

Prepared for:
National Grid, USA
287 Maspeth Avenue, Brooklyn, NY 11211

Remedial Design Work Plan

Former Clifton MGP Site
Operable Unit No. 2
Richmond County, New York
Site No.: 2-43-023

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Acronyms and Abbreviations

AOC	Administrative Order on Consent
ASTM	American Society for Testing and Materials
bgs	below ground surface
CAMP	Community Air Monitoring Plan
CPP	Citizen's Participation Plan
DER	Declaration of Environmental Restriction
DNAPL	dense nonaqueous phase liquid
DOT	Department of Transportation (U.S.)
FS	Feasibility Study
GAC	granular activated carbon
HASP	Health and Safety Plan
hsa	hollow stem auger
IC/EC	institutional controls and engineering controls
IDW	investigation derived waste
IRM	interim remedial measure
MGP	manufactured gas plant
msl	mean sea level
NGVD	National Geodetic Vertical Drum
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
OM&M	operation, maintenance, and monitoring
OSHA	Occupational Safety and Health Administration
OU-1	Operable Unit 1
OU-2	Operable Unit 2
OVDPCP	Odor, vapor, and dust control plan
PDI	Pre-Design Investigation
POTW	publicly-owned treatment works
PPE	personal protective equipment
PRAP	Proposed Remedial Action Work Plan
QAPP	Quality Assurance Project Plan
RD	Remedial Design
RIR	Remedial Investigation Report
ROD	Record of Decision
ROW	right of way

SCGs	standards, criteria, and guidance
SMP	Site Management Plan
SPDES	State Pollutant Discharge Elimination System
SPT	standard penetration testing
SVOCs	semivolatile organic compounds
TCLP	Toxicity Characteristics Leaching Procedure
TOC	total organic carbon
TP	test pit
VOCs	volatile organic compounds

Executive Summary

On behalf of National Grid, USA (National Grid), ENSR Corporation (ENSR) has prepared this Remedial Design (RD) Work Plan for the former Clifton Manufactured Gas Plant (MGP) Site - Operable Unit No. 2 (OU-2) located in Clifton, Richmond County, New York (Site). This Work Plan provides the framework for implementing the New York State Department of Environmental Conservation (NYSDEC) selected remedy in accordance with the Record of Decision (ROD) for the Site [NYSDEC, 2006] and the Administrative Order on Consent [Index No. D2-0001-98-04, (NYSDEC, 1998)] between Brooklyn Union (now National Grid) and the NYSDEC.

This Work Plan presents the approach by which the design will be completed in order to satisfy the remedial objectives. The components of the remedy as defined in the ROD are as follows:

- Demolition of the existing building on the Site to allow for the excavation of the contamination located beneath the building;
- Removal of former MGP-related structures including their foundations which contain coal tar to the extent practicable;
- Excavation of approximately 38,300 cubic yards of grossly contaminated soils, down to an approximate depth of ten (10) feet below ground surface (bgs);
- Backfill of the excavated areas with clean fill from an off-site location. Visually clean material from on-site building demolition may be used to backfill the lower portion of the excavated areas. The top two (2) feet will consist of clean soil capable of supporting vegetation;
- Installation of vertical cutoff walls in the subsurface to prevent off-site migration of dense nonaqueous phase liquids [(DNAPL), coal tar] from the Site;
- Installation of recovery wells to allow for collection, treatment and disposal of DNAPL that remains at depth in the subsurface after the excavation work is complete; and
- A Site Management Plan and environmental easement.

The design basis presented in this Work Plan includes a description and rationale for the proposed design and focuses on site preparation, excavation, waste management, water management, site restoration, and environmental monitoring and control to achieve the remedial goals established in the ROD. In addition, this work plan provides a brief summary of the activities associated with the removal and disposal of impacted soils, site and public safety, structure safety, and air monitoring which will be further detailed in the Transportation Plan, Community Air Monitoring Plan (CAMP), Health & Safety Plan (HASP), Odor, Vapor, and Dust Control Plan (OVDPC) for the Site. These documents will be submitted as addenda following completion of the 60% design phase.

This Work Plan also includes the details of the Pre-Design Investigation (PDI) activities. During PDI activities, the following information will be collected for design of the final remedy:

- Soil analytical data needed to characterize the soils to be excavated for off-site disposal at a National Grid approved facility. This data is required by the off-site facilities where the soils will be taken for final disposal.

- Geotechnical data around the perimeter of the Site, including along Willow Avenue and Bay Street. This data will be used to help design the cutoff wall, temporary excavation bracing; and dewatering system necessary to allow excavation of soils at the Site.
- Testing of soil at the Site for dewatering and soil management parameters. This information is necessary to predict how the soil will need to be handled on site before sending it off-site for disposal.
- Testing of groundwater to define the likely design/effluent permitting requirements for on-site treatment systems.
- Delineation of historical subsurface structures using precharacterization borings and test pits.

These activities are scheduled to be conducted in winter 2008 and spring 2009. During the performance of this work there will be heavy equipment on the Site and on some of the adjoining roads. National Grid will work with the local authorities to control any interruptions to traffic. National Grid will perform community air monitoring around the perimeter of the Site in accordance with New York State Department of Health (NYSDOH) requirements. National Grid will keep NYSDEC, the City, and surrounding property owners apprised of the schedule and activities throughout the investigation. The data from these activities will be made available to the NYSDEC during the design process.

1.0 Introduction

ENSR Corporation (ENSR), on behalf of National Grid, USA (National Grid) has prepared this Remedial Design (RD) Work Plan for remediation of the former Clifton Manufactured Gas Plant (MGP) Site - Operable Unit Number 2 (OU-2) located at 25 Willow Avenue in Clifton, Richmond County, New York (Site). The Site location is shown in Figure 1-1. The New York State Department of Environmental Conservation (NYSDEC), in consultation with the New York State Department of Health (NYSDOH), has selected the remedy for the Site, as established in the Record of Decision (ROD) for the Site (NYSDEC, 2006). The RD detailed within this work plan is being completed as per the ROD and also as a part of the Administrative Order on Consent [Index No. D2-0001-98-04, (AOC), (NYSDEC, 1998)] between Brooklyn Union (now National Grid) and NYSDEC. National Grid is currently undertaking remedial actions at the OU-1 parcel at the Clifton Site. The details of this work have been submitted under separate cover.

This Work Plan presents the approach by which the design will be completed at the Site in order to satisfy the remedial objectives specified in the ROD.

A Remedial Investigation Report [(RIR); GEI 2005] and a Feasibility Study [(FS); PS&S PC, 2005] were completed for the Site and approved by the NYSDEC. The FS identified six remedial alternatives and provided arguments on whether or not each alternative was technically feasible. Subsequently, the NYSDEC issued the ROD for the Site based on NYSDEC Administrative Record and public input to the Proposed Remedial Action Work Plan (PRAP) presented by NYSDEC [NYSDEC, 2006]. The components of the remedy are as follows:

- Demolition of the existing building on the Site to allow for the excavation of the contamination located beneath the building;
- Removal of former MGP-related structures including their foundations which contain coal tar to the extent practicable;
- Excavation of approximately 38,300 cubic yards of grossly contaminated soils, down to an approximate depth of ten (10) feet below ground surface (bgs);
- Backfill of the excavated areas with clean fill from an off-site location. Visually clean material from on-site building demolition may be used to backfill the lower portion of the excavated areas. The top two (2) feet will consist of clean soil capable of supporting vegetation;
- Installation of vertical cutoff walls in the subsurface to prevent off-site migration of dense nonaqueous phase liquids [(DNAPL), coal tar] from the Site;
- Installation of recovery wells to allow for collection, treatment and disposal of DNAPL that remain at depth in the subsurface after the excavation work is complete; and
- A Site Management Plan and environmental easement.

This Work Plan also includes details of Pre-Design Investigation (PDI) activities to collect additional information needed for design of the remedy for the Site. The PDI is scheduled for spring 2009 and will provide design data for excavation shoring and the dewatering system and address potential data gaps along the proposed excavation perimeter. In addition, the PDI will include soil pre-characterization for disposal and an evaluation of the free drainage potential of the soils for dewatering purposes. During PDI activities, groundwater samples will also be collected from select monitoring wells to obtain data for design of construction water treatment system and discharge permitting.

1.1 DER-10 Requirements

A copy of the ROD has been included as Appendix A of this document to satisfy the following requirements of Section 5.2 (b) of the DER-10:

- Summary of the RIR Section 5.1 of the ROD;
- Summary of sampling results collected to date of the publication of the ROD;
- Identification of all applicable Standards, Criteria, and Guidance (SCGs);
- Figures identifying all areas where the remedial action will be conducted;
- Figures showing the vertical and horizontal extent of the area to be remediated.

Additionally, an Operation, Maintenance, and Monitoring (OM&M) Plan will be developed and submitted as an addendum following completion of the 60% design phase.

In accordance with the AOC and the Draft DER-10, technical guidance for site investigation and remediation [(DER-10); NYSDEC, 2002], the Remedial Design program will include the preparation/submittal of the following information:

Remedial Design Work Plan (this document)

- Remedial Design Report (this RD Work Plan is submitted in lieu of the RD Report);
- Schedule to implement the RD;
- Protocols to determine the effectiveness of the RD; and
- PDI activities, note that Health and Safety Plans (HASP) for the investigation portions of the work is included in Appendix C.

60% design submittal

- Biddable quality design documents for the RD, consisting of specifications and drawings;
- Operation, Maintenance and Monitoring (OM&M) Plan;
- Contingency Plan; and
- Citizen's Participation Plan (CPP).

90% design submittal including biddable quality design documents for the RD, consisting of specifications and drawings

The following additional documents are not explicitly required by the AOC but are integral to the remedial design program. They will also be provided as addenda to the 60% design submittal:

- Community Air Monitoring Plan (CAMP);
- Odor, Vapor, and Dust Control Plan (OVDCCP);
- Transportation Plan;
- Construction site-specific Health and Safety Plan (HASP);
- Vibration Monitoring Plan; and
- Permitting Plan that includes associated permits and review correspondence.

The remedy will be implemented in the following four phases:

- The first phase of the remedy will involve PDI activities and development of design drawings and specifications to execute the work. These activities will include the design of soil removal plans and systems (sequencing and support) and a subsurface containment system consisting of two vertical barrier walls keyed into the underlying confining layer at approximately 44 feet bgs. This first phase of the remedy is more fully described in this RD Work Plan.
- The second phase will involve the field implementation of the excavation and containment designs. Field activities will consist of surface building demolition, excavation and off-site disposal of soils saturated with NAPL at thermal treatment facilities pre-approved by National Grid, and the installation of two barrier walls to prevent further migration of on-site impacts. Upon completion of this phase, the Site will be restored.
- In the third phase of the remedy, a DNAPL recovery program will be implemented to remove potentially mobile DNAPL from the subsurface.
- Finally, in accordance with the AOC and the ROD, institutional controls will be imposed as the fourth phase of the remedy. These controls will be documented in a Site Management Plan, which will include a schedule for operation, maintenance, and monitoring of components of the remedy and for the submission of the periodic certification of the institutional and engineering controls.

Please note that these phases may be implemented consecutively or concurrently based on the Site conditions as they develop.

1.2 Off-Site Remedial Action

In addition to the remedial work proceeding on OU-1 and OU-2 of the Clifton Site, a Remedial Action (RA) is currently being implemented on the off-site 89 Willow Street property. In addition, a second RA is planned for the off-site Edgewater Plaza property. The design and implementation of the two RA's are being undertaken outside of the remedial design process for OU-2.

A Supplemental Remedial Investigation Report and an RA Work Plan for 89 Willow Avenue off-Site property have already been issued to NYSDEC. A Supplemental Remedial Investigation (SRI) Report for Edgewater Plaza, developed by another consultant, has also been submitted to NYSDEC. Based on the results of the SRI Report, a RA Work Plan for Edgewater Plaza property will be developed and submitted to NYSDEC later this year.

1.3 Report Format

This Work Plan is organized in the following manner: Section 2.0 details the PDI objectives and activities; Section 3.0 presents the Work Plan for the implementation of the remedial design; Section 4.0 provides a summary of all required permits and/or substantive permit requirements; and Section 5.0 provides details of the proposed schedule for the implementation of the Remedial Design program.

The following documents/appendices were developed to support the PDI field efforts detailed in Section 2.0. A Quality Assurance Project Plan (QAPP) specific to the PDI activities is included as Appendix B and specifies procedures for data collection and quality control in the field and in the laboratory. A site specific Health and Safety Plan (HASP) is included as Appendix C and provides a description of the procedures to be followed during the PDI to protect the health and safety of the field-personnel and the public in the vicinity of the Site. In addition, ENSR Field Methods for the PDI are compiled in Appendix D. Appendix E contains Historic Boring Logs and Test Pit Logs for use as a reference for field personnel.

2.0 Pre-Design Investigation

This section details the PDI activities proposed at the Site. The PDI activities will provide design data for the excavation shoring and dewatering systems and address potential data gaps along the proposed excavation perimeter. In addition, the PDI will include pre-characterization activities for soil and groundwater to evaluate the free drainage potential of the soils for dewatering purposes and to facilitate the treatment/disposal of impacted media.

2.1 Site Background

2.1.1 Site Location and Description

The Site is situated at the northwest corner of the intersection of Bay Street and Willow Avenue in the Clifton section of Staten Island, New York. The current Site layout with the locations of the former MGP structures is illustrated on Figure 2-1. OU-2 is the focus of this report and includes the following parcels: 25 Willow Avenue, adjacent parcels located to the northwest on Greenfield Avenue, railroad embankment and active railroad right of way (ROW), and a small triangular shaped parcel located between Bay Street and Edgewater Street. OU-2 also encompasses the ROW of Willow Avenue, Edgewater Street and Bay Street adjacent to the 25 Willow Avenue parcel, as well as the property located at One Edgewater Street.

The Site is currently improved with an unoccupied single-story, multi-bay, commercial building. The building was formerly utilized as an automotive repair and new car preparation facility. Automotive repair operations were conducted within the building and included the storage and handling of petroleum products (*i.e.*, motor oil, gasoline, diesel fuel, *etc.*). With the exception of a small landscaped strip of land that separates the Site building from the adjacent Bay Street, the remainder of the Site is surfaced with bituminous pavements and utilized for automobile parking.

The 25 Willow Avenue parcel is currently zoned for manufacturing. The area surrounding it is characterized by a combination of urban residential and commercial uses. Commercial parcels are located on Greenfield Avenue to the northwest of the 25 Willow Avenue Parcel. A vacant lot, currently utilized for parking, is located to the northeast between Bay and Edgewater Streets.

2.1.2 Site Topography and Drainage

The Site is located in a locally topographic low, bowl shaped area that gently slopes to the northwest towards the railroad embankment and appears to be associated with the historic stream that flowed on the northwest portion of the 25 Willow Avenue Parcel. The surface drainage is consistent with the bowl like topography of the Site, with surface water flowing away from the higher elevations towards lower elevations as presented in the RIR (GEI, 2005). The elevations ranging from approximately 8 feet above mean sea level (msl) in the southwestern part of the Site to approximately 10 feet above msl in the northeastern part of the Site. During heavy rain, storm water accumulates at low points, particularly in the southwestern portion of the Site and along Willow Avenue. Northeast and south of the Site, along Bay Street and Willow Avenue (respectively), storm water catch basins connect to storm sewers that convey flow to the northwest and ultimately discharge to the New York Harbor.

2.1.3 Site Geology and Hydrogeology

Four major stratigraphic units were identified underlying the Site during RI activities (GEI, 2005). These units are, in order of increasing depth:

- 1) Imported fill material made up of silt, sand and gravel mixed with slag, coal, brick, concrete, metal, ash, and clinkers. This unit ranges in thickness from a few inches to approximately nine feet;
- 2) Alluvial/marsh deposits beneath the layer of fill. This unit ranges up to 20 feet thick;
- 3) Glacial deposits beneath the alluvial deposits; and
- 4) A weathered bedrock layer known as saprolite. The top of the saprolite was encountered at depths of 114 to 123 feet.

No surface water bodies are currently located on or immediately adjacent to the Site. However, a stream formerly traversed the 25 Willow Avenue Parcel. Currently, a storm sewer line follows the approximate trace of the historic stream and extends along the northwestern border of the 25 Willow Avenue Parcel within the site. The storm sewer empties into New York Harbor approximately 500 to 600 feet to the northeast.

Two aquifers have been identified underlying the Site: a shallow, unconfined aquifer (water table) and a deep confined aquifer. In addition, a water-bearing zone was also identified within the semiconfining units and displays artesian conditions. This shallow groundwater aquifer is located in the fill, alluvium/marsh and shallow glacial deposits. The water table elevations (shallow aquifer) ranged from approximately 4.02 to 8.99 feet National Geodetic Vertical Datum (NGVD). The deep aquifer is under confining pressure; wells installed in this aquifer (RW-15 and RW-16) exhibited flowing artesian conditions. These wells were screened in the stratified silty-sand and gravelly-sand layers located with the glacial deposits located above the bedrock. Static head elevations in this aquifer ranged from 9.89 feet to 13.88 feet NGVD. The dense silt ground moraine and harbor till terminal moraine form a semi-confining layer separating the water table aquifer from the deep aquifer. The water-bearing unit located within the semi confined aquifer is under confining pressure and exhibited higher elevations than nearby wells screened in the water table aquifer.

Additional information regarding the site geology and hydrogeology of the site is presented in the RIR and the ROD (NYSDEC, 2006).

2.1.4 Summary of Impacts Requiring Further Delineation and/or Investigation for Design Components

Several environmental investigations have been performed at the Site and indicate that MGP-related compounds are present in soil and groundwater on and adjacent to the Site. The extent of the NAPL/tar containing soil is shown on Figure 2-2 and is largely encompassed by the proposed excavation area. The impacts appear to be well delineated at the Site. The approximate area of horizontal delineation is shown on Figure 2-2. Vertically, impacts are largely isolated at depths of five to ten feet bgs in unsaturated soils.

2.2 Pre-Design Investigation

A PDI will be conducted to gather the remaining information needed to ensure a safe and effective design of the field remedy and facilitate its implementation. The needs of the investigation are summarized below:

Remedial Component	Data Needed	Pre-Design
Excavation	Vertical and horizontal extents of NAPL	Geotechnical boring and Geoprobe sampling during disposal pre-characterization.
Subsurface Structure Removal	Delineation of subsurface structures	Test pits and disposal pre-characterization borings.
Shoring	Geotechnical parameters	Geotechnical data from soil borings.
Dewatering Configuration and Flowrates	Grain size	Sampling during pre-design investigation
NAPL Cutoff	Vertical and horizontal extent of NAPL	Geoprobe sampling during disposal pre-characterization.
DNAPL Collection	Flowability and recoverability	NAPL viscosity, interfacial sampling during pre-design investigation and NAPL recovery testing.

The objectives of the PDI are listed below:

- delineate the vertical extent of the contaminated soils ,
- confirm the horizontal extent of the contaminated soils to be removed,
- delineate the vertical and horizontal extent of subsurface structures to be removed,
- provide design data for the excavation shoring containment systems,
- pre-characterize soil for disposal options,
- aquifer testing to evaluate dewatering rates and free drainage potential of soils,
- evaluate potential impacts in groundwater to facilitate the design of on-site treatment systems, and review of effluent disposal options, and
- determine the extent and recoverability of DNAPL along the cutoff wall alignments

The following tasks will be performed to provide data to meet the PDI objectives:

- Property access agreement and road/sidewalk closing permit procurement
- Utility clearance
- Mobilization
- Soil boring advancement
- Test pit excavation
- Dewatering evaluation
- Water treatment evaluation
- DNAPL recovery evaluation sampling

- Investigation derived waste management
- Community air monitoring
- Site survey

These tasks are detailed in the scope of work presented in the subsequent subsections.

2.2.1 Property Access Agreements and Road/Sidewalk Closing Permits

ENSR will work with National Grid to obtain access agreements to the adjacent properties where additional borings are required to delineate the extent of impacts to be remediated and to provide design data as necessary. In addition, ENSR will work with County officials to acquire a street opening permit and determine proper procedures and protocols such as signage for drilling within the streets and/or sidewalks to the east and south of the Site. Copies of access agreements and permits will be kept onsite during the performance of the field investigations to ensure compliance with requirements.

2.2.2 Utility Clearance

A code 753 mark-out will be completed to identify subsurface utilities on and adjacent to the Site prior to intrusive activities. Following mark-out, proposed boring locations will be hand-cleared to five feet bgs to ensure the locations are free of underground utilities. Once clear, drilling and excavation activities will proceed slowly and carefully for the top ten feet of each investigation location. Proposed sampling locations may be shifted to avoid subsurface and overhead utilities as appropriate.

2.2.3 Mobilization

Following procurement of appropriate agreements and permits, ENSR will mobilize to the Site and set up a decontamination area, drum storage area, and heavy equipment laydown area for the PDI activities. This area will be placed within National Grid property in a centrally located area. ENSR will coordinate field activities with the appropriate agencies and the County to avoid or minimize disruptions, to the extent practicable.

2.2.4 Soil Boring Advancement

During the PDI, soil borings will be advanced by direct push methods to collect soils for pre-characterization efforts and hollow stem auger (HSA) methods to provide geotechnical data for design parameters (excavation, shoring, and dewatering). These borings will also be used to delineate the horizontal and vertical impacts and subsurface structures. Drilling and decontamination procedures provided in Appendix D (ENSR Field Procedures) will be followed during the drilling efforts. Upon completion, the borings will be tremie-grouted to land surface. .

Figure 2-3 illustrates the areas in which geotechnical borings will be advanced. Table 2-1 summarizes the boring location rationale. Approximately six borings will be advanced to approximately 50 ft bgs along the proposed barrier wall alignment and four borings to approximately 30 ft bgs spaced along the remaining areas of the perimeter, as illustrated on Figure 2-3 and summarized on Table 2-1. The final boring locations and depths may be adjusted based on the observations of MGP impacts at the proposed locations. Aside from soil logging and standard penetration testing, samples will be collected for geotechnical testing parameters from each boring (Table 2-1). A minimum of one sample per boring will be submitted for particle size analysis using the American Society for Testing and Materials (ASTM) Method D422. In addition, all borings will be continuously sampled for standard penetration testing (SPT) using ASTM Method D1586.

Additional soil borings will be placed in a grid pattern within the proposed excavation area at a spacing sufficient to collect one sample per 500 cubic yards of soil (the minimum sampling frequency of the soil disposal facilities). In order to expedite the transportation and off-site disposal of excavated soil during implementation of the site remedy, pre-characterization of the soil for disposal facilities will be performed. The characterization of the soil for disposal is dictated by the permit of the disposal facility receiving the waste. A list of the potential disposal facilities and their analytical requirements for soil characterization are presented in Tables 2-2 and 2-3.

2.2.5 Test Pit Excavation

Test pits will be conducted at locations presented in Figure 2-3 to locate structures not detailed during previous investigations and to evaluate the presence of obstructions along the barrier wall alignments. As detailed in the field procedures provided in Appendix D, a small rubber tired excavator will be used to advance test pits, the depth of the test pit will be based on the stability of the excavation and the degree of impact encountered. Materials removed from the test pit may be used to evaluate free draining capacity of the soil or other geotechnical parameters that may assist in the design and implementation of the selected remedy.

Three test pits (TP-1, TP-2 and TP-4) will be advanced in order to confirm or verify the location and depth of select on-site structures that appear to not have been located during the previous investigations. This includes, but is not limited to fuel oil tanks, storage tanks, used oil tank, and a gas holder. Another test pit (TP-3) will be constructed at a location along the western site boundary, parallel to the railroad embankment in an effort to determine the subsurface features of the embankment. This test pit will be installed in a manner so that the structural stability of the railroad embankment is not compromised.

The test pits will be advanced in areas and to a depth known to contain minimal impacts. If necessary, odor control foam and plastic sheeting will be used to minimize odors generated during test pitting. In the event that the CAMP or worker protection air monitoring criteria is exceeded, soil handling and excavation activities will be temporarily suspended and additional odor control measures will be evaluated.

2.2.6 Dewatering Evaluation

A preliminary evaluation of the existing data indicates that excavation dewatering may generate significant volumes of water. Additional aquifer testing, including pumping tests, may facilitate design of more efficient dewatering and water treatment systems and reduce the overall remediation costs for the project. The need for this testing will be further assessed during the initial design stages. This will include an estimate of the possible range of dewatering rates given the available data, expected contaminant loadings, and options and possible flow rate limitation for treated water discharge. This evaluation will establish the need for any additional aquifer testing.

2.2.7 Water Treatment Evaluation

Samples of water collected during free draining evaluation of impacted soil (Section 2.2.6) will be analyzed for MGP constituents as well as acceptance parameters for the local Publicly Owned Treatment Works (POTW), these will include total and suspended solids, oil and grease, and total cyanide. The results will be used to determine the preliminary treatment requirements and facilitate the evaluation of the cost-effectiveness of an on-site treatment system.

2.2.8 DNAPL Recovery

An evaluation of the DNAPL recovery parameters will be made during the PDI. If necessary, two new DNAPL monitoring wells may be installed at locations shown in Figure 2-3. The exact number, location and depth of these monitoring wells will be determined during the implementation of PDI. Select monitoring wells installed during previous investigations will be gauged and monitored for DNAPL. If DNAPL is present in the well, it will be pumped out for volume measurement and recovery rates. The samples will be submitted to PTS Laboratories in Santa Fe Springs, California for physical characteristic testing including viscosity, density,

interfacial, and surface tension analysis using the ASTM Methods D445 and D1481. NAPL samples will also be submitted to NYS approved analytical laboratory for chemical characteristic testing including volatile organic compounds (VOCs) using Environmental Protection Agency (EPA) Method 8260, semivolatile organic compounds (SVOCs) using EPA Method 8270, and total organic carbon (TOC) using EPA Method 9060. The samples collected will follow the laboratory sampling guide provided in Appendix B. Geotechnical and pre-characterization borings will be used to further refine the limits of DNAPL.

2.2.9 Investigation Derived Waste Management

All Investigation Derived Waste (IDW) generated during the PDI will be collected in properly labeled 55-gallon drums and grouped by environmental matrix. Subsequently, the drums will be characterized with laboratory analyses and properly disposed in accordance with management of IDW procedures outlined in Appendix D.

The majority of the soil removed during the excavation of test pits will be returned to the test pit. All additional residuals generated during the test pits (chemical treated soils and/or water) will be containerized and shipped to a pre-approved off-site disposal facility.

2.2.10 Community Air Monitoring

Community air monitoring requires real-time monitoring for VOCs, particulates (*i.e.*, dust), and MGP-related odors at the downwind perimeter of each designated work area when certain activities are in progress at the site. The community air monitoring is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (*i.e.*, off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigation work activities. The CAMP provided as part of the HASP included in Appendix C specifies action levels which require increased monitoring corrective actions to abate emissions and/or work shutdown for the PDI.

2.2.11 Site Survey

Following completion of the PDI, all sampling and investigation locations will be surveyed for elevation and location using a licensed New York surveyor. In addition, the survey will include other site elements such as site boundaries, topography, storm drain and/or sanitary sewer system invert elevations, and possibly other subsurface utilities (water lines, *etc.*). This information will be merged with existing base map information to allow preparation of a revised base map for the Site.

3.0 Design Basis

This section describes the remedial goals and provides details of the remedial action and the methods and procedures by which the anticipated activities will be completed in order to satisfy the remedial objectives.

3.1 Remedial Goals

The remedial goals for the Site have been established through the remedy selection process stated in 6 NYCRR Part 375-1.10. As stated in the ROD, "The selected remedy is protective of human health and the environment, complies with state and federal requirements that are legally applicable or relevant and appropriate to the remedial action to the extent practicable, and is cost effective. The remedy utilizes permanent solutions and alternative treatment or resource recovery technologies, to the maximum extent practicable, and satisfies the preference for remedies that reduce toxicity, mobility, or volume as a principal element." (NYSDEC, 2006).

In accordance with the ROD, the remediation goals for this Site are to eliminate or reduce to the extent practicable:

- direct contact with contaminated surface and subsurface soil at concentrations exceeding SCGs;
- ingestion of contaminated surface and subsurface soil at concentrations exceeding SCGs;
- migration of NAPL in the subsurface soil; and
- the source of contamination to the groundwater with a goal of reduction in the groundwater contamination over time.

3.1.1 Site Remedy

To achieve the remedial goals, NYSDEC, in consultation with NYSDOH, has selected the following remedial approach for the Site:

- A RD program will be implemented to provide the details necessary for the construction, operation, maintenance, and monitoring of the remedial program.
- Demolition of the existing building and associated features located in the northeastern portion of the 25 Willow Avenue parcel to allow for the excavation of the impacted materials located beneath the building.
- Installation of two vertical barrier cutoff walls to prevent the migration of NAPL from the site source areas to off-site locations.
- Excavation of source materials to an approximate depth of ten (10) feet bgs to remove approximately 38,300 cubic yards of contaminated soils. Material to be removed will include soil containing visible coal tar or separate phase materials.
- Former MGP-related structures including foundations and associated grossly contaminated soil determined to contain coal tar with potential for future mobility will be removed to their full depth, to the extent practicable.

- Excavated areas will be backfilled with clean soil from an off-site location or if applicable, with clean debris from surface demolition activities. The top two (2) feet of the entire on-site parcel will be filled with clean top soil.
- DNAPL recovery wells will be installed to allow for the collection, treatment and disposal of mobile DNAPL that may be present in the subsurface after shallow soils and MGP-related structures have been removed.
- Institutional control in the form of an environmental easement will be required for the remedy. The environmental easement will:
 - (a) restrict the use of the Site to “commercial use”;
 - (b) restrict the use of groundwater at the Site;
 - (c) require the management of the Site in accordance with the provisions of the site management plan, to be approved by the Department; and
 - (d) require a periodic certification to be completed and submit to the NYSDEC.
- A Site Management Plan (SMP) will be developed and implemented. The SMP will identify the institutional controls and engineering controls (IC/ECs) required for the remedy and detail their implementation. The SMP for this remedy will include:
 - (a) an IC/EC control plan to establish the controls and procedures necessary to; (i) manage remaining contaminated soils that may be excavated from the Site during future activities, including procedures for soil characterization, handling, health and safety of workers and the community as well as, disposal/reuse in accordance with applicable NYSDEC regulations and procedures; (ii) evaluate the potential for vapor intrusion for any buildings developed on the Site, including mitigation of any impacts identified; (iii) maintain use restrictions regarding site development or groundwater use identified in the environmental easement; and (iv) require the property owner to provide an IC/EC certification on a periodic basis.
 - (b) a monitoring plan to monitor the vertical barrier walls and NAPL recovery wells. The effectiveness of the cut-off walls will be determined from sampling results obtained from a periodic groundwater monitoring program; and
 - (c) an OM&M Plan to provide the detailed procedures necessary to operate and maintain the remedy, including the NAPL recovery system. The operation of the components of the remedy will continue until the remedial objectives have been achieved, or until the NYSDEC determines that continued operation is technically impracticable or not feasible.

Figure 3-1 shows the proposed limits of excavation and vertical barrier cut off walls as described above.

The proposed remedial program will include the following components:

- mobilization and site preparation including demolition;
- installation of a shoring wall around the perimeter of the excavation area;
- erection of a temporary fabric structure for vapor containment and control over areas with significant impacts and potential for odor generation;
- air monitoring to evaluate potential fugitive emissions;

- excavation of impacted soils and MGP structures, including piping;
- transportation and management of impacted material at an off-site permitted facility;
- installation of subsurface containment consisting of two vertical barrier walls;
- installation of recovery wells for passive collection of any DNAPL; and
- surveying, backfilling, site restoration, and demobilization.

The remainder of this report describes these activities and provides the information used as the basis for the design.

3.2 Design Submissions

The design will consist of the following documents to be submitted for NYSDEC review:

- Remedy Design Work Plan (this document)
- 60% Remedial Design submittal (Drawings and Specifications) and corresponding plans
- 90% Remedial Design submittal (Drawings and Specifications).

The anticipated list of specifications for the 90% design is:

Division 1 Specifications – General requirements

- Summary of Work
- Work Restrictions
- Contract Modification Procedures
- Measurement and Payment
- Payment Procedures
- Project Management and Coordination
- Construction Progress Documentation
- Submittal Procedures
- Regulatory Requirements
- Health and Safety Requirements
- Mobilization and Temporary Facilities
- Erosion and Sediment Controls
- Surveying
- Closeout Procedures

Division 2 Specifications – Site work

- Off-Site Transportation and Disposal
- Decontamination
- Odor and Vapor Control (temporary fabric structure and controls)
- Building and Subsurface Demolition
- Clearing
- Dewatering
- Construction Water Treatment and Discharge
- Excavation
- Excavation Support
- Barrier Wall
- Backfilling and Grading
- Existing Site Infrastructure
- Roadway Pavement
- Parking Lot Pavement
- Concrete Curb and Sidewalk
- Collection Wells
- Planting and Seeding
- Treated Water Discharge Pipeline Construction (Optional)

The anticipated list of drawings for the 90% design is:

- Title Sheet and Index
- Legend and General Notes
- Existing Conditions and Extents of Excavation
- Site Preparation and Erosion and Sediment Control (site layout and infrastructure)
- Erosion and Sediment Control Details (silt fence, construction entrance, stockpiling, and decontamination pad construction)
- Structure Demolition Plan (surface and subsurface)

- Excavation Support
- Excavation Support Cross Sections
- Temporary Fabric Structure
- Excavation Limits (on- and off-site locations)
- Excavation Cross Sections
- Barrier Wall
- Barrier Wall Cross Sections
- Excavation Details
- Restoration
- Restoration Cross Sections

A 100% design document will be prepared based on contractual negotiations with the selected remedial contractor. The 100% design will be submitted to NYSDEC, but will not require review.

This list is preliminary and subject to change as the design process proceeds.

3.3 Site Preparation

The Site will be prepared for the required remedial action and restoration work. The site preparation activities include: mobilization; relocation of existing security fencing as needed for the proper implementation of the remedy; installation of erosion and sedimentation controls; installation of temporary site facilities; surveying to establish baseline conditions and grades; utility location, protection, and relocation, if necessary; demolition of existing surface and subsurface structures; and installation of traffic controls at the Site. Any monitoring wells that will be damaged during the remedy implementation will be removed in their entirety or abandoned per NYSDEC regulations during the site preparation activities. Documentation required for the abandonment and removal of these wells will be included in the remedy completion report.

All necessary engineering controls to control odors will be installed prior to the start of excavation activities.

3.4 Excavation

Excavation will achieve the specific performance and design requirements presented in the ROD (NYSDEC, 2006) and summarized in Section 3.1. The current estimate of the limit of excavation, as determined in the ROD, is shown in Figure 3-1 and is approximately 103,410 square feet. The estimate assumes that the excavation will extend down to a depth of 10 feet bgs representing a total in-place volume of approximately 38,300 cubic yards.

The proposed extents of excavation will be finalized as part of the PDI and will be presented to NSDEC prior to the start of field remediation activities. During the PDI, ENSR will utilize the geotechnical soil borings along the excavation perimeter to establish the vertical extent of impacts and provide an initial estimate of the depth of excavation. These results will be used to define the extent of excavation at the 60% design level. The depth of the excavation will be further refined during the subsequent pre-characterization boring program (grid of geoprobe points). Given the required time sensitivity of the data used for disposal pre-characterization and

facility acceptance, the pre-characterization program will be undertaken as late in the design process as practical. The refined limits of excavation will be reflected in the 90% design.

Excavation will begin following demolition of surface structures, site clearing and grading, construction of a shoring wall, installation of site-wide and/or localized dewatering systems, and erection of a temporary vapor containment structure. Additionally, some portion of the areas shown in Figure 3-1 for removal may not be sufficiently contaminated to warrant removal. The actual extent of removal in these locations will be based on visual observations as the excavation proceeds, with the concurrence of the NYSDEC on-site representative.

3.4.1 Shoring Wall/Vertical Barrier Wall and Dewatering/DNAPL Collection System Construction

Based on the proximity of the soil excavation area to surrounding buildings and streets and the presence of a shallow water table, engineering controls including benching and/or structural shoring and a dewatering system will be required. In locations where the shoring wall coincides with the vertical barrier wall described in the ROD, the vertical barrier will be constructed to provide structural support for the excavation. Additionally, dewatering of the excavation will be required for effective operations. Details on the shoring wall and dewatering activities are provided in the following discussion.

The structural shoring wall will be constructed at the perimeter of the excavation area to provide excavation wall stability as well as reduce the amount of lateral groundwater infiltration into the excavations. Geotechnical soil samples will be collected from various locations on the perimeter of the excavation area during the PDI to characterize the soils for construction of a shoring wall. The vertical barrier walls will be installed in two areas of the Site to cut off migration of contamination off the Site. The barrier walls will be designed so as to prevent water from simply flowing around the wall (e.g., wing walls, etc.). The type and configuration of the walls to be installed will be determined during the design of the selected remedy. The evaluation will take into account the constructability and compatibility of the wall with subsurface site contamination. The barrier wall will also serve to support excavation.

Temporary shoring or benching will be used to support excavation at significant depth in the central portions of the Site. PDI activities will indicate those areas of the Site where these controls are likely to be required.

Site-wide and/or localized dewatering systems will be installed to lower the water table across the excavation area to prevent groundwater infiltrations into the excavations. Along with the Site wide and/or localized dewatering systems, recovery/monitoring wells will be placed immediately upgradient and down gradient of the walls to ensure recovery of DNAPL collecting behind the vertical barrier walls, as well as any significant DNAPL that may be present immediately outside of the walls. The actual number and locations of wells, the screen intervals and method of recovery will be determined during the design of the remedy. Groundwater samples will be collected from select wells during PDI to obtain data for construction water treatment design, disposal and permitting.

Detailed plans and specifications for the shoring wall and dewatering activities will be prepared as part of the design activities and will be presented to NYSDEC during the design submittals.

3.5 Waste Management

3.5.1 On-Site Waste Management

To the extent possible, excavated soil will be loaded directly into trucks for off-site transportation. However, because of construction sequencing and off-site disposal facility scheduling issues, and in order to consolidate large amounts of waste material for bulk truck shipments, it will likely be necessary to store waste material on-site prior to loading and shipment. In these instances, excavated soil will be transported by loader or on-site

haul truck from the excavation areas to the stockpile area within the temporary fabric structure. To the extent practicable stockpile areas will be located over areas to be excavated, negating the need for liners and berms. If stockpile areas are placed in unimpacted or restored areas, berms and liners will be used to protect underlying materials from becoming impacted.

Surface debris generated during demolition may require decontamination or crushing to meet facility acceptance requirements. Decontamination will take place using brushes, steam cleaners, and/or pressure washers. Residues from decontamination operations will be collected and managed with impacted soils. Excavation debris may potentially be decontaminated and sent to an off-site facility for disposal. Decontamination water, as well as residuals from dewatering activities will be temporarily stored in appropriate tanks prior to treatment and management in the temporary water treatment system or transported to an appropriate off-site disposal facility as required.

It is assumed that the composition of the excavated soils will meet the requirements of NYDEC guidance, Management Of Coal Tar Waste and Coal Tar Contaminated Soils and Sediment [(DER - 4), NYSDEC 2002], and can be managed as solid wastes at permitted off-site disposal facilities. The soils within the site will be pre-characterized during the PDI. Pre-characterization will facilitate the profiling and pre-acceptance of the materials to the disposal facilities. Soils excavated from below the water table, may require temporary staging at the edge of the excavation to allow free water to drain back into the excavation. These soils may require amendment prior to shipment, if required the soils will be amended with a facility accepted drying agent (fly ash or equivalent) to facilitate transport to the off-site disposal facility.

3.5.2 Waste Characterization

All wastes at the Site that have been impacted by MGP residues will be classified as non-hazardous industrial waste unless they are determined to exhibit the characteristics of ignitability, corrosivity, reactivity, or toxicity characteristics leaching procedure (TCLP) benzene, as determined by laboratory testing. If they do exhibit one or more of these characteristics, they will be classified as hazardous wastes.

The soils within the Site will be pre-characterized during the PDI. Pre-characterization will facilitate the profiling and pre-acceptance of the materials to the disposal facilities. Once the soils are pre-characterized and accepted they can be direct loaded from the excavation into transport trucks or stockpiled on the Site so not to impede the progress of the excavation.

3.5.3 Off-Site Transportation

Excavated materials will be transported off-site in dump or tanker trucks to the receiving facilities. Transportation of impacted materials from the Site will be performed in accordance with all regulatory requirements and in accordance with a Transportation Plan.

All haul trucks will have poly bed liners that fully line the bed of the truck and can be overlapped to cover the top of the load to manage odors during transportation. The vehicles will be loaded in such a way as to avoid contamination of their exteriors, including tires. All trucks will be checked before leaving the Site and all loose soil or other materials will be brushed off to prevent spreading to streets or other areas off-site.

Waste shipments will be documented using the required waste manifests. Other materials that have no specific documentation requirements will be documented using waste tracking forms, bills of lading, and receipts. All shipments of waste from the Site will be documented, describing the type and amount of material and the receiving facility.

3.5.4 Off-Site Disposal or Treatment

The following facilities have been preliminarily identified for the thermal desorption and disposal of impacted soil from the Site:

- Environmental Soil Management of New Jersey, LLC, located at 75 Crows Mill Road, Keasbey, NJ 08832.
- Clean Earth of Southeast Pennsylvania, Inc., located at 7 Steel Road East, Morrisville, Pennsylvania 19067.
- Mid-Atlantic Recycling Technologies, located at 3209 North Mill Road, Vineland, NJ 08360.

These treatment facilities are suitable for the disposal of non-hazardous industrial waste and contaminated debris that has been crushed to appropriate size. Final selection of facilities will be based on facility acceptance, facility scheduling, and availability. Additional information regarding the above mentioned facilities is provided in Table 2-2.

Debris which cannot be reduced to the appropriate size will be transported to an approved and licensed landfill disposal facility. Additional disposal facilities may be required for the treatment or recycling of NAPL if sufficient quantities are encountered in the excavations. These materials will be characterized and managed in accordance with the applicable requirements of 6 NYCRR Parts 370 through 374 and 376 (NYSDEC, 2006).

3.6 Water Management

Construction water will be generated during the dewatering activities conducted to support excavation and water containing MGP constituents will be generated during decontamination of debris and equipment. Storm water run-off from impacted areas will also be collected. The work, performed under the AOC (NYSDEC, 1998) will meet the substantive requirements for discharge to the local sanitary sewer system. Permitting requirements for this proposed discharge will be further assessed during the design process and a permitting plan will be submitted.

3.6.1 Excavation Dewatering

The lower portions of the excavation are expected to be carried out in the saturated zone. As previously discussed in Section 3.3.1, a dewatering plan will be prepared as part of design activities and will be included in a later submission.

3.6.2 Water Treatment

A temporary water collection and treatment system will be constructed at the Site to manage construction water generated during the soil removal activities. The treatment system will run continuously until the remediation project is complete. The treatment system will be designed to meet the limits stated by the NYSDEC and/or the local sewerage authority. A typical collection and treatment system for treating MGP impacted construction water is comprised of the following major subsystems:

- Construction dewatering pumps;
- Influent surge tanks;
- Oil water separators;
- Clarifiers;

- Sand filters;
- Granular activated carbon adsorption; and
- Effluent surge tanks.

Typically, construction dewatering pumps transfer construction water generated as a result of the excavation activities into a surge tank. Water from the surge tanks flow through oil water separators and clarifier(s) to remove NAPL and large particulates, respectively. If necessary, flocculants and coagulants are added in the clarifiers to enhance settling. Following sediment and grit removal, water is pumped through a series of sand filters. Granular activated carbon (GAC) vessels, located downstream of the sand filters, remove any organics from the water followed by storage in effluent surge tanks. Typical GAC units consist of two trains operating in parallel with each train having two carbon vessels in lead lag arrangement. Effluent surge tanks allow temporary storage of treated GAC effluent. As mentioned earlier, treated water for this project will likely be discharged to the local POTW through the sanitary sewer. Details of any necessary water treatment system and the required permitting will be based on the results of PDI data and will be provided in the 60% design submittal.

3.7 Site Restoration

Following excavation activities, the excavation will be backfilled with certified clean fill or virgin quarry process material in 12-inch lifts and properly compacted, to restore the Site to the original grade. Specifications for clean fill will be presented in the 90% design submittal. All remnants of the remediation activities will be removed from the Site after completion of remediation activities. Disturbed areas shall be re-graded to match the surrounding areas. Pursuant to the ROD, the top two feet of the entire on-site parcel area will consist of clean soil able to support vegetation. The fence surrounding the Site and within the excavation area will be restored to its original location prior to Site work.

3.8 Environmental Monitoring and Controls

Environmental controls will ensure that the work activities do not spread impacted soil and MGP wastes outside the impacted areas and maintain the protection of human health and the environment throughout the remedial activity.

3.8.1 Odor, Vapor, and Dust Control

Odor, vapor, and dust control will be required for this project due to the immediate proximity of residential and commercial buildings.

A temporary fabric structure will be erected during site preparation to contain odors and vapors that are generated during the work. All excavation, staging, backfilling, loading, or any other handling of impacted soil or MGP residuals will be conducted under the temporary fabric structure to the extent practicable. If needed, a temporary fabric structure might also be erected over the temporary water treatment staging area. Engineering controls, as described below, will be applied during the excavation and handling of soils that cannot be practicably conducted under the temporary fabric structure. The structure will consist of a rigid frame covered with an impermeable fabric cover. Sprung Instant Structures, Universal Fabric Structures, or a similar vendor will manufacture the structure.

The structure will be equipped with an air handling and treatment system. The air handling system will consist of blowers, air filters, and an air treatment system to remove vapors from inside the structure. The air handling system will be a complete unit equipped with a motor starter, changeable filters to capture particulate matter, start/stop controls, and will be sized to provide a minimum of four air changes per hour. The air treatment system will be a vapor-phase carbon system that can remove carbon monoxide from heavy equipment and

truck operation, and volatile organic compounds that will be generated while handling impacted soil and MGP residuals.

An odor and vapor suppressing foam will also be available during the remedial activity to contain air emission sources. The foam will be a direct-contact, spray-on foam, applicable to soil and MGP residuals, that provides an impermeable barrier and has a minimum effective duration of 7 days in all weather conditions. Odor suppressing foam and plastic sheeting (or other approved methods, including BioSolve™ and similar products) will be available onsite at all times, for all soil excavations. The necessary application equipment and plastic sheeting will be brought onsite during mobilization, along with odor neutralization concentrate.

3.8.2 Air Monitoring

Site perimeter and work zone air monitoring will be performed per NYSDOH and Occupational Safety and Health Administration (OSHA) requirements, and according to the site-specific HASP and CAMP (to be provided as an addendum following completion of the 60% design). The contaminants of concern are VOCs and particulates.

Monitoring will be continuous during the excavation and handling of impacted soils. Monitoring will be periodic during non-intrusive activities such as mobilization and equipment decontamination.

Summaries of all air monitoring data will be provided to the appropriate parties' regulatory agencies on a weekly basis to facilitate the transfer of information related to potential health risks.

3.8.3 Noise and Vibration Evaluation

The planned remediation activities, including building demolition, shoring installation, excavation, and backfilling, have the potential to generate noise and vibration. Once the pre-design activities are completed, and a design for the remedy developed, the potential noise and vibration impacts associated with implementing the remedy will be evaluated.

3.8.4 Erosion and Sediment Control

The remediation activities will disturb an area greater than one acre in size. Therefore, the work will meet the substantive requirements of a SPDES General Permit for Stormwater Discharges from Construction Activity (GP-02-01). Erosion will be prevented and sediment will be controlled during all on-site earthwork activities in accordance with the applicable New York State guidance. Stormwater run-off will be controlled to prevent contact with impacted soils. Any stormwater that does contact impacted soils will be diverted to the temporary water treatment system. Hay bales, silt fence, and rip rap will be used as necessary to prevent erosion of exposed soils.

On-site decontamination pads will be used to remove mud from truck tires and prevent tracking of mud and impacted soil onto the streets. Detailed plans and specifications for erosion and sediment control will be provided with the 90% design submittal.

3.8.5 Decontamination

During and upon completion of the investigation and excavation phases of the project, decontamination of equipment will be performed in order to prevent contaminated material from being spread off-site during waste hauling activities and to prevent the spreading of impacted material to un-impacted areas of the site. Trucks used for transport of excavated material will be decontaminated using dry decontamination methods (*i.e.*, removal of loose material with a broom or brush) to limit the volume of decontamination water, which will require treatment and disposal. These methods, along with parking of trucks on plastic sheeting during loading, will effectively prevent the spread of contaminated materials onto roadways during transport to

disposal facilities. Decontamination of the earth-moving equipment will occur at the completion of the excavation phase and prior to the handling of clean backfill or mobilization off-site. The method of equipment decontamination will consist of pressure washing to remove any impacted soil. Decontamination water generated during cleaning of tools and equipment will be discharged to the dewatering system treatment and disposal stream. Water generated from decontaminating personnel will be minimal due to the availability of disposable personal protective equipment (PPE) such as tyvek coveralls, booties, and nitrile gloves. The volume of decontamination water is assumed to be negligible compared to flow rates for dewatering and stormwater removal in the disturbed areas of the Site.

4.0 Permitting and Regulatory Requirements

4.1 Permitting

In addition to performance requirements established to ensure that the design of the remedial action meets the remedial action objectives set in the ROD (NYSDEC, 2006), the design will also be prepared to meet permitting and other regulatory requirements of local, state, and federal laws and regulations. Table 4-1 presents a listing of potentially applicable federal, state, and local permit requirements. As specified in Appendix 7B of the Draft DER-10 Technical Guidance for Site Investigation and Remediation (NYSDEC, December 2002), NYSDEC may grant exemption from most state permits required for completion of this remedial action, provided the substantive requirements of the permit programs are followed. For federal and local permits that will be required, a plan will be developed to identify the application requirements, a summary of information required, and application forms. Government contacts will be identified for each permit and a potential schedule for meetings with regulators and application submittals will be developed.

4.2 Regulatory Requirements

Compliance with regulatory requirements applicable to this work was discussed in Section 3, including the following work activities:

- Wastewater treatment and discharge requirements;
- Hazardous and non-hazardous waste management; and
- Air quality maintenance and monitoring.

A contingency plan will be developed and submitted as an addendum following completion of the 60% design. The contingency plan will be implemented if any element of the RD Work Plan fails to achieve any of its objectives or otherwise fails to protect human health. Additionally, a CPP will also be developed to incorporate appropriate activities outlined in 6 NYCRR Part 375 (NYSDEC, 2006), and any subsequent revisions thereto.

4.2.1 Occupational Safety and Health Regulations

Regulations promulgated by OSHA specify safety and health requirements for work procedures at all work places and specifically at construction sites and hazardous waste sites.

Industry standards for work at hazardous waste sites presented in 29 CFR 1910.120 describe specific requirements, including the following:

- Preparation of a site-specific HASP;
- Training and medical monitoring of personnel who may be exposed to hazardous substances; and
- Air monitoring, respiratory protection and PPE.

A site-specific HASP will be produced prior to any remedial activity. Procedures outlined in the site-specific HASP will provide requirements for daily health and safety review meetings, proper use of safety equipment, proper mechanical equipment use, and other policies. At a minimum, the PPE to be worn on site will include safety glasses, hard hat, and steel-toed shoes or boots. The subjects covered in the HASP will include:

- Health & safety risk analysis;

- PPE;
- OSHA air monitoring & action levels;
- Site control;
- Decontamination;
- Emergency response plan;
- Lockout/tagout;
- Heavy equipment operations;
- Excavation and trenching;
- Material safety data sheets; and
- Health and safety records and reports.

4.3 Transportation Requirements

The federal Department of Transportation (DOT) has developed requirements that regulate the transportation of hazardous materials by road and rail. Among the hazardous materials identified in these regulations are coal tar distillates. In addition, as discussed above, hazardous waste regulations specify that shipments of hazardous wastes must meet certain requirements presented in the DOT regulations. Specific requirements for hazardous material shipments include the following:

- Shipping papers must include a description of hazardous materials included in the shipment along with the DOT designated identification number and hazard class. Hazardous wastes may not be shipped without a manifest (49 CFR 172.200).
- Each container, package, or vehicle containing a hazardous material must be marked or labeled with the DOT shipping name, technical name, identification number, and hazard class (49 CFR 172.300 and .400).
- Each vehicle or container containing a hazardous material must be appropriately placarded (49 CFR 172.500).
- When hazardous materials are transported, emergency response information must be available at the point of loading, unloading, and during transport.

Truck routes to and from the site will comply with the Transportation Plan.

5.0 Schedule

The schedule for submission of various documents as stated in the Consent Order is detailed in Figure 3-2. The schedule key activities and submissions include the following:

- The PDI is planned to begin in spring 2009 and completed in summer 2009;
- Remedial Design bid documents will be generated subsequent to PDI activities;
- The 60% Remedy Design is anticipated to be submitted to the NYSDEC in July 2009;
- The pre-characterization program is anticipated to start in April 2009
- The 90% Remedy Design is anticipated to be submitted in September 2009.

Remedial activities are planned to begin as soon as NYSDEC approves the Remedial Design submittal and contractors have been procured to perform the remediation.

6.0 References

- GEI Consultants, Inc., 2005. Final Remedial Investigation Report, Clifton Former MGP Site, Operable Unit 2 (OU-2), February 2005
- New York State Department of Environmental Conservation (NYSDEC). 1998. Administrative Order on Consent – In the matter of the Development and Implementation of a Former Manufactured Gas Plant (MGP) Site Investigation and Remediation Program by Brooklyn Union for the former Richmond County Gas Light site located at 25 and 40 Willow Avenue, Staten Island, New York.
- NYSDEC, 2002. Draft DER-10, Technical Guidance for Site Investigation and Remediation.
- NYSDEC, 2002. DER-4, Management of Coal Tar Waste and Coal Tar Contaminated Soils and Sediment from former MGPs (TAGM – 4061), January 2002.
- NYSDEC. 2006. Record of Decision – Former Clifton MGP Site Operable Unit No. 2 Richmond County, New York. Site No. 2-42-023.
- NYSDEC, 2006. NYCRR PART 370 – 374 and PART 376 Environmental Remediation Programs. 2006.
- NYSDEC, 2006. 6 NYCRR PART 375 Environmental Remediation Programs Subparts 375-1 to 375- 4 & 375-6, December 2006.
- Paulus, Sokolowski and Sartor Engineering, PC, 2005. Feasibility Study Report for the Former Clifton Manufactured Gas Plant (MGP) Site, 25 Willow Avenue Parcel, Operable Unit No. 2 (OU-2), March 2005.

Tables

Figures

Appendix A

NYSDEC Record of Decision (ROD)

Appendix B

PDI Quality Assurance Project Plan (QAPP) (Will be developed prior to field work)

Appendix C

PDI Site-Specific Health and Safety Plan (HASP)

Appendix D

ENSR Field Procedures

Appendix E

Historic Boring Logs (will be included prior to field work)