCGs considered for the remedial alternatives analyzed in this FS Report were classified as follows:

Chemical-Specific SCGs – These SCGs are health- or risk-based numerical values or methodologies that, when applied to site-specific conditions, result in the establishment of numerical values for each constituent(s) of concern (COC). These values establish acceptable concentrations of chemical constituents found in site media.

Action-Specific SCGs – These SCGs are technology or activity based requirements or limitations on actions taken with respect to hazardous waste management.

Location-Specific SCGs – These SCGs are restrictions placed on the conduct of activities solely because of locality based requirements.

Chemical-specific, action-specific, and location-specific SCGs considered in this Feasibility Study are summarized in Tables 2A through 2C.

4.0 DEVELOPMENT OF REMEDIAL ACTION OBJECTIVES AND GENERAL RESPONSE ACTIONS

4.1 CONSTITUENTS OF CONCERN AND REMEDIAL GOALS

This section presents the remedial action objectives (RAOs) for impacted media identified at the Site. These RAOs represent medium-specific goals that are protective of human health and the environment (USEPA, 1988; NYSDEC, 2002). These objectives are, in general, developed by considering the results of the exposure evaluation and with reference to potential SCGs identified for the project area. The constituents of concern (COCs) and associated impacted media for the Jackson Street Former MGP Site are:

- PAHs and metals in Site surface soil
- BTEX and PAHs in Site subsurface soil
- BTEX and PAHs in Site groundwater

As described in Section 2.4, a qualitative human health exposure assessment (HHEA) was conducted to identify COPCs and evaluate human receptors at the Site and nearby areas based on current and foreseeable land use. The HHEA found that levels of Site-related COPCs in some on-Site soil and groundwater exceeded comparative screening criteria. Current on-Site commercial/maintenance workers and trespassers may potentially be exposed to COPCs in surface soil via dermal contact and inhalation of particles under certain activities that disturb surface soils. However; the exposure duration by a worker or trespasser would be short and the potential for exposure is considered to be low. Potential human exposure to impacted subsurface soil is limited to construction workers conducting excavation activities (through incidental dermal contact, inhalation, and ingestion). Other than the construction worker scenario, there are no complete on-Site or off-Site exposure routes to groundwater because groundwater in the vicinity of the Site is not used as a drinking water source and municipally supplied water is available and is used by area residents and business occupants.

4.2 REMEDIAL ACTION OBJECTIVES

According to USEPA guidance, RAOs for protecting human receptors can include qualitative and quantitative remediation goals for COCs in association with an exposure route (e.g., subsurface soil, groundwater, etc.). Protectiveness may be achieved qualitatively by eliminating exposure (such as covering an area, limiting access, or providing an alternate water supply) or by reducing the quantifiable levels of COCs.

The RAOs for the Site are to eliminate or reduce, to the extent practicable:

- Ingestion of MGP-related COCs in soil and groundwater

- Contact with or inhalation of MGP-related COCs in soil and groundwater

The RAOs above are consistent with media specific remedial action objectives identified in remedy selection methods presented in NYSDEC DER-10 (NYSDEC, 2010) and New York State's Approach to the Remediation of Former MGP Sites (NYSDEC, www.dec.ny.gov/chemical/8430.html).

4.2.1 Surface Soil

A layer of sod and grass cover the Site which limits potential exposure to surface soil. However, the Site is not fenced, is readily accessible to the public via Linden Street, and, other than mowing, a maintenance program that would ensure integrity of the sod and grass does not exist. Therefore, a RAO for surface soil will target reducing potential future risks associated with human exposure to COCs in the shallow soil below the layer of sod and grass.

4.2.2 Subsurface Soil

The potential for direct contact with subsurface soil could occur only during soil excavation/trenching construction activities. RAOs applicable to subsurface soil were developed to reduce potential risks to future construction workers associated with human exposure to COCs in subsurface soil.

4.2.3 Groundwater

Groundwater at the Site is not used for drinking and nearby residences in the area surrounding the Site rely on municipally supplied water for their domestic water supply. Therefore, the greatest potential for exposure is via direct contact that may occur during excavation/trenching construction work where depths are greater than 8 to 10 feet below ground surface.

RAOs applicable to groundwater were developed to reduce the potential for exposure to Site-related COCs in groundwater.

5.0 TECHNOLOGY SCREENING AND DEVELOPMENT OF REMEDIAL ALTERNATIVES

5.1 INTRODUCTION

Remedial technology identification and screening presented in this section consists of: identification of general response actions to satisfy the RAOs; identification of potentially applicable remedial technologies that fall within the general response categories; and screening of those technologies with respect to their relative effectiveness, technical implementability and relative cost in meeting the RAOs for the Site. Technologies identified for this MGP Site have been selected from the host of technologies considered potentially effective for use at MGP sites in general, and include primarily those technologies that have been previously implemented successfully at other MGP sites.

5.2 GENERAL RESPONSE ACTIONS

Based on the RAOs identified in Section 4.2, the following Site-specific General Response Actions (GRAs) are established for soil and groundwater at the Site:

- No Further Action
- Institutional Controls
- In-Situ Treatment
- Removal

5.2.1 No Further Action

In many feasibility studies, the no action response is typically identified and carried through the evaluation process as a point of comparison for other actions.

5.2.2 Institutional Controls

Institutional controls are applicable to soil and groundwater. These actions include access control measures, deed restrictions with environmental easements, and established procedures for managing ground-intrusive work through implementation of a Site Soils and Groundwater Management Plan. Specific institutional controls could be tailored to the remedy chosen.

5.2.3 In-Situ Treatment

In-situ treatment is applicable to the soil and groundwater. Treatment alters the physical and/or chemical nature of the media to cause a change in contaminant mass, mobility, or toxicity. Treatment can be accomplished in-situ or ex-situ.

5.2.4 Removal

Excavation is applicable to shallow soil. Excavation of impacted shallow soils could be accomplished using conventional construction equipment and methods. Deeper excavations would pose significant challenges considering the small size of the Site and limited space available for stockpiling, loading and excavation stabilization measures.

For each of these GRAs, remedial technologies have been identified for each impacted medium as described below. The No Further Action GRA has been included and retained throughout the screening evaluation as required by USEPA and NCP guidance.

5.3 TECHNOLOGY IDENTIFICATION AND SCREENING

Remedial technologies potentially applicable for achieving the RAOs for the Site were identified through a variety of sources including vendor information, engineering experience and review of available literature, including the following documents:

- DER-10 Technical Guidance for Site Investigation and Remediation (NYSDEC, 2010)
- Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (Interim Final) (USEPA, 1988)
- Technology Screening Guide for Treatment of CERCLA Soils and Sludges (USEPA,1988)
- Management of Manufactured Gas Plant Sites (Gas Research Institute, 1996)
- USEPA Technology Briefs – Data Requirements for Selecting Remedial Action Technologies (various dates)

Preliminary screening was performed to focus the number of potentially applicable technologies on the basis of technical implementability and effectiveness (long- and short-term). Technical implementability was evaluated based on site characterization information collected during the remedial investigations to screen out technology types and process

options that could not be effectively implemented at the Site. The effectiveness of a technology is determined through its ability to achieve RAOs.

5.3.1 Surface Soil

RAOs were developed to mitigate exposures to surface soil containing MGP-related COCs immediately below the grass and sod at the Site. The existing surface cover material which serves as a barrier to minimize direct contact with COCs in shallow soil at the former MGP property could, with proper maintenance, achieve these RAOs. However, the Site is not fenced, is readily accessible to the public via Linden Street , and, other than mowing, a maintenance program that would ensure integrity of the sod and grass does not exist. Removing shallow soils and placing clean fill cover would achieve RAOs.

Barrier technology and excavation are retained for further evaluation to address surface and shallow soil at the Site.

5.3.2 Subsurface Soil

Table 3 summarizes the screening of technologies evaluated for general response actions identified in Section 5.2 for subsurface soil. As shown in the table, the technologies screened include No Further Action, Institutional Controls, and Removal.

The No Further Action alternative is included as a baseline to which other remedial alternatives are compared. Institutional controls for access restrictions (restrictions in the form of governmental, proprietary, enforcement or permit controls and/or informational devices [e.g., signs, postings, etc.]) are retained for further evaluation.

Excavation of subsurface soil (removal) was retained for further evaluation. This technology is a proven process for removing impacted soil and MGP material. Excavation of soil is considered implementable; however, Site-specific constraints (e.g., large extent of historic fill and logistics of Site) pose technical challenges. Where deeper excavations are considered, sheet piling with bracing along Jacobs Brook would be necessary. The equipment required to install steel sheeting and the required footprint of the working space required to install sheeting are large. Given the small size of the Site, the space required to complete deeper excavations could pose limitations on the implementability of deeper excavations. Equipment and labor capable of soil excavation are readily available and, while unit capital costs can be high (primarily for the disposal of excavated soil), engineering, mobilization, and O&M costs are considered low. Excavated soil could be treated off-Site and properly disposed of, or disposed directly in a non-hazardous solid waste landfill.

5.3.3 Groundwater

Table 4 summarizes the screening of technologies evaluated for general response actions identified in Section 5.2 for groundwater. The technologies considered are remedial options that would address COCs in groundwater (BTEX and PAHs). As shown in the table, the technologies include No Further Action and Institutional Controls. The No Further Action alternative is included as a baseline to which other remedial alternatives are compared. It will be retained for further consideration. Institutional controls for groundwater usage restrictions (restrictions in the form of governmental, proprietary, enforcement or permit controls and/or informational devices [e.g., signs, postings, etc.]) could effectively prevent exposure and are retained for further evaluation.

Other technologies considered include:

In-Situ Treatment – The in-situ remedial treatment technologies considered for groundwater is passive biological treatment (i.e., monitored natural attenuation). As described in Section 2.3.4, field evidence indicates natural attenuation of COCs is occurring at the Site. Dissolved oxygen (DO) concentrations in upgradient groundwater are sufficiently high to stimulate biological activity in the subsurface to degrade hydrocarbon compounds in groundwater. Lower DO concentrations on-site suggest biodegradation is occurring. The presence of benzene in MW-1 (upgradient) and MW-3A (cross-gradient) suggests the presence of an off-source of that compound that may be contributing in part to the benzene concentrations detected in on-Site groundwater. These observations are documented in the RI Report. Monitored natural attenuation is retained for further evaluation.

5.3.4 Summary of Retained Technologies

The technologies retained for further evaluation are:

Soil:

- Institutional Controls
- Excavation

Groundwater:

- Institutional Controls
- Monitored natural attenuation

These technologies are developed into remedial action alternatives in Section 5.4.

5.4 DEVELOPMENT OF REMEDIAL ACTION ALTERNATIVES

This section assembles retained remedial actions and technologies into a list of remedial alternatives applicable to soil and groundwater. These alternatives are described in detail below and are evaluated in Section 6.0 using criteria specified in NYSDEC DER-10 (NYSDEC, 2010). In consideration of technological, site, medium, and contaminant-specific factors, remedial alternatives for soil and groundwater developed to address RAOs are identified and described below.

5.4.1 Soil Remedial Alternatives

Including the No Further Action alternative, three alternatives (S-1 through S-3) have been developed to address Site soil:

- S-1: No further action
- S-2: Institutional controls
- S-3: Removal (excavation and off-Site disposal) of soils containing COCs at concentrations above 6NYCRR Part 375 Unrestricted Property Use SCOs.

5.4.1.1 Alternative S-1 – No Further Action

Under the no further action alternative, no remedial activities beyond the RI/FS would be conducted at the Site.

5.4.1.2 Alternative S-2 – Institutional Controls

This alternative would implement institutional controls in the form of governmental, proprietary, enforcement, or permit controls and/or informational devices (e.g., signs, postings, etc.) to provide special protocols for any excavation and soil use at the Site. A Deed restriction would be established for the parcel to preclude Site development for unrestricted or restricted residential use. Institutional controls would also include preparation of an Institutional Control and Engineering Control Plan (IC/EC) which would detail the steps and requirements necessary to assure the institutional controls remain in place and effective. The IC/EC plan would also include a Site Soil and Groundwater Management Plan (SMP) to address the following:

1. Provide procedures for handling residual contaminated soils that may be excavated from the Site during future construction or become exposed after demolition and removal of existing structures including underground structures (i.e., utilities). The SMP would require soil characterization and, where applicable, disposal/reuse in accordance with NYSDEC regulations.

2. Evaluate the potential for vapor intrusion for any occupied commercial buildings to be developed on the Site, including provision for mitigation of any impacts identified.

3. Identify any future use restrictions or institutional controls.

4. Provide for maintenance of the grass cover at the Site (regular mowing and placement of sod or reseeding as appropriate to prevent development of unvegetated soil).

5.4.1.3 Alternative S-3 – Remove Soil Above 6NYCRR Part 375 Unrestricted Use Soil Cleanup Objectives

This alternative involves the excavation and removal of soil containing COCs above Part 375 Unrestricted Use SCOs. Under this alternative, all of the historic fill material (estimated to include the upper 6 to 15 feet of soil/fill, including the entire bank of Jacobs Brook) as well as deeper soils containing COCs at concentrations above Part 375 Unrestricted Use SCOs to a depth would be removed. Excavating deep soils along Site boundaries would necessitate sheet pile installation around portions of the Site perimeter. Erosion control, development of a Storm Water Pollution Prevention Plan (SWPP), and other regulatory requirements (e.g., community air monitoring plan) would be necessary as part of the detailed design of this alternative.

For the purposes of this FS, approximate excavation limits are shown on Figure 12. Actual excavation limits would be determined by completion of a pre-design sampling investigation. Alternative S-3 entails excavation of approximately 10,000 cubic yards (cy) of soil for off-Site disposal.

5.4.2 Groundwater Remedial Alternatives

Including the No Further Action alternative, three remedial alternatives have been developed to address MGP impacted groundwater. Groundwater is not used as a drinking water source in the area and sampling of Jacobs Brook indicates surface water quality is not affected by Site constituents in groundwater. Alternatives are described below.

5.4.2.1 Alternative GW-1 – No Further Action

Under this alternative, no active remedial activities would be conducted.

5.4.2.2 Alternative GW-2 – Institutional Controls

This alternative would require the implementation of institutional controls in the form of governmental, proprietary, enforcement, or permit controls to restrict groundwater usage.

5.4.2.3 Alternative GW-3 – Monitored Natural Attenuation

The MGP-related constituents detected in groundwater above standards are amenable to natural biodegradation. Naturally occurring chemical, biological, and/or physical processes that degrade MGP related COCs in groundwater (natural in-situ treatment) occur at the Site and would be monitored under this alternative. These processes would continue to reduce the toxicity, mobility, and mass of dissolved phase MGP constituents in groundwater. A groundwater monitoring program would be developed for the Site to monitor on-Site and off-Site groundwater quality. The monitoring program would assess groundwater flow direction, conditions affecting natural attenuation processes, and monitor concentrations of COCs in groundwater. No new monitoring wells are required under this alternative. Monitoring wells would be sampled semi-annually for the first five years. After five years of monitoring, all monitoring results would be compiled and evaluated to ascertain whether or not continued monitoring is required.

Institutional controls as described above for Alternative GW-2 would also be included in Alternative GW-3.

6.0 EVALUATION OF REMEDIAL ALTERNATIVES

NYSDEC requires an analysis of remedial alternatives against seven criteria and specifies factors to consider for each criterion. The seven criteria, also described in NCP regulations and in NYSDEC DER-10 include the following:

- Short-Term Effectiveness
- Long-Term Effectiveness
- Reduction of Toxicity, Mobility, or Volume
- Implementability
- Compliance with SCGs
- Overall Protection of Human Health and the Environment
- Cost

Evaluation criteria are described in Section 6.1 and the evaluation of alternatives is presented in Section 6.2. In addition to the seven criteria described above, Community Acceptance will be evaluated after the public review of the remedy selection process as part of the NYSDEC's selection/approval of a remedy for the Site. A Proposed Remedial Action Plan (PRAP) will be prepared by the NYSDEC which will describe the proposed selected remedy for public review and comment. NYSDEC will consider community comments on the PRAP in their final selection of the remedy for the Site.

6.1 EVALUATION CRITERIA

6.1.1 Short-term Impacts and Effectiveness

The potential short-term adverse impacts and risks of the remedy to the community, Site workers, and the environment during the construction and/or implementation are evaluated. The evaluation includes a discussion of how the identified adverse impacts and health risks to the community or workers at the Site will be controlled and the effectiveness of the controls. Engineering controls that could be used to mitigate short term impacts (i.e., dust control measures) will also be considered. Included in the evaluation of short-term impacts will be a qualitative assessment of contributions to greenhouse gas emissions. The relative greenhouse gas emissions from sources such as combustion of fossil fuels associated with transportation, operation of treatment systems, and other technologies will be considered.

The length of time needed to achieve the remedial objectives is also addressed in this evaluation.

6.1.2 Long-term Effectiveness and Performance

This criterion evaluates the long-term effectiveness of the remedy after implementation. If wastes or treated residuals remain on-Site after the selected remedy has been implemented, the following items are evaluated:

- The magnitude of the remaining risks (i.e., will there be any significant threats, exposure pathways, or risks to the community and environment from the remaining wastes or treated residuals?)
- The adequacy of the engineering and institutional controls intended to limit the risk
- The reliability of these controls
- The ability of the remedy to continue to meet RAOs in the future

6.1.3 Reduction of Toxicity, Mobility, or Volume with Treatment

This criterion evaluates the remedy's ability to reduce the toxicity, mobility, or volume of Site contamination. Preference is given to remedies that permanently and significantly reduce the toxicity, mobility, or volume of the wastes at the Site.

6.1.4 Implementability

The technical and administrative feasibility of implementing the remedy is evaluated. Technical feasibility includes the difficulties associated with the construction and the ability to monitor the effectiveness of the remedy. For administrative feasibility, the availability of the necessary personnel and material is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, and other factors influencing the construction of the alternative.

6.1.5 Compliance with Standards, Criteria, and Guidance (SCGs)

Compliance with SCGs addresses whether or not a remedy will meet applicable environmental laws, regulations, standards, and guidance. Chemical-specific, action-specific, and location specific-SCGs for the Site are summarized in Tables 2A through 2C. The evaluation will include a discussion of SCGs that affect each alternative.

6.1.6 Overall Protection of Public Health and the Environment

This criterion entails an evaluation of the remedy's ability to protect public health and the environment, based on assessment of how risks posed through each existing or potential pathway of exposure are eliminated, reduced, or controlled through removal, treatment,

engineering controls or institutional controls. The remedy's ability to achieve each of the RAOs is evaluated.

6.1.7 Cost

Capital, operation, maintenance, and monitoring costs are estimated for the remedy and presented on a present worth basis.

6.2 EVALUATION OF ALTERNATIVES

This section presents the detailed evaluation of the remedial alternatives for soil and groundwater with respect to the evaluation criteria described in Section 6.1.

6.2.1 Soil Remedial Alternatives

Three soil remediation alternatives have been developed to address impacted soils at the Site:

- S-1 No Further Action
- S-2 Institutional Controls
- S-3 Remove Soil above 6NYCRR Part 375 Unrestricted Use SCOs

These alternatives are evaluated below.

6.2.1.1 Alternative S-1 – No Further Action

Technical Description: Under the no further action alternative, no remedial actions would be conducted to address soils at the Site. There would be no restrictions pertaining to soil use or management placed on the current or future uses of the property.

Short-Term Effectiveness: The no further action alternative would not pose any short term risks associated with implementation as it involves no construction activities. Since the existing Site grass and sod cover would likely prevent human exposure to Site soils (except for the future on-Site construction worker exposure scenario), it would most likely be effective in attaining the RAOs for soil over the short term.

Long-Term Effectiveness: The no further action alternative would be less effective in attaining the RAOs for soil over the long term. Without proper maintenance, the existing Site grass and sod cover could be subject to erosion and underlying soils could become exposed. Future subsurface construction work performed at the Site, which would be allowed without restriction under this alternative, could not only expose workers but could result in the uncovering and uncontrolled redistribution of subsurface soils on the ground surface. The no further action alternative cannot be considered to have satisfactory long term effectiveness in attaining the RAOs.

Reduction of Toxicity, Mobility, or Volume: Under the no further action alternative the reduction of toxicity, mobility or volume of contamination would only occur as a result of the ongoing natural attenuation processes occurring in soil at the Site. As such, no further action would result in progressively lower concentrations of COCs in soil over time.

Implementability: The implementability criterion is not applicable to the no further action alternative.

Compliance with SCGs: The no further action alternative would not achieve any improvement with respect to compliance with SCGs.

Overall Protection of Human Health and the Environment: Over the short term, the no further action alternative is protective of human health and the environment as the existing Site grass and sod cover prevents contact with impacted soils. The lack of Site restrictions would allow future exposures potentially associated with subsurface excavation activities.

Cost: There is no cost associated with the no further action alternative.

6.2.1.2 Alternative S-2 – Institutional Controls

Technical Description: Alternative S-2 would implement institutional controls in the form of governmental, proprietary, enforcement, or permit controls and/or informational devices (e.g., signs, postings, etc.) to provide special protocols for any excavation and soil use or disturbance at the Site. A Deed restriction would be established for the property to preclude Site development for unrestricted or restricted residential use. Institutional controls would also include an Institutional Control and Engineering Control (IC/EC) Plan to be incorporated into the environmental easement for the property. The IC/EC would include a include Soil and Groundwater Management Plan (SMP). The SMP would include the following:

1. Provide procedures for handling residual contaminated soils that may be excavated from the Site during future construction activities or become exposed after demolition and removal of existing structures including underground structures. The SMP would require soil characterization and, where applicable, disposal/reuse in accordance with NYSDEC regulations.

2. Evaluate the potential for vapor intrusion for any buildings to be developed on the Site, including provision for mitigation of any impacts identified.

3. Identify any future use restrictions or institutional controls.

4. Provide for maintenance of the grass cover at the Site (regular mowing and placement of sod or reseeding as appropriate to prevent development of unvegetated soil).

Short-Term Effectiveness: Alternative S-2 would not pose any short term risks associated with implementation as it involves no construction activities. Since the existing Site grass and sod cover prevents human exposure to Site soils (except for the on-Site construction worker exposure scenario), it would be effective in attaining the RAOs for soil over the short term.

Long-Term Effectiveness: Alternative S-2 would be more effective than Alternative S-1 in attaining the RAOs for soil over the long term. The SMP would include a maintenance program to prevent erosion and potential exposing of underlying soils. The SMP would also control any subsurface construction work performed at the Site in that it would specify safety measures to prevent worker exposure and procedures for proper soil handling/disposal and excavation closure.

Reduction of Toxicity, Mobility, or Volume: Alternative S-2 would not reduce toxicity, mobility or volume of contamination except as results from the ongoing natural attenuation processes in soil at the Site. As such, Alternative S-2 would result in progressively lower concentrations of COCs in soil over time.

Implementability: The incorporation of a Deed restriction and SMPs into Site remediation programs would be subject to legal review and follow the necessary legal process in the State of New York. However, these controls are commonly required for remediated sites in New York and present no implementability concerns.

Compliance with SCGs: Alternative S-2 would not achieve any improvement with respect to compliance with SCGs.

Overall Protection of Human Health and the Environment: Alternative S-2 is protective of human health and the environment as the existing Site grass and sod would be maintained to prevent contact with impacted surface soils and the SMP would provide protocols to control potential future exposure to subsurface soil. Alternative S-2 would meet the RAOs for soil.

Cost: The costs to implement Alternative S-2 are associated with the preparation of the SMP and legal fees associated with the preparation and filing of the environmental easement. The estimated cost to implement Alternative S-2 is $140,000 as shown in Table 5.

6.2.1.3 Alternative S-3 – Remove Soil Above 6NYCRR Part 375 Unrestricted Use Soil Cleanup Objectives

Technical Description: Alternative S-3 involves the excavation and removal of soil containing COCs above Part 375 Unrestricted Use SCOs and is presented as a NYSDEC requirement. Under this alternative, historic fill material (including the entire bank of Jacobs Brook) as well as deeper soils containing COCs at concentrations above Part 375 Unrestricted Use SCOs would be removed. Excavating soil near the Site boundaries would necessitate sheet pile installation around portions of the Site perimeter. Erosion controls and development of a Storm Water Pollution Prevention Plan (SWPP), among fulfilling other permit requirements would be necessary.

For the purposes of this FS, approximate excavation limits are shown on Figure 12. Alternative S-3 entails demolition of existing on-site structures, tree removal, and excavation of approximately 10,000 cy of soil for off-Site disposal. Actual excavation limits would be determined in a pre-design sampling investigation. In addition to the pre-design investigation, the planning required for this alternative would be extensive given the volume of soil to be removed and disposed. Because deeper excavations would extend below the water table, temporary dewatering of the excavations would be required. This water would be pumped to on-Site storage tanks and sent to a permitted off-Site water treatment facility. The design documents for Alternative S-3 would include provisions for community air monitoring, odor control contingencies, vibration monitoring and noise control (during sheeting installation/removal), and public safety and traffic control contingencies.

Certified clean soils/stone will backfill all excavations performed under this alternative and the ground surface would be graded and seeded as appropriate.

This alternative would not require implementation of an SMP since surface and shallow soils containing COCs above SCOs would be removed. This alternative would satisfy RAOs for soil by minimizing contact and ingestion of COCs in soil. By removing soils that could theoretically impact groundwater quality, this alternative could also serve to reduce COCs in groundwater. However, little to no additional protection of human health and the environment would be afforded by this alternative since groundwater is not a source of drinking water and surface water quality in Jacobs Brook is not impacted. Most of the soil removed for this alternative would be historic fill materials unrelated to the past MGP activities.

Short-Term Effectiveness: Alternative S-3 entails excavation of approximately 10,000 cy of soil for off-Site disposal. There would be substantial short term considerations associated with open excavations, stockpiling and/or loading of impacted materials and transport of haul trucks to and from the Site.

The likely excavation limits for Alternative S-3 are shown approximately on Figure 12. The excavation areas would extend to the sidewalk adjacent to Linden Street and to the bank of Jacobs Brook to the east and to the property lines to the North and South of the Site. Sheeting would be driven around parts of the Site perimeter and other locations on Site as necessary to facilitate excavating deep soils. Noise and vibration concerns would be monitored during installation and would impact residential life quality and business operations on Linden Street. Odors from the excavation and stockpiles could be noticeable to persons walking or driving on Linden Street even with construction odor management. The planning and design for Alternative S-3 would therefore include a community air monitoring plan with provisions for odor controls as necessary. Implementation of a vibration monitoring/loss control plan would also be needed during sheeting installation/removal. It may be necessary to close Linden Street to pedestrian and vehicle traffic during work activities.

The excavation areas shown on Figure 12 are estimated to be excavated to the average depth as shown on the map. Due to the Site space limitations, there would likely be no attempt to segregate impacted soil from less impacted soil. All excavated soil would be transported off-Site for proper disposal. In addition, if practical, excavated soils could be loaded directly into trucks without stockpiling. This would also minimize odors and logistical issues associated with soil handling and stockpiling. However, this “load and go” strategy requires staging of trucks on-Site or nearby to minimize excavation downtime.

It is estimated that the excavations could be completed over a three month period following preparation of all required plans and specifications. A total of approximately 10,000 cy representing approximately 800 truck loads. Another 800 trucks would be required for delivery of replacement fill to the Site. This would pose a significant increase in truck traffic in the vicinity of the Site over the course of the project. Safety concerns associated with this large an increase in truck traffic in an area unaccustomed to such traffic are considerable and likely not entirely avoidable. Staging of the trucks represents a challenge as there may not be room on Linden Street. Truck traffic and staging will result in community disruption and inconvenience to nearby residents and businesses located along Linden Street. Logistics issues associated with Alternative S-3 are far more complex than for any of the other alternatives.

Fossil fuel use and emissions (including greenhouse gas emissions) would be associated with implementation of Alternative S-3.

After construction and backfilling with certified clean soils, Alternative 3 would be immediately effective in attaining the RAOs.

Long-Term Effectiveness: Alternative S-3 would be highly effective in meeting project RAOs without any post-construction maintenance or institutional controls.

Reduction of Toxicity, Mobility, or Volume: Alternative S-3 would reduce the volume of MGP and historic fill impacts at the Site through removal and off-Site disposal at a permitted facility. Alternative S-3 would remove approximately 10,000 cy of soil, most of which has been impacted primarily by the presence of historic fill.

Implementability: Implementation of the excavations and off-Site disposal poses major concerns. As indicated above, special excavation procedures (sheet pile installation) will be required for excavating deep soils. Dewatering would also be required since excavations would extend below the water table.

Truck staging and traffic represents a major concern with respect to community disruption and safety. Planning to stage and manage the truck traffic will be extensive and require community input. Safety concerns associated with this large an increase in truck traffic in an area unaccustomed to such traffic are considerable and likely not entirely avoidable.

Compliance with SCGs: Alternative S-3 would comply with all applicable chemical specific, action specific, and location specific SCGs identified in Tables 2A, 2B, and 2C. Erosion controls and development of a Storm Water Pollution Prevention Plan (SWPP), among fulfilling other permit requirements would be necessary to implement Alternative S-3

Overall Protection of Human Health and the Environment: Alternative S-3 would be protective of human health and the environment. Exposures to impacted soils would be eliminated by replacing all MGP impacted and historic fill impacted soils with clean backfill.

However, Alternative S-3 would provide additional environmental benefit relative to Alternative S-2 only if the excavations reduce the source of potential impacts to groundwater. This would only be the case if the MGP and historic fill impacted materials contain elevated concentrations of mobile COCs. Based on the RI results, COCs present in soils at the Site have not likely resulted in off-Site impacts to surface water or groundwater. Additionally, the presence of benzene in MW-1 (upgradient) and MW-3A (cross-gradient) suggests the presence of an off-source of that compound that may be contributing in part to the benzene concentrations detected in on-Site wells. On this basis, it is unlikely these soils represent a continuing source of mobile COCs which could impact off-Site surface water or groundwater. Also, removal of on-Site soil would not mitigate any off-source that may be contributing to benzene concentrations in on-Site wells. Excavation of these MGP and historic fill impacted

soils to achieve Part 375 Unrestricted Use SCOs would provide little or consequential environmental or human health benefit.

Alternative S-3 would consume a significant resource (soil) in that it would require excavation of soil from a greenfield location and transporting it to the Site. It also would also utilize off-Site landfill space.

Cost: The estimated cost to implement Alternative S-3 is approximately $4,485,000 as shown in Table 6.

6.3.2 Groundwater Remedial Alternatives

6.3.2.1 Alternative GW-1 – No Further Action

Technical Description: Under this alternative, no active groundwater remediation activities would be conducted.

Short-Term Effectiveness: Since impacted groundwater has not likely migrated off-Site and is not used on-Site or by local residents and commercial businesses (municipal water is used by nearby residents and businesses), over the short term this alternative may be considered protective of the public and the environment.

Long-Term Effectiveness: Lacking institutional controls, GW-1 would not prevent future exposure to COCs in on-Site groundwater.

Reduction of Toxicity, Mobility, or Volume: Alternative GW-1 would reduce toxicity, mobility or volume of contamination as a result of the ongoing natural attenuation processes at the Site.

Implementability: There are no implementability concerns with Alternative GW-1.

Compliance with SCGs: Natural attenuation processes may eventually attain chemical specific SCGs at the Site. If the plume is stable or receding, natural attenuation processes would continue to prevent off-Site exceedance of SCGs.

Overall Protection of Human Health and the Environment: The no further action alternative for groundwater may be protective of human health and the environment. However, while on-Site use of groundwater is unlikely given the current and foreseeable uses of the Site and the availability of public water, there should be a formal restriction on shallow groundwater use at the Site as long as the applicable chemical specific SCGs are exceeded.

Cost: There are no costs associated with GW-1.

6.3.2.2 Alternative GW-2 – Institutional Controls

Technical Description: This alternative would require the implementation of institutional controls in the form of governmental, proprietary, enforcement, or permit controls to restrict groundwater usage. In addition, procedures to control and prevent exposure during any future excavations below the water table would be included in the easement or SMP as appropriate.

Short-Term Effectiveness: On-Site use of impacted groundwater would be prohibited by institutional controls. Impacted groundwater has likely not migrated off-Site and is not used on-Site by local residents and commercial businesses. Therefore, over the short term this alternative would be considered protective of human health and the environment.

Long-Term Effectiveness: Institutional controls incorporated into Alternative GW-2 would prevent exposure to COCs in on-Site groundwater. Impacted groundwater has likely not migrated off-Site and is not used by local residents or commercial businesses. The long term effectiveness of this alternative depends solely on natural attenuation processes to maintain a stable or receding plume of COC impacted groundwater. This appears to be a valid condition since industrial activity on the parcel occurred more than 70 years ago and COC concentrations in groundwater were lower during RI sampling than the Atlantic investigations completed in the early 1990s.

Reduction of Toxicity, Mobility, or Volume: Alternative GW-2 would reduce toxicity, mobility or volume of contamination as a result of the ongoing natural attenuation processes at the Site.

Implementability: A Deed restriction regulating on-Site use of impacted groundwater would be subject to legal review and follow the necessary legal process in the State of New York. However, these controls are commonly required for remediated Sites in New York and present no implementability concerns.

Compliance with SCGs: Natural attenuation processes may eventually attain chemical specific SCGs at the Site. If the plume is stable or receding, natural attenuation processes would continue to prevent off-Site exceedance of SCGs.

Overall Protection of Human Health and the Environment: Alternative GW-2 would be protective of human health and the environment with respect to potential exposure to impacted groundwater. The data developed for the RI is indicative of a COC plume which is no longer expanding and has reached a stable or receding phase. It has been more than 70 years that the property use involved industrial activity. The assessment of groundwater quality occurred during the Atlantic Investigations completed during the early 1990s and the RI – both of which

have shown no off-Site impacts. Alternative GW-2 is considered to be fully protective of human health and the environment in light of existing investigation data.

Cost: The estimated cost for preparation and filing of the institutional controls is $30,000 (Table 7).

6.3.2.3 Alternative GW-3 – Monitored Natural Attenuation

Technical Description: Alternative GW-3 relies on naturally occurring chemical, biological, and/or physical processes to degrade MGP related COCs in groundwater. These processes would continue to reduce the toxicity, mobility, and mass of dissolved phase MGP constituents in groundwater. A groundwater monitoring program would be developed for the Site to monitor on-Site and off-Site groundwater quality. The monitoring program would assess groundwater flow direction, conditions affecting natural attenuation processes, and monitor concentrations of COCs in groundwater. No new monitoring wells are required under this alternative. Monitoring wells would be sampled semi-annually for the first five years. After five years of monitoring, all monitoring results would be compiled and evaluated to ascertain whether or not continued monitoring is required.

Institutional controls as described above for Alternative GW-2 would also be included in Alternative GW-3.

Short-Term Effectiveness: On-Site use of impacted groundwater would be prohibited by institutional controls. Impacted groundwater has likely not migrated off-Site and is not used on-Site by local residents and commercial businesses. Therefore, over the short term this alternative is considered protective of the public and the environment.

Long-Term Effectiveness: Institutional controls incorporated into Alternative GW-3 would prevent exposure to COCs in on-Site groundwater. Impacted groundwater has likely not migrated off-Site and is not used by local residents or commercial businesses. Therefore Alternative GW-3 would be effective in protecting off-Site groundwater. Its long term effectiveness depends on natural attenuation processes to reduce concentrations of COCs in groundwater and prevent plume expansion. Alternative GW-3 includes a long-term groundwater monitoring program designed specifically to demonstrate and monitor the natural attenuation process. Alternative GW-3 could provide for contingent evaluation and implementation of supplemental remedial actions (e.g., addition of amendments to groundwater) if deficiencies in the MNA program represent an unacceptable public health risk. Therefore Alternative GW-3 is considered to be effective in protecting off-Site groundwater.

Reduction of Toxicity, Mobility, or Volume: Alternative GW-3 would reduce toxicity, mobility or volume of contamination as a result of the ongoing natural attenuation processes at the Site. These reductions would be demonstrated by the groundwater monitoring program.

Implementability: There are no implementability concerns associated with the environmental easements restricting on-Site use of impacted groundwater, or conduct of the MNA groundwater monitoring program.

Compliance with SCGs: Natural attenuation processes may eventually attain chemical specific SCGs at the Site. Groundwater sampling would be conducted in accordance with action specific SCGs.

Overall Protection of Human Health and the Environment: Alternative GW-3 would protect human health and the environment from exposure to impacted groundwater. Institutional controls would prevent on-Site groundwater use and minimize any exposure during future excavation activities. As discussed above, Site investigation data are indicative of a COC plume where off-Site plume expansion has not occurred. The MNA groundwater monitoring program included in Alternative GW-3 would serve to confirm the longer-term protection of human health and the environment with respect to an unlikely scenario where plume expansion occurs. Alternative GW-3 is therefore considered to be protective of human health and the environment with respect to potential exposure to impacted groundwater.

Cost: The estimated cost for implementation of Alternative GW-3 is $264,000 (Table 8).

7.0 COMPARATIVE ANALYSIS OF REMEDIAL ALTERNATIVES

7.1 SOIL REMEDIATION ALTERNATIVES

Three soil remediation alternatives were evaluated in Section 6.0:

- S-1 No Further Action
- S-2 Institutional Controls
- S-3 Remove Soil above 6NYCRR Part 375 Unrestricted Use SCOs

These alternatives are compared below.

Short-Term Effectiveness: Alternatives S-1 and S-2 would both be effective over the short term since the existing grass and sod cover prevents exposure to Site soils and these alternatives do not involve any construction activities.

Alternative S-3 presents short term concerns associated with the uncovering and handling of impacted soils. It would also involve a high degree of community disruption including closing Linden Street to pedestrian traffic and temporary closing of Linden Street to vehicular traffic to accommodate the truck traffic required to implement the alternative. Alternative S-3 would require management of up to 1,600 trucks (for removal of Site soil and replacement with off-Site soil) on a site that would be nearly entirely excavated. Short term nuisance issues associated with traffic, off-Site staging of trucks, vibration (during sheet pile installation), noise and odors would be unavoidable and would last approximately three months. The short-term impacts associated with S-3 are not considered to be manageable and would result in significant community disruption.

Truck staging and traffic associated with Alternative S-3 also represents a major concern with respect to safety. Safety concerns associated with this large an increase in truck traffic in an area unaccustomed to such traffic are considerable and likely not entirely avoidable.

Long-Term Effectiveness: As discussed in Section 6.2, Alternative S-1 cannot be considered to be effective over the long term. The long term effectiveness of Alternative S-2 could be achieved through use of the SMP. The SMP would control any subsurface construction work performed at the Site in that it would specify safety measures to prevent worker exposure and procedures for proper soil handling/disposal and excavation. Alternative S-3 is generally equally effective in minimizing exposure to COCs, in Site soils but short-term impacts of implementing S-3 are overwhelmingly greater than impacts from S-2.

Reduction of Toxicity, Mobility, or Volume: Alternatives S-3 would reduce the volume of historic fill and MGP impacts at the Site through removal and off-Site disposal at a permitted facility. However, if an off-source is contributing to on-Site concentrations of Benzene, removal of the historic fill and MGP impacts would reduce only part of the source volume. Alternatives S-1 and S-2 would not immediately reduce toxicity, mobility or volume of contamination except as results from the ongoing natural attenuation processes at the Site.

Compliance with SCGs: All soil alternatives evaluated generally comply with applicable location specific and action specific SCGs listed in Tables 2B and 2C. Alternatives S-1and S-2 would not meet chemical-specific SCGs until natural attenuation processes had reduced concentrations of COCs to the identified levels, which would occur over time. Chemical-specific SCGs pertaining to waste characterization would be met for all soils to be disposed off-Site. Alternative S-3 would comply with chemical specific SCGs by removing all historic fill and deeper soil.

Overall Protection of Human Health and the Environment: Alternative S-1 is inadequate with respect to long term protection of human health and the environment. With proper maintenance as would be required by the environmental easement and associated SMP, Alternative S-2 would be protective of human health and the environment.

With respect to overall protection of human health and the environment, the only potentially substantive benefit associated with Alternative S-3 over Alternative S-2 is the potential for acceleration of the remediation of groundwater as a result of removal of COCs from the saturated zone. The RI showed that COCs present in soils at the Site have not likely resulted in off-Site impacts to groundwater. Therefore, it is unlikely these soils represent a continuing source of potential off-Site groundwater impacts. The environmental benefit associated with Site excavation (S-3) is therefore marginal.

Cost: The estimated costs to implement the soil remediation alternatives are summarized below:

Soil Alternative	Estimated Capital Cost	Estimated O&M Present Worth	Total Estimated Cost
S-1 - No Further Action	$0	$0	**$0**
S-2 – Institutional Controls	$42,000	$96,000	**$138,000**
S-3 – Remove Soil above Part 375 SCOs for Unrestricted Use	**$4,485,000**	**$0**	**$4,485,000**

7.2 GROUNDWATER ALTERNATIVES COMPARISON

Three groundwater remediation alternatives were evaluated in Section 6.0:

- Alternative GW-1 – No Further Action
- Alternative GW-2 – Institutional Controls
- Alternative GW-3 – Monitored Natural Attenuation

Short-Term Effectiveness: Since impacted groundwater has not likely migrated off-Site and is not used on-Site or by local residents and commercial businesses (municipal water is used by nearby residents and businesses), over the short term all three alternatives may be considered protective of the public and the environment.

Long-Term Effectiveness: Lacking institutional controls, GW-1 would not prevent future exposure to COCs in on-Site groundwater. Alternative GW-2 provides institutional controls to prevent exposure to COCs in on-Site groundwater. Investigation data have shown that impacted groundwater has likely not migrated off-Site and groundwater is not used by local residents or commercial businesses. Therefore, Alternative GW-2 could be effective in protecting both on and off-Site groundwater. Alternative GW-3 provides long term monitoring to confirm reduction of COCs in on-Site groundwater. However, the Site has not been used for industrial purposes for more than 70 years and it is likely that groundwater quality is stable (or improving). Therefore, long-term monitoring of groundwater conditions associated with Alternative GW-3 provides little additional benefit in protecting off-site groundwater quality.

Reduction of Toxicity, Mobility, or Volume: All three alternatives would reduce toxicity, mobility or volume of contamination as a result of the ongoing natural attenuation processes at the Site.

Implementability: There are no significant implementability concerns with any of the three groundwater remediation alternatives.

Compliance with SCGs: Natural attenuation processes would continue to prevent off-Site exceedance of SCGs under all three alternatives. In addition, for all three alternatives the natural attenuation processes may eventually attain chemical specific SCGs at the Site.

Overall Protection of Human Health and the Environment: In the absence of institutional controls to restrict groundwater use and minimize on-Site exposures should excavations below the water table be performed in the future, GW-1 would not be protective of human health and

the environment. GW-2 provides a mechanism to protect human health and the environment from exposure to impacted groundwater. Institutional controls would prevent on-Site groundwater use and minimize any exposure during future excavation activities that occur below the water table. Alternative GW-3, in addition to having institutional controls, would provide for groundwater monitoring. The benefits of ongoing monitoring at this Site are considered low. The age of the release (70-plus years) and the results of the groundwater investigations which suggest a stable or receding plume indicate ongoing groundwater monitoring would provide little added environmental benefit.

Cost: The estimated costs to implement the groundwater remediation alternatives are summarized below:

Ground Water Alternative	Estimated Capital Cost	Estimated OM&M Present Worth	Total Estimated Cost
GW-1 No Further Action	$0	$0	**$0**
GW-2 – Institutional Controls	$30,000	$0	**$30,000**
GW-3 – Monitored Natural Attenuation	$42,000	$222,000	**$264,000**

8.0 RECOMMENDATION OF PREFERRED ALTERNATIVE

8.1 RECOMMENDED SOIL REMEDIAL ALTERNATIVE

Alternative S-1 is inadequate with respect to long term protection of human health and the environment. Alternatives S-2 and S-3 meet the project RAOs. The removal of impacted soil (S-3) to allow unrestricted Site use is not considered a practical alternative considering technical difficulties described in Section 6.2.1.3 and Section 7.1 and significant impact on the residential and business community in the town of Penn Yan. The only potentially substantive benefit associated with Alternative S-3 over Alternative S-2 is the potential for acceleration of the on-Site remediation of groundwater as saturated soil removal. The RI showed that COCs present in soils at the Site have not likely resulted in off-Site impacts to groundwater. Therefore, it is unlikely these soils represent a continuing source of potential off-Site groundwater impacts. The environmental benefit associated with deeper Site excavations is therefore marginal.

Alternative S-2 is therefore recommended as the preferred alternative.

8.2 RECOMMENDED GROUNDWATER REMEDIAL ALTERNATIVE

Alternatives GW-1 cannot be considered fully protective of human health and the environment. Alternative GW-2 meets project RAOs and would protect human health and the environment from exposure to impacted groundwater. Little to no additional benefit associated with continued monitoring for constituents in groundwater which have been degrading for the past 70 years would be afforded through implementation of Alternative GW-3.

Alternative GW-2 is therefore recommended as the preferred alternative.

9.0 REFERENCES

Atlantic Environmental Services, Inc., “Jackson Street Manufactured Gas Plant Site Task I Screening Report, Penn Yan New York” dated May 1991

Atlantic Environmental Services, Inc., “Jackson Street Manufactured Gas Plant Site Task II Site Investigation Report, Pen Yan New York” dated June 1993

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Geomatrix, correspondence to NYSDEC transmitting supplemental surface soil sampling results for the Jackson Street Former Manufactured Gas Plant (MGP) Site (NYSDEC Site # 862008) Penn Yan, New York” dated August, 21, 2009.

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10.0 CERTIFICATION

I certify this Feasibility Study for the Jackson Street Former MGP Site was prepared in accordance with appropriate statutes and regulations and in substantial conformance with DER Technical Guidance for Site Investigation and Remediation (DER-10) with DER approved modifications by, and under the direction of, the undersigned.

Kelly R. McIntosh, Ph.D., P.E.

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