

Draft — Remedial Investigation Work Plan

Fulton Municipal Works Former Manufactured Gas Plant Site

Brooklyn, New York

ACO Index No. A2-0552-0606

Site #: 224051

Submitted to:

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Table of Contents

Abbreviations and Acronyms	iii
1. Introduction	1
2. Site Background	4
2.1 Site Location and Description	4
2.2 Site History	4
2.2.1 MGP History	4
2.2.2 Post-MGP History	5
2.2.3 Current Site Conditions	6
3. Summary of Records Search	8
3.1 Records Search	8
3.2 Environmental Records Information Summary	8
3.2.1 NYSDEC Environmental Site Remediation Database Search	9
3.2.2 NYSDEC Spill Incident Database Search	9
3.2.3 Commercial Environmental Records Review	10
3.2.4 NYSDEC Site Characterization	10
3.3 Possible Subsurface Structures	12
4. Local Environment	13
4.1 Surficial Geology	13
4.2 Hydrogeology	14
5. Scope of Work	15
5.1 Pre-Investigation Tasks	15
5.1.1 Site Access	15
5.1.2 Utility Clearance	16
5.2 Field Investigation Sampling and Analysis	16
5.2.1 Surface Soil Samples	16
5.2.2 Test Pit Excavations	17
5.2.3 Soil Boring Installation and Sampling	18
5.2.4 Monitoring Well Installation	19
5.2.5 Well Development	20
5.2.6 Groundwater Sampling	20
5.2.7 Hydraulic Conductivity Testing	21
5.2.8 Soil Vapor Sampling	21
5.2.9 Ambient Air Sampling	22
5.2.10 Air Monitoring	23

5.2.11	Decontamination and Investigation Derived Wastes	23
5.2.12	Waste Disposal Sampling	23
5.3	Survey	24
5.4	Quality Assurance/Quality Control and Data Validation	24
5.5	Qualitative Human Health Risk Assessment	24
5.6	Step I Fish and Wildlife Resource Impact Analysis	25
6. RI Report Preparation		26
7. Schedule		27
8. References		28

Tables

- 1 Summary of Environmental Records Information
- 2 Sample Descriptions, Rationale and Analysis

Figures

- 1 Site Location Map
- 2 Summary of Environmental Records

Plate

- 1 Proposed Sample Locations

Appendices

- A New York State Department of Conservation Site Characterization Report and Correspondence (electronic only)
- B Historical Documents (electronic only)
- C Environmental Records Information (electronic only)
- D Community Air Monitoring Plan
- E Field Sampling Plan (electronic only)
- F Health and Safety Plan (electronic only)
- G Quality Assurance Project Plan (electronic only)

Abbreviations and Acronyms

ACGIH	American Conference of Government Industrial Hygienists
ACO	Administrative Order on Consent
ASTM	American Society for Testing and Materials
BCP	Brownfields Cleanup Program
bgs	Below Ground Surface
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
BUG	Brooklyn Union Gas Company
CAMP	Community Air-Monitoring Plan
CHSS	Corporate Health and Safety Specialist
DER	Division of Environmental Remediation
DNAPL	Dense Non-Aqueous Phase Liquid
EDR	Environmental Data Resources
ELAP	New York State Environmental Laboratory Approval Program
EPA	United States Environmental Protection Agency
FOIA	Freedom of Information Act
FSP	Field Sampling Plan
FWRIA	Fish and Wildlife Resources Impacts Analysis
GEI	GEI Consultants, Inc.
HASP	Health and Safety Plan
IDW	Investigation derived waste
KeySpan	KeySpan Corporation
MGP	Manufactured Gas Plant
MS/MSD	Matrix Spike/ Matrix Spike Duplicate
NAPL	Non-aqueous Phase Liquids
NYSASP	New York State Analytical Services Protocols
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
OSHA	Occupational Health & Safety Administration
PCB	Polychlorinated biphenyl
PID	Photoionization Detector
PM-10	Respirable Particulates
ppm	Parts Per Million
PPE	Personal protective equipment
PRP	Potential responsible party
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
QHHEA	Qualitative Human Health Exposure Assessment
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RSCOs	Recommended Soil Cleanup Objectives

Sanborn	Sanborn Fire Insurance Map
SC	Site Characterization
SSO	Site Safety Officer
SVOC	Semivolatile Organic Compound
TAL	Target Analyte List
USDOT	United States Department of Transportaion
UST	Underground Storage Tank
VOC	Volatile Organic Compound

1. Introduction

On behalf of KeySpan Corporation (KeySpan) [now part of National Grid], GEI Consultants, Inc. (GEI) has prepared this Draft Remedial Investigation (RI) Work Plan for the Fulton Municipal Works (Fulton) Manufactured Gas Plant (MGP) site located on six parcels located along Degraw and Sackett Streets and 3rd Avenue and the Gowanus Canal in the Gowanus Neighborhood in Brooklyn, New York. The site also includes a holder station located adjacent to 3rd Avenue between Douglass and Degraw Streets. **Figure 1** shows the location of the Fulton former MGP site.

KeySpan is conducting this RI because a predecessor company, the Brooklyn Union Gas Company (BUG), operated the former MGP to produce manufactured gas for the use in the surrounding community from 1879 to the early-1930s. The Fulton MGP was dismantled prior to 1938. The site was subsequently subdivided, sold to third parties and has been redeveloped for industrial, commercial and recreational uses, including a park and pool facilities owned and operated by the City of New York.

In February 2007, KeySpan and the New York State Department of Environmental Conservation (NYSDEC) entered into an administrative order on consent (ACO) and administrative settlement #A2-0552-0606 to evaluate environmental conditions at a number of sites in New York City and Long Island. The Fulton former MGP site was identified in Table 3 of the ACO; however, the site was not covered under the order at that time. In August of 2007, KeySpan and the NYSDEC completed a modification to the ACO in administrative settlement #A2-0552-0606 which added the former Fulton MGP site to the order.

Independent of KeySpan, the New York State Department of Environmental Conservation (NYSDEC) conducted Site Characterization (SC) activities to evaluate the potential impacts related to the Fulton former MGP from April 17 to June 7, 2007. The SC revealed non-aqueous phase liquid (NAPL) coal tar impacts in subsurface soils and groundwater. Petroleum-impacted soils exhibiting diesel odors were also reported by NYSDEC. Elevated concentrations of volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs) above the NYSDEC Technical and Administrative Guidance Memorandum (TAGM-4046) recommended soil cleanup objectives (RSCOs) were observed in soils with coal tar and petroleum-related impacts that extended beyond the limit of the former MGP site. A copy of the NYSDEC SC report is attached to **Appendix A** of this work plan. In a December 4, 2007 letter to KeySpan (Appendix A), the NYSDEC requested a remedial investigation at the site and the submission of a Remedial Investigation/Feasibility Study Work Plan to address the impacts identified in SC investigation. The NYSDEC also requested that KeySpan should be prepared to develop and implement an

interim remedial measure in the park area following consultation and coordination with the City of New York. A feasibility study and IRM will be addressed after the completion of the RI.

The RI scope of work described in this work plan is intended to collect sufficient data to evaluate the nature and extent of compounds within soils, soil vapor and groundwater that may be associated with the Fulton former MGP site. The RI scope will address specific NYSDEC and NYSDOH comments provided in the December 4, 2007 letter including:

- Defining the location of holder foundations and any other subsurface MGP structures that remain at the site
- Defining the surface elevation and continuity of the peat layer
- Defining the extent of coal tar contamination particularly to the south, at the location of the former MGP plant on the block bounded by Degraw and Sackett Streets and the Gowanus Canal
- Defining the relation of the tar contamination to the Gowanus Canal and potential for NAPL migration into the Canal
- Defining impacts to groundwater
- Investigating the potential of soil vapor intrusion

The RI will assess whether potential pathways exist through which people, flora, or fauna could be exposed to the contaminants. The work plan has been prepared in general accordance with the ACO, the NYSDEC *Draft DER-10 Technical Guidance for Site Characterization and Remedial Investigation* dated December 25, 2002, and the New York State Department of Health (NYSDOH) *Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York* dated October 2006.

This work plan includes a brief site description, site history, records review summary, and a proposed scope of work for the remedial investigation of the Fulton former MGP site. The RI scope of work includes the following tasks:

- Pre-Investigation Tasks
- Site Utility Survey
- Field Investigation Sampling and Analysis
- Survey
- Quality Assurance/Quality Control (QA/QC) and Data Validation
- Step 1 Fish and Wildlife Resource Impact Analysis (FWRIA)
- Qualitative Human Health Exposure Assessment (QHHEA)
- RI Report Preparation

Detailed descriptions of each proposed work activity are provided in Section 5 of this work plan.

The appendices contain the previous investigations and NYSDEC correspondence (**Appendix A**), historical documents (**Appendix B**), environmental records information (**Appendix C**), a Community Air Monitoring Plan (CAMP) (**Appendix D**), a Field Sampling Plan (FSP) (**Appendix E**), a Health and Safety Plan (HASP) (**Appendix F**) and a Quality Assurance Project Plan (QAPP) (**Appendix G**).

2. Site Background

2.1 Site Location and Description

The Fulton former MGP site was subdivided in the years following decommissioning. The former plant is now comprised of six properties that encompass approximately 5.5 acres in the Gowanus neighborhood in Brooklyn, New York. The site location is depicted on **Figure 1**. The property addresses and parcel information for the properties of the Fulton former MGP site are listed below.

Fulton Former MGP Site

Address	Block	Lot
225 Nevins Street, Brooklyn, NY 11217	419	1
270 Nevins Street, Brooklyn, NY 11217	425	1
537 Sackett Street, Brooklyn, NY 11217	426	1
560 Degraw Street, Brooklyn, NY 11217	426	17
553 (aka 549) Sackett Street, Brooklyn, NY 11217	426	49

Fulton Former MGP Holder Site

Address	Block	Lot
191 3rd Avenue, Brooklyn, NY 11217	420	1

The current site conditions are shown on **Plate 1** and are discussed in subsection 2.2.3

2.2 Site History

The site history of the Fulton former MGP site and surrounding area was developed through the review of available Sanborn Fire Insurance (Sanborn) Maps and historical newspaper articles. A brief summary of the history of the Fulton former MGP site is provided below. The Sanborn Maps are included in **Appendix B**. The historical features are summarized on **Plate 1**.

2.2.1 MGP History

The Fulton Municipal Gas Company was incorporated in March 1879 as documented in Brooklyn Union-A Centennial History. The Fulton MGP is first shown on the 1886 Sanborn Map. The MGP gas production facilities were isolated to 270 Nevins Street and consisted of coal gas production facilities including a retort house, an engine room, condenser rooms and a gasoline house. Gas storage and purification facilities including two gas holders, a governor

house, purifying houses and a lime house were located to the southeast across Nevins Street on 537 Sackett Street and 560 Degraw Street. A hydrogen tank, a purge tank and naphtha tanks were located at 225 Nevins Street. By late 1888, the gas holder was constructed at 191 3rd Avenue. These structures are shown on Plate 1. Based upon the age of their construction, these holders were likely pit style holders with sub-grade foundations.

In 1895, the Fulton Municipal Gas Company and others merged to form the Brooklyn Union Gas Company, a predecessor to KeySpan. The 1904 Sanborn indicates that the MGP was referred to as the Brooklyn Union Gas Fulton Municipal Branch.

According to 1904 Sanborn maps, the gas production facilities at 270 Nevins Street remained relatively unchanged with the exception of the addition of a circular oil storage tank, underground oil tanks, and an aboveground tar separator. Two circular oil tanks and additional underground gas oil tanks were noted at 225 Nevins Street. By 1915, the MGP appears to have converted to water gas production as evidenced by the addition of generators and conversion of the retort house to a generator house at 270 Nevins Street. An additional oil storage tank was noted on the 225 Nevins Street property (**Plate 1**).

The Fulton Former MGP ceased operation prior to 1938. The MGP structures were dismantled and vacant lots are shown in the 1938 Sanborn map.

2.2.2 Post-MGP History

The Fulton MGP was subdivided and redeveloped for commercial, industrial, and recreational uses. These parcels are all currently owned and/or used by third parties unrelated to KeySpan. A brief history of the post-MGP use was developed from available Sanborn maps and is presented below by current parcel address and tax lot.

- 225 Nevins Street [Block 419 Lot 1]: A Comfort Station is shown on the northern portion of the site in the 1950 and 1969 Sanborn Maps. By 1979, the pool and associated changing rooms were constructed. The parcel is currently Thomas Greene Playground.
- 270 Nevins Street [Block 425 Lot 1]: The current warehouse building was constructed by 1950. An underground gasoline tank is depicted on the 1950 Sanborn Map. By 1969, the building was occupied by T.E. Conklin Brass & Copper Company and utilized as a warehouse from at least 1969 until 1996 according to Sanborn maps.
- 537 Sackett Street [Block 426 Lot 1]: A warehouse/industrial building was constructed by 1950 and was occupied by the Majestic Metal Spinning and Stamping Company, Inc. from at least 1950 until 1982. By 1986, the property was occupied by the Adams Book Company which currently occupies the site. The remaining southern portion of the lot

was developed with a warehouse in 1955 that operated until 1982. A commercial auto repair facility operated at the property from at least 1986 through 1996 according to Sanborn map information.

- 560 Degraw Street [Block 426 Lot 17] and 553 Sackett Street [Block 426 Lot 49]: The properties were utilized for used truck parking, truck wrecking, and truck sales from 1950 through 1995 based upon Sanborn map information.
- 191 3rd Avenue [Block 420 Lot 1]: The property was developed as a garage for the News Syndicate Inc. prior to 1951. The garage had a paint shop and underground gasoline storage tanks as part of the operations. The News Syndicate Inc. operated the garage from 1951 through 1995 according to Sanborn maps.

2.2.3 Current Site Conditions

The current site conditions and the surrounding area are shown on the aerial photograph on **Plate 1**. As discussed above in the site history, the site was subdivided into six parcels. The current site conditions were summarized from the publicly accessible areas including sidewalks and Thomas Greene Playground. The interior conditions of the buildings were not accessed as part of the visit. As shown in the aerial photograph, the majority of the Fulton former MGP Site is either paved or developed with buildings. The site conditions of each parcel are summarized below.

Fulton Former MGP

Address	Current Owner	Block	Lot	Land Use Description
225 Nevins Street	New York City Parks and Recreation	419	1	Thomas Greene Playground which includes an asphalt-paved picnic area and playing courts to the east and concrete paved playing courts and 2 swimming pools with associated buildings to the west.
270 Nevins Street	270 Nevins St Property	425	1	Industrial-Factory Building
537 Sackett Street	ATS Realty Inc.	426	1	Industrial-Factory Building
560 Degraw Street	242 Nevins, Inc.	426	17	Commercial-Store Building - Automotive
553 (aka 549) Sackett Street	ATS Realty Inc.	426	49	Commercial-Vacant Land - Garage/Parking Lot

Fulton MGP Holder Site

Address	Block	Block	Lot	Land Use Description
191 3rd Avenue	595 Degraw, LLC.	420	1	Commercial-Garage

The Fulton MGP and surrounding area are zoned for manufacturing (M1-2), as a result the site is surrounded by commercial and manufacturing businesses. The Fulton MGP is bordered by the remainder of Thomas Greene Playground and Douglass Street to the north; Sackett Street and then properties with mixed use including transportation uses and residential apartments and industrial building to the south; to the east by the Gowanus Canal and a commercial truck facility and the former Fulton MGP Holder site to the west. Degraw Street bisects the Fulton Former MGP.

The Fulton Former MGP Holder Site is currently covered with a commercial garage building. The site is bounded by Third Avenue to the west and then Thomas Greene Playground, Douglass Street and then industrial use buildings and one multi-family building to the north, a vacant lot and garage are located to the east, Degraw Street and then industrial use buildings are located to the south.

The Fulton former MGP is developed with buildings that are secured with locked entrances or fences with the exception of Thomas Greene Playground. The pool area of Thomas Greene Playground is secured with fences and locked gates. The remainder of the Playground is surrounded with a chain link fence with open entrances. The NYSDEC SC indicated that there is no exposure pathway for current users of the Playground. The property at 560 Degraw Street is secured with a chain link fence and gates.

3. Summary of Records Search

A review of environmental records for the Fulton former MGP property was completed as part of the preparation of the RI Work Plan. The purpose of this review was to determine:

- Environmental data and information currently available
- History and description of site including nature of operations

3.1 Records Search

The record search report for the Fulton former MGP site included the review or evaluation of the following:

- For potential releases on site, GEI reviewed the NYSDEC's on-line Spills Incidents Database Search and the Environmental Remediation Database Search <http://www.dec.ny.gov/chemical/8437.html>
- For environmental data, potential hazardous waste storage, and PRPs, GEI relied upon information from Environmental Data Resources (EDR), a commercially available environmental database, searches dated May 7, 2004 and January 11, 2008, and available Sanborn maps dated 1886 through 1996. EDR environmental database searches are attached in Appendix C. Sanborn maps are located in Appendix B.
- GEI also reviewed the Site Characterization Report Fulton Former Manufactured Gas Plant. Brooklyn (II), Kings County, N.Y. Site No. 2-24-051 dated September, 2007 prepared by the NYSDEC Remedial Bureau C, Division of Environmental Remediation.

The site history, current site conditions and site security are discussed above within subsection 2.2.

A Freedom of Information Act (FOIA) request letter will be submitted to the NYSDEC to obtain information for the subject property and abutting properties with environmental records prior to the completion of the RI report.

3.2 Environmental Records Information Summary

A search of the NYSDEC spill incidents and environmental site remediation databases was conducted by GEI on January 23, 2007. The following environmental records were encountered for the site when GEI accessed the databases.

3.2.1 NYSDEC Environmental Site Remediation Database Search

The NYSDEC website contained a record for the Former Fulton Works MGP site and a record for the adjacent former Bayside Fuel Oil terminal located to the southwest of the site across the Gowanus Canal.

The NYSDEC website refers to the Fulton Former MGP site as the K-Fulton Works (Site No. 224051) which is located on Nevins, Degraw and Sackett Streets between 3rd Avenue and the Gowanus Canal in Brooklyn, New York. The NYSDEC website indicates that the Site is listed as a Class A site within the State Superfund Program which indicates that a remedial program is underway but not yet currently complete. The NYSDEC Remedial Bureau C Division of Environmental Remediation (DER) initiated a SC investigation in February 2007. A summary of the NYSDEC SC findings are provided below in subsection 3.2.4.

The Bayside Fuel Oil Depot-Bond Street Terminal (Site C224080) is located at 510 Sackett Street to the southwest across the Gowanus Canal. The site was previous listed Site No. V00582 by the NYSDEC. The site is listed as a Class A site within the State Brownfield Cleanup Program (BCP), which indicates that a remedial program is underway but not yet currently complete. The Bayside Fuel Oil-Bond Street Terminal is a major oil storage facility (MOSF) with a 1.5 million gallon oil capacity. Fuel oil contamination has been documented at the site. Concentrations of VOCs and SVOCs significantly exceeded applicable soil cleanup objectives and groundwater standards. Metals were also detected at concentrations that exceeded the applicable standards.

3.2.2 NYSDEC Spill Incident Database Search

The following spill incidents were reported by then current owners many years subsequent to termination of ownership by KeySpan's predecessor.

One spill incident was encountered for the Fulton former MGP site at 537 Sackett Street. The spill incident indicates that 5-gallons of #2 fuel oil were spilled on the ground on November 30, 1993. The spill report was closed on November 30, 1993.

Four spill incident reports were encountered for properties on the western side of the site. One spill record was recorded (No. 0613824) adjacent to the Fulton MGP Site at 223 Nevins Street for the release of one gallon of lube oil that leaked from a drum to the ground on March 26, 2007. The spill is not closed. Three spill reports were encountered for sewage releases to the Gowanus Canal for the Nevins Street Pump Station.

Multiple spill incidents were encountered for 510 Sackett Street [Bayside Oil Bond Street Terminal] which is located to the southwest of the site across the Gowanus Canal.

3.2.3 Commercial Environmental Records Review

A number of current/historic activities of potential environmental concern were identified on site, adjacent, and at nearby properties based on the EDR report and on Sanborn maps (see Table 1, Figure 2).

3.2.4 NYSDEC Site Characterization

The NYSDEC completed a SC investigation of the Fulton former MGP in April through June 2007. Scope of the SC included the installation of 29 soil borings (KSF-SB-1 through KSF-SB-29) and seven monitoring wells (MW-1 through MW-7) within Thomas Greene Playground and within public street right-of-ways (ROWS) and sidewalks of Degraw, Sackett and Nevins Streets. The NYSDEC SC locations are shown on **Plate 1**. The NYSDEC collected thirteen (13) soil samples for VOC and SVOC analysis. Groundwater analytical samples were collected from the seven (7) monitoring wells. Concentrations of VOCs and SVOCs exceeded the established TAGM 4046 RSCOs and ambient water quality standards were present in soils and groundwater. The NYSDEC SC report concluded with eight principal observations. A summary of the observations are provided below:

- Coal tar contamination was observed at depth beneath the Thomas Greene Playground in the area surrounding the swimming pool and at the edge of the basketball courts. Coal tar saturated soils were observed in ten of the thirteen soil borings completed in the Playground. Soil samples collected from these borings exceeded the TAGM 4046 RSCOs. Petroleum-impacted soils with diesel odors were observed in borings on the eastern part of the Playground.
- “Coal tar was not observed at or near the ground surface. Consequently, the potential for human exposure to coal tar contaminants by routine users of the park, workers involved in park operations, or people on the surface in the surrounding neighborhood is low. Exposures could take place during intrusive subsurface work such as underground utility construction or repair.”
- Observations of coal tar saturated soils were encountered at depth outside the Playground along both sides of Degraw Street in the vicinity of the former gas holders and to the western side of Nevins Street at KSF-SB-14 adjacent to the Playground.
- Coal tar sheens and odors were observed at 23.5 to 26 feet below ground surface (bgs) near the intersection of Nevins and Degraw Streets. Laboratory analysis revealed SVOC concentrations that exceeded established cleanup objectives.

- A clay and peat layer appears to act as a confining layer limiting the downward penetration of coal tar in Thomas Greene Playground and on Degraw Street. The layer was encountered at approximately 20 feet bgs and ranged in thickness from approximately 6 inches to 4 feet.
- NAPL exhibiting a strong coal tar odor was observed in monitoring wells MW-6 and MW-7 adjacent to Thomas Greene Playground where coal tar was observed in subsurface soils.
- Groundwater concentrations in MW-2, MW-6 and MW-7, which are located in the vicinity of coal tar-impacted soils, exceeded applicable groundwater standards.
- Coal tar odors and sheens have been observed at low tide in the adjacent Gowanus Canal. Soil borings completed during the SC encountered tar at depths that could intersect the Gowanus Canal. However, a soil boring completed by KeySpan as part of the Gowanus Canal study encountered tar impacts at depths from approximately 38 to 45 feet bgs

Based on the findings of the SC investigation, the NYSDEC recommended that a RI was required to determine the full nature and extent of contamination at this site. The NYSDEC indicated that the RI should at a minimum include:

- “1. Additional subsurface investigation to accurately define:
 - a. the location of the holder foundations and any other subsurface MGP structures which may remain at the site.
 - b. the surface elevation and continuity of the peat and clay layer
 - c. the extent of coal tar contamination, particularly to the south, at the location of the former MGP plant on the block bounded by Degraw, Nevins, and Sackett streets.
 - d. Relationship of the tar contamination to the canal and potential for NAPL migration into canal.
 - e. Impacts to groundwater
2. Investigation of potential for soil vapor intrusion into buildings on site and in surrounding areas.
3. Following completion of the RI, a Feasibility Study will be developed to evaluate remedial alternatives to address the contamination.”

3.3 Possible Subsurface Structures

A review of Sanborn maps revealed that a number of historic subsurface structures may be potentially located within the footprint of the Fulton former MGP site. Sanborn maps depict the following possible subsurface structures during the operation of the MGP:

- Five (5) rectangular tar/oil tanks and circular oil tank were located at 270 Nevins Street
- Two gasholders at 537 Sackett Street and 560 Sackett Street
- A hydrogen gas tank, two circular oil tanks, a set of six underground gas oil/naphtha tanks and an oil tank in a concrete basin at 225 Nevins Street
- A gas holder at 191 3rd Street

The location of these former MGP structures are shown on **Plate 1**.

A review of Sanborn Maps and the EDR environmental records report document post-MGP subsurface structures within the footprint of the former MGP. EDR environmental database searches are attached in Appendix C. Sanborn maps are located in Appendix B. The structures are summarized below by property:

270 Nevins Street

- Gasoline underground storage tanks (USTs) on the 1950 Sanborn map. In addition, two gasoline USTs were located immediately adjacent to the south of the 270 Nevins Street.
- EDR indicates that two 550 gallon diesel USTs and a gasoline UST were closed in place.

537 Sackett Street

- EDR indicates that a 7,000 gallon fuel oil tank is closed in place.

560 Sackett Street

- EDR indicates that an active 275 gallon waste oil tank is registered at the site.

191 3rd Avenue

- Two gasoline USTs are shown on Sanborn maps from 1950 through 1995.

4. Local Environment

The following section provides a summary of the local environmental setting at the Fulton former MGP site and vicinity. The local environment information is summarized for published information including:

- Site Characterization Report Fulton Former Manufactured Gas Plant. Brooklyn (II), Kings County, N.Y. Site No. 2-24-051 dated September, 2007 prepared by the NYSDEC Remedial Bureau C, Division of Environmental Remediation
- Buxton , et al. 1981 United States Geological Survey *Reconnaissance of the Ground-Water Resources of Kings and Queens Counties, New York*
- Cadwell, D. H. 1989 *Surficial Geology Map of New York, Lower Hudson. New York State Museum Map and Chart Series 40, scale 1:250,000*

4.1 Surficial Geology

The Fulton Former MGP is underlain by artificial fill, marsh deposits (clay and peat), and glacial till according to the NYSDEC SC report and the 1989 *Surficial Geologic Map of New York, Lower Hudson Street*. Soil borings completed during the NYSDEC SC activities encountered fill ranging in depth from 8 feet bgs to over 28 feet in thickness. The fill is described as primarily sand and silt mixture with varying amounts of cinders, wood brick, metal, pottery and rock fragments. According to the NYSDEC, the artificial fill was likely placed at the site during the historical filling of the wetlands system in south Brooklyn. A layer of peat and silty-clay was encountered within SC borings at depths ranging from as shallow as 11.5 to over 28 feet bgs. Although not encountered during the SC, the Fulton former MGP is underlain by glacial till, according to the 1989 *Surficial Geologic Map of New York, Lower Hudson Street*. The till is described as variable texture (clay, silt-clay boulder-clay) that is typically poorly sorted with variable clast content that are well rounded and of varying lithologies. The glacial till deposits are approximately 100 feet thick in the vicinity of the site.

The Gardiners Clay is clay that is located at -100 feet elevation (National Geodetic Vertical Datum 1929) according to Buxton , et al. (1981). The Gardiners Clay is described as a greenish-gray clay and silt with inter-bedded sand with occurrences of fossils, shells, foraminifera, and lignite.

The Jameco Gravel is located beneath the Gardiners Clay to approximately -150 feet (NGVD 1929) according to Buxton et. al. (1981). The deposits consist of dark brown coarse sand and gravel with many cobbles and boulders.

Crystalline bedrock is located approximately at approximately -150 feet (NGVD 1929) according to Buxton et. al. (1981)

4.2 Hydrogeology

The hydrogeology beneath the Fulton former MGP is discussed in terms of the available SC groundwater data and the nearest waterbody, the Gowanus Canal. Groundwater was encountered between 6 to 8 feet bgs in the vicinity of the Gowanus Canal and was encountered at approximately 14 feet bgs to the east of the former MGP site. Based upon the surrounding topography, the groundwater flow is anticipated to flow westward to the Gowanus Canal.

The Gowanus Canal is located at the western boundary of the Fulton former MGP site. The Gowanus Canal is a saline class D tidal water body. This class of surface water body is the most degraded water saline water body classification. The best use for SD water bodies is for fishing and fish survival.

5. Scope of Work

The scope of work addresses field investigation tasks that will evaluate the nature and extent of soil and groundwater impacts related to the operation of the Fulton former MGP site. The type, number and depth of samples were developed based on a preliminary review of historic sources of information such as historic topographic maps and Sanborn maps and the NYSDEC SC information. Accordingly, the proposed sampling program includes sampling of soils, soil vapor and groundwater.

The scope of work includes the following tasks:

- Pre-Investigation Tasks
- Site Utility Survey
- Field Investigation Sampling and Analysis
- Survey
- QA/QC and Data Validation
- Qualitative Human Health Exposure Assessment
- Step I Fish and Wildlife Resources Impact Analysis
- RI Report Preparation

Descriptions of each proposed work activity are provided separately below.

5.1 Pre-Investigation Tasks

Upon receipt of authorization from KeySpan, and the necessary access agreements, the consultant will mobilize to the site to implement the sampling program. The initial field mobilization will include the following items to be completed prior to the commencement of the field RI activities:

- Establish a temporary decontamination area
- Establish a temporary waste storage area and make arrangements with KeySpan for the removal of investigation derived wastes (IDW)
- Identify underground utilities

5.1.1 Site Access

KeySpan and its contractors will need site access granted by the City of New York and private property owners to complete the proposed RI scope of work. KeySpan will negotiate access with

the City and the private property owners. If access to all the properties can not be obtained for all parcels, KeySpan will work with the NYSDEC to gain access to complete the RI activities.

5.1.2 Utility Clearance

The general location of the proposed RI sample locations were identified during the preliminary site visit. Each actual proposed boring and subsurface investigation location will be marked with white paint by the consultant. The drilling subcontractor will provide the boring locations to the utility clearance organization (New York City and Long Island One Call) to identify potential utility conflicts at the site and with the street ROWs adjacent to the site. Prior to installation, each proposed RI sample location will also be cleared by a private utility mark-out company. A request will be submitted to the private property owner for on-site utility plans prior to completing intrusive activities.

Each soil boring, monitoring well and test pit location will either be hand cleared to a depth of 5 feet bgs, or 1 foot below the estimated depth of any adjacent known utility.

5.2 Field Investigation Sampling and Analysis

This section of the RI Work Plan describes the proposed test pits, surface soil, soil borings, soil vapor points and groundwater monitoring well installation, sampling and analysis activities. **Table 2** presents the general rationale and proposed sampling and analysis for the surface soils, test pit excavations, soil borings, soil vapor points, ambient air and groundwater monitoring wells and temporary points. In addition, air monitoring, well development, groundwater sampling, and hydraulic conductivity testing procedures to be implemented are discussed. Sampling procedures and methods are detailed within the FSP in **Appendix E**. The proposed analyses, analytical methods, and QA/QC samples are discussed under each of the following subsections for test pit, surface soil, soil boring, soil vapor, ambient air and monitoring well sampling procedures. Laboratory data deliverables and data validation procedures are discussed below in subsection 5.5. QA/QC procedures are detailed within the QAPP in **Appendix G**.

5.2.1 Surface Soil Samples

Seven surface soil samples (FW-SS-01 through FW-SS-07) will be collected from unpaved areas where surface soils are exposed around tree plantings and at 560 Degraw Street, within footprint of the Fulton former MGP. The sample locations are shown on **Plate 1**. Sample descriptions, rationale and analysis are shown in **Table 2**.

Stainless-steel sampling implements (including spoons or trowels) and stainless steel bowls will be used to collect each surface soil sample from the upper 2 inches beneath any turf or vegetative layer. The exposed soil will be screened for VOCs using a photoionization detector (PID). A discrete VOC soil sample will be collected from the area of the highest PID reading. Each

surface soil sample will be sampled for VOCs by the United States Environmental Protection Agency (EPA) SW-846 Method 8260B, SVOCs by EPA Method 8270C; Target Analyte List (TAL) metals by EPA Method 6000/7000 series; pesticides by Method 8081; polychlorinated biphenyls (PCBs) by EPA method 8082; herbicides by EPA Method 8151A, and total cyanide by EPA Method 9012. If elevated cyanide readings are present in a sample, then analysis for cyanide speciation may be completed. No compositing or mixing of the VOC sample aliquot will occur. Sample aliquots for analysis of SVOCs, metals, PCBs, pesticides, herbicides and total cyanide will be homogenized in a stainless steel bowl using a stainless steel spoon prior to being placed in laboratory-provide sample containers.

Each sampling implement will be decontaminated in accordance with decontamination procedures described in the FSP. One blind duplicate QA/QC sample, matrix spike/matrix spike duplicate (MS/MSD) sample, and equipment rinsate blank sample will be collected for surface soil samples. An approved NYSDOH Environmental Laboratory Approval Program (ELAP) laboratory will perform the analyses. QA/QC procedures are detailed within the QAPP located in **Appendix G**.

5.2.2 Test Pit Excavations

A total of six test pits (FW-TP-01 through FW-TP-06) are proposed to be excavated at the Fulton former MGP site. The proposed test pit excavation locations are shown on **Plate 1**, and the descriptions, rationale, and analysis are presented in **Table 2**. The test pits are proposed to assess the configuration and contents of former MGP structures.

Each test pit will be photographed and logged by the field representative during the excavation. Test pits will be terminated at the approximate groundwater table which was encountered at the approximately 8 feet bgs during the previous NYSDEC SC. Field screening of soils will be conducted with a PID for the presence of VOCs from the ground surface to the entire depth of the excavation. A minimum of one soil sample will be selected for analysis per each test pit. Samples will be selected from the area exhibiting the most prominent signs of apparent contamination. Each sample will be analyzed for VOCs by Method 8260, SVOCs by EPA Method 8270, TAL metals by EPA method 6000/7000 series, pesticides by Method 8081, PCBs by EPA method 8082, herbicides by EPA Method 8151A, and total cyanide by EPA Method 9012. If elevated cyanide readings are present in a sample, then analysis for cyanide speciation may be completed. After the completion of the test pit, the test pit will be backfilled in reverse sequence in which it was excavated, so that materials removed from the bottom of the test pits are placed back at the bottom and materials removed from the top of the test pit are placed back at the top. The test pits will be backfilled in lifts and compacted. Excess soils will be containerized in a lined roll-off which will be characterized and disposed of by KeySpan. If test pits are excavated in paved areas, the pavement will be restored following completion of RI activities.

QA/QC samples will include blind duplicate soil samples, MS/MSD samples, and equipment rinsate blank samples. The quality control samples will be completed on a frequency of 1/20 or once per week of sampling. A laboratory certified in the NYSDOH ELAP will perform the analyses. One trip blank will be included per shipment of soil samples to the laboratory.

5.2.3 Soil Boring Installation and Sampling

A total of forty-nine (49) soil borings are proposed for installation at the Fulton former MGP. The proposed soil boring and monitoring well locations are shown on **Plate 1**. **Table 2** provides sample description, rationale, and analysis. Each soil boring location will be cleared utilizing manual methods or vacuum methods to a depth of 5 feet bgs, or 1 foot below the estimated depth of any nearby known utility.

Soil samples will be collected and logged continuously from each boring. It is anticipated that drilling will proceed approximately 10 feet into soils that are visually un-impacted. If no impacts are observed at a particular on-site boring location, the boring will terminate at approximately 50 feet bgs. Any deep drilling through impacted zones will ensure that there is no vertical communication of DNAPL caused by the drilling. Specifically, the upper potentially-impacted units would be cased and sealed into a lower, more confining unit. Drilling methods and procedures will be consistent with the FSP. Low clearance drilling equipment will be utilized to install soil borings located inside the warehouse-type buildings. Actual drilling locations will be determined based on the building configuration and the operations of the current tenant.

Drilling equipment (i.e., drilling rods, auger, casing, and/or macro-core sampler) will be decontaminated between each sample location. Soil cuttings and decontamination fluids will be collected in 55-gallon USDOT drums, lined roll-off or frac tank and will be disposed of by KeySpan.

Up to three soil samples per boring will be selected for chemical analysis. The first soil sample will be collected from the depth interval indicating the greatest apparent degree of contamination from beneath the pavement and road base to approximately 5 feet bgs during utility clearance activities to evaluate shallow subsurface soil conditions for determination of potential exposure pathways at the site. A sample will also be collected at the depth interval indicating the greatest degree of impacts to evaluate the magnitude of the observed impacts at each boring. The greatest degree of contamination will be identified by field screening of the borings with a PID, and by visual and olfactory observations. If soils within a particular boring are un-impacted then a sample will be collected from the apparent observed groundwater table. A sample will be collected beneath the DNAPL impacts at the completion of the boring.

Each sample will be analyzed for VOCs by EPA Method 8260B, SVOCs by EPA Method 8270C, TAL metals by EPA Method 6000/7000 series, and total cyanide by EPA Method 9012.

If elevated cyanide readings are present in a sample, then analysis for cyanide speciation may be completed. One sample from within the fill (approximately first 15 feet bgs) in each soil boring will be analyzed for PCBs and pesticides by EPA Method 8082, herbicides by EPA Method 8151A. Environmental forensic analysis of polycyclic aromatic hydrocarbons (PAHs) may be used to evaluate co-mingled or non-MGP related impacts which were identified during the SC.

Geotechnical parameters will also be evaluated during the RI. Shelby tubes will be collected within the confining peat/silt-clay layer at four locations within Thomas Green Playground and the permeability, Attenberg limits, and strength will analyzed. The fill layer within the park will also be analyzed for grain size by ASTM method D421/422, moisture content by ASTM method D-2216, and total organic carbon by ASTM D2974.

Following the collection of subsurface soil samples, each subsurface soil boring will be abandoned by tremmie grouting the boring from the bottom of the boring to the top in accordance with the FSP.

Each sampling implement will be decontaminated in accordance with decontamination procedures described in the FSP. QA/QC procedures are detailed within the QAPP located in Appendix G. QA/QC samples will include blind duplicate soil samples, MS/MSD samples, and equipment rinsate blank samples. The quality control samples will be completed on a frequency of 1/20. An approved NYSDOH ELAP registered laboratory will perform the analyses. One trip blank will be included per shipment of samples to the laboratory.

5.2.4 Monitoring Well Installation

Fifteen of the proposed soil borings (FW-MW-01 through FW-MW-15) will be completed as permanent monitoring wells. Temporary groundwater points will be installed and sampled at six locations (FW-SB-07, FW-SB-11, FW-SB-15, FW-SB-16, FW-SB-20 and FW-SB-33). The location of the borings and the proposed analysis are shown on **Plate 1** and **Table 2**. The permanent monitoring wells are proposed to evaluate the groundwater conditions at and immediately adjacent to the Fulton former MGP. Temporary groundwater points are proposed to evaluate the conditions immediately adjacent to and within former structures. The proposed monitoring wells supplement the exiting SC monitoring wells installed by the NYSDEC in 2007. The condition of the existing monitoring wells will be assessed during the RI. Each monitoring well/point will be installed in general accordance with procedures described below and within the FSP (**Appendix E**).

Each proposed monitoring well will be screened in the uppermost portion of the water table aquifer. Each well screen will extend approximately 2 feet above the water table. If DNAPL is encountered in the soil boring, the well screen bottom will be installed on top of any observed confining layer that may be retarding the migration of DNAPL. The screen lengths will not

exceed 10 feet. Based upon the vertical extent of DNAPL tar, deep groundwater monitoring wells may be considered. The installation method selected for the deep wells will depend on the depth of contamination, the number of anticipated deep wells, and on the physical drilling conditions.

The monitoring wells will be constructed of 2-inch inside diameter (ID), flush-threaded polyvinyl chloride (PVC) screen and solid casing with a 2-foot sump. The annular space between the well screen and borehole wall will be backfilled with chemically inert sand to promote sufficient groundwater flow to the well and to minimize the passage of any fine-grained formational material into the well. A bentonite clay seal will be placed above the sand pack. The remaining annular space will be filled to grade with cement/bentonite grout. Each monitoring well will be fitted with a lockable cap and finished with a flush-mounted curb box secured with cement.

Temporary points will be constructed of a PVC screen and riser or collected through a stainless steel groundwater sampler. Each temporary groundwater point will be abandoned by tremmie grouting the boring from the bottom of the boring to the top in accordance with the FSP.

Soil cuttings and decontamination fluids generated during the installation of monitoring wells will be collected in 55-gallon USDOT drums, lined roll-off or frac tank and will be disposed of by KeySpan.

5.2.5 Well Development

Each newly installed monitoring well will be developed by alternatively surging and pumping until the turbidity is less than 50 nephelometric turbidity units (NTUs) or until a maximum of 10 well volumes of water have been removed. A field turbidity meter will be used to monitor the NTU levels. Well development will be completed in general accordance with the FSP in Appendix E. Purged groundwater will be containerized in 55-gallon USDOT drums and will be disposed of by KeySpan at an approved facility.

5.2.6 Groundwater Sampling

The fifteen (15) proposed RI monitoring wells, the six temporary monitoring points, and the seven (7) existing SC monitoring wells will be gauged and sampled. The existing SC monitoring wells will be assessed to determine if the well is serviceable and screened based on observed impacts during the RI boring program. If unserviceable, a new well (or wells) will be installed based on impacts observed in adjacent soil borings.

Each of the newly installed monitoring wells will be sampled at a minimum of two weeks following completion of development. Prior to sampling, a synoptic round of groundwater level

measurements will be recorded for each of the monitoring wells and an established surface water measuring point at the bulkhead in the Gowanus Canal. The groundwater will be gauged at both the low tide and high tidal levels in the Gowanus Canal.

Newly installed RI and previous SC-installed monitoring wells and the six monitoring points will be purged and sampled utilizing low flow groundwater sampling procedures. Each groundwater sample will be analyzed for VOCs by EPA Method 8260B, SVOCs by EPA Method 8270C, TAL metals by EPA Method 6000/7000 series, herbicides by EPA Method 8151A, pesticides by EPA Method 8082, cyanide by EPA Method 9012. If elevated cyanide readings are present in a sample, then analysis for cyanide speciation may be completed.

If DNAPL accumulation is present in any well, then no groundwater sample will be collected for laboratory analysis. If DNAPL is found to accumulate in a well, then the DNAPL will be bailed or pumped from the well and the volume of bailed DNAPL tar will be recorded. The DNAPL recovered from each well will be examined and described by the field representative. All DNAPL removed from a well will be containerized for disposal by KeySpan. The recovery rate of the DNAPL will be assessed through periodic measurements of DNAPL levels with an oil/water interface probe. DNAPL levels in each monitoring well will be measured and recorded with the time of the measurement after the DNAPL tar has been removed. If present, a sample of the accumulated tar may be analyzed for disposal characteristics.

QA/QC procedures are detailed within the QAPP located in **Appendix G**. QA/QC samples will include two blind duplicate groundwater samples, two MS/MSD samples, and two equipment rinsate blank samples. An approved ELAP laboratory will perform the analyses. One trip blank will be included per shipment of samples to the laboratory.

5.2.7 Hydraulic Conductivity Testing

In-situ hydraulic conductivity tests (slug tests) will be completed at three (3) selected monitoring wells. The location of the slug tests will be determined after evaluation of the site lithology.

5.2.8 Soil Vapor Sampling

Thirteen soil vapor samples (FW-SV-01 through FW-SV-13) are proposed to assess the soil vapor conditions beneath the Fulton former MGP site.

Each soil vapor point will be installed and samples will be collected in general accordance with the *New York State Department of Health's "Guidance for Evaluating Soil Vapor Intrusion in the State of New York"* and KeySpan's *"Draft Standard Operating Procedure- Soil Vapor Intrusion for MGP Sites in New York"*.

Soil vapor points installed within building interiors will be installed and completed as sub-slab soil vapor points. Sub-slab soil vapor points will be installed by drilling a hole through the concrete floor slab and fitted with Teflon or stainless steel tubing fitted with stainless steel fittings and cap. Each sub-slab soil sample port will be sealed with non-shrinking grout or beeswax.

Temporary soil vapor sample points will be advanced approximately 5 feet bgs or 1 foot above the water table. Temporary points will be constructed utilizing a stainless steel screen that is fitted to Teflon or stainless steel tubing fitted with stainless steel fittings and caps to the ground surface. The annular space around the screen will be backfilled with inert silica to a minimum of 6-inches above the screen. A bentonite seal will be placed above the sand and the remainder of the annulus will be filled with soil cuttings. The sampling port will be sealed with a 2-inch layer of bentonite paste at the surface.

To ensure that the sampling tube is sealed from the ambient air above ground, the consultant will utilize helium as a tracer gas as described in the NYSDOH Soil Vapor Intrusion Guidance document. The sample will be collected utilizing an individually certified SUMMA[®] canister with a laboratory-calibrated flow controller that will not exceed 0.2 liters/minute. Each SUMMA[®] canister will be shipped to an approved-NYSDOH ELAP registered laboratory for analysis. The sample will be analyzed for VOCs and naphthalene by the modified EPA Method TO-15 (including naphthalene) and helium by ASTM Method D-1945. The soil vapor sampling will target the winter heating season between November 15 and March 30 in accordance with NYSDOH Soil Vapor Guidance.

5.2.9 Ambient Air Sampling

Six indoor air samples (FW-IA-01 through FW-IA-06) and three outdoor ambient air samples (FW-OA-01 through FW-OA-03) are proposed to be collected as part of the Fulton RI Work Plan. The ambient air samples will be used to assess the potential for soil vapor intrusion into the buildings. The proposed locations are shown on Plate 1 and the rationale is provided in **Table 2**.

The proposed ambient air samples will be collected from the approximate breathing height (approximately 3 to 5 feet aboveground). The indoor air and outdoor air samples will be collected utilizing an individually certified 6-Liter SUMMA[®] canister with a laboratory-supplied flow controller that is calibrated to an 8-hour period. The regulator flow rate will not exceed 0.2 liters per minute. Each SUMMA[®] canister will be shipped to an approved-NYSDOH ELAP registered laboratory for analysis. The samples will be analyzed for VOCs and naphthalene by the modified EPA Method TO-15. QA/QC procedures are detailed within the QAPP located in **Appendix G**. QA/QC samples will include one blind duplicate ambient air sample (indoor or outdoor air sample) will be collected during each sampling event. The ambient air sampling will

target the winter heating season between November 15 and March 30 in accordance with NYSDOH Soil Vapor Guidance.

Property information will also be collected in general accordance with the NYSDOH Center of Environmental Health's Indoor Air Quality Questionnaire and Building Form that is provided as Appendix B of the NYSDOH soil vapor guidance and KeySpan's Draft Standard Operating Procedures for Soil Vapor Intrusion for MGP Sites in New York which is located in the FSP.

5.2.10 Air Monitoring

A Community Air Monitoring Program (CAMP) will be implemented at the site during intrusive field activities. The CAMP will meet the requirements of the NYSDOH's Generic CAMP contained in Appendix 1 of NYSDEC's Draft DER-10 Technical Guidance For Site Investigation and Remediation dated December 25, 2002. Air will be monitored upwind and downwind of each intrusive work area (i.e., boring, monitoring well and test pit locations). VOCs and respirable particulates (PM-10) will be monitored up-wind and downwind on a continuous basis. Wind direction will be determined using a wind sock(s) and/or flagging poles installed on site.

VOC vapors will be monitored using a PID. Particulate dust will be monitored using a DataRAM particulate meter or equivalent. The equipment will be calibrated at least daily or in accordance with manufacturers' recommendations. The proposed CAMP is presented in **Appendix D**.

5.2.11 Decontamination and Investigation Derived Wastes

Drilling equipment will be decontaminated at the established decontamination pad between each sample in accordance with the FSP in **Appendix E**. Sampling equipment used for sample collection (e.g., stainless steel split spoons, sample spoons, and hand trowels) will be decontaminated prior to use and reuse or disposable sampling equipment will be used.

Soil cuttings and wastewaters produced during decontamination will be collected and contained within 55-gallon USDOT drums, roll-off or frac tank. KeySpan will arrange for the disposal of the investigation derived wastes after they have been characterized at the completion of the field program.

5.2.12 Waste Disposal Sampling

KeySpan will arrange for the disposal of the investigation derived wastes at the completion of the field program.

A waste profile sample of soil and fluid investigation derived wastes to characterize the wastes to determine the appropriate disposal options available. Samples will be collected into laboratory-preserved bottles, chilled with ice and submitted to the laboratory under chain of custody as described in the FSP and QAPP. Each disposal sample media will be sampled for parameters to meet the requirements of the approved disposal facilities. A list of potential disposal parameters is provided in the QAPP.

5.3 Survey

Each of the completed RI sample locations including test pits, soil borings, temporary groundwater points, monitoring wells and soil vapor locations and previous NYSDEC SC locations will be surveyed by a licensed New York State Licensed Land Surveyor. The elevation of each temporary monitoring well will be determined to ± 0.01 foot and will be tied into the site benchmark. All locations and elevations will be referenced to the New York State Plane Eastern Zone (3104) North American Datum 1983 (NAD) and North American Vertical Datum (NAVD 88).

5.4 Quality Assurance/Quality Control and Data Validation

An approved ELAP laboratory will provide New York State Category B data deliverables. The data will be validated in accordance with New York State Analytical Service Protocols (NYSASP). The data will be validated and a data usability summary report will be prepared documenting the adequacy of the analytical data obtained from the laboratory and discussing any pertinent data excursions or limitations on the use of the data. The data usability report will be used in preparing the RI report, and will be submitted as part of the RI report. The QAPP is located in **Appendix G**.

5.5 Qualitative Human Health Risk Assessment

In accordance with direction provided by NYSDEC, a QHHEA will be prepared. This assessment will generally follow the guidelines provided in the *New York State Department of Health Qualitative Human Health Exposure Assessment* (Appendix 3B to NYSDEC's December 2002 *Draft DER-10 Technical Guidance for Site Investigation and Remediation*). In general, the assessment will identify the exposure setting, identify exposure pathways, and will evaluate the fate and transport of the contaminants. The QHHEA will include all environmental data gathered pertaining to the RI. The qualitative assessment will identify potential risks for specific potential receptors based on complete pathways of exposure to contaminant levels exceeding default "screening criteria," such as the NYSDEC Part 375 soil standards and drinking water standards. The assessment will be used to render an opinion as to whether potential complete exposure pathway(s) and/or risk exist for potential receptors.

5.6 Step I Fish and Wildlife Resource Impact Analysis

A Step I FWRIA will be completed for the site. The Step I analysis will be conducted in accordance with the current version of NYSDEC's *Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites (FWIA)*. The general objectives of the Step I assessment are:

- Identify the fish and wildlife resources, habitats, cover type, wetland and stream; classifications at the site and in the vicinity
- Identify the fauna expected within each cover type and aquatic habitat
- Document observations of stress to the site soils and vegetation
- Describe the value of habitat to expected fauna
- Describe the value of the fish and wildlife resources to humans
- Determine whether contaminants are present that potentially could affect the expected fish and wildlife resources
- Recommend whether a Step II FWRIA is warranted

The findings of the Step I FWRIA will be included in the RI Report.

6. RI Report Preparation

A RI report will be prepared for submittal to NYSDEC and NYSDOH. The report will present the findings of the RI which will describe the nature and extent and fate and transport of all contaminants associated with the former Fulton former MGP. The RI report will identify specific contaminant concentrations throughout each media (e.g., soil, groundwater, soil vapor, etc.), which is necessary to assess whether any media require remediation or further evaluation. The RI report will also incorporate the findings of the hydraulic conductivity testing, QHHEA and Step I FWRIA.

7. Schedule

KeySpan is actively procuring consultant services to implement this RI scope of work. A detailed schedule will be established upon the approval of this work plan and prior to commencing RI field activities. KeySpan will notify NYSDEC five working days prior to the anticipated start date of the remedial investigation program.

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Tables

**Table 1
Summary of Environmental Records
Fulton Municipal Works MGP
Brooklyn, New York**

DRAFT

On Site			Abutting Properties			Properties within One Block		
Parcel I.D. No.	Company Name	Facility Operations (years)	Parcel I.D. No.	Company Name	Facility Operations (years)	Parcel I.D. No.	Company Name	Facility Operations (years)
1	Admiral Metals/T.E. Conklin Brass & Copper Co., Inc	Metal Goods Warehouse/UST/AST (1960's to present)	7	Unknown	Chemical Manufacturer (1920's to 1990's)	6	Brightwern Leather Co., Inc./E.A. Roos	Leather Works (1900 to late 1950's)
2	Majestic Metal Spinning & Stamping Co., Inc.	Metal Manufacturing/Plating (1940's to 1984)	9	Scranton & LeHigh Coal Co./Kelsey & Loughlin/Story's Coal Yard	Coal Yard (1880's to 1950's)	8	Tanks To U	LQG (current)
2	Adams Book Company, Inc.	Manufacturing/UST/Spill (1984 to present)	9	McNally Trucking Corporation	Trucking Company (1950's to 1984)	8	Petroleum Tank Cleaners	AST (current)
3	Unknown	Truck Wrecking/Spill (1940's to present)	9	Cross Bay Contracting Corporation/Royal Recycling Corp.	Transfer Station/SQG (1984 to present)	11	John E. Learney	Coal Yard (1905 to 1940's)
4	Autobody Concepts DBA ABC Collision	Autobody Repair/SQG (current)	10	Scranton & Lehigh Coal Co.	Coal Yard/Garage (1880's to 1940's)	11	Plastic Products Manufacturing	Plastic Manufacturing (1954 to 1987)
5	News Syndicate, Inc.	Automotive Garage/UST (1940's to 1990's)	10	Unknown	Automobile Garage/UST (1940's to present)	18	Ross & Snyder	Lumber Yard (1900 to 1940's)
5	Ryder Truck Rental, Inc./Penske Truck	SQG/UST/LTANK/Spills (current)	12	J.F. Schmadeke, Inc.	Coal Yard (1880's to 1930's)	18	The White Company	Truck Service Station (1940's to present)
17	NYC Dept. of Parks & Recreation	CBS AST (current)	12	Magnet Fuel Corp./Supreme Oil Terminal Corp./Bayside Fuel Oil Depot Corp.	Bulk Petroleum SQG/Spills/ERNS (1930's to present)	19	Unknown	Gasoline Station (1930's to early 1970's)
			13	Vanderbilt's/Z.O. Nelson & Son/Quinn's/Burns Brothers	Coal Yard (1880's to 1940's)	20	Unknown	Automobile Repair Garage/UST (1930's to present)
			13	Bayside Fuel Oil Corp.	UST/AST/Spill (current)	22	Knickerbockers Ice Co.	Garage/UST (1920's to 1950's)
			14	Wood's Coal Yard	Coal Yard (1880's to 1890's)			
			14	Plastic Products Manufacturing	Plastic Manufacturing (circa 1980)			
			14	Chatham Cleaners	SQG (current)			
			15	D. Gver & Sons, Inc.	UST/LTANK (current)			
			16	A&A Brake Co.	UST (current)			
			21	Unknown	Automobile Garage/UST (1930's to present)			

Notes:
 AST - Above ground bulk petroleum storage tank.
 CBS - Chemical bulk storage.
 LQG - RCRA- Large Quantity Generator.
 SQG- RCRA-Small Quantity Generator
 UST- Underground storage tank

**Table 2
Sample Descriptions, Rationale and Analysis
Fulton Municipal Works MGP Site
Brooklyn, New York**

Sample I.D.	Sample Location	Sample Rationale	Sample Depth	Number of Samples			VOCs (EPA 8260B)	SVOCs (EPA 8270C)	TAL Metals (60007000)	Total CN (EPA 9012B) ²	Herbicides (EPA 8151A)	PCBs (EPA 8082)	Pesticides (EPA 8081A)	VOCs (Expanded) (Modified TO-15)
				Soil	Groundwater	Soil Vapor/ Indoor Air/ Outdoor Air								
Test Pit Locations														
FW-TP-01	560 Degraw Street [Block 426, Lot 17] within the footprint of the former gas holder	Assess the location, depth, configuration and contents of the former gas holder	Depth at greatest observed impacts. If no impact then the observed water table.	1	0	0	X	X	X	X ²	X	X	X	
FW-TP-02	560 Degraw Street [Block 426, Lot 17] within the footprint of the former gas holder	Assess the location, depth, configuration and contents of the former gas holder	Depth at greatest observed impacts. If no impact then the observed water table.	1	0	0	X	X	X	X ²	X	X	X	
FW-TP-03	Thomas Greene Playground 225 Nevins Street [Block 419, Lot 1] within the footprint of the former oil tank	Assess the location, depth, configuration and contents of the former oil tank	Depth at greatest observed impacts. If no impact then the observed water table.	1	0	0	X	X	X	X ²	X	X	X	
FW-TP-04	Thomas Greene Playground 225 Nevins Street [Block 419, Lot 1] within the footprint of the former oil tank	Assess the location, depth, configuration and contents of the former oil tank	Depth at greatest observed impacts. If no impact then the observed water table.	1	0	0	X	X	X	X ²	X	X	X	
FW-TP-05	Thomas Greene Playground 225 Nevins Street [Block 419, Lot 1] within the footprint of the former oil tank	Assess the location, depth, configuration and contents of the former gas oil/naphtha tanks	Depth at greatest observed impacts. If no impact then the observed water table.	1	0	0	X	X	X	X ²	X	X	X	
FW-TP-06	Thomas Greene Playground 225 Nevins Street [Block 419, Lot 1] within the footprint of the former oil tank	Assess the location, depth, configuration and contents of the former gas oil/naphtha tanks	Depth at greatest observed impacts. If no impact then the observed water table.	1	0	0	X	X	X	X ²	X	X	X	
Subsurface Soil Borings, Monitoring Wells and Temporary Groundwater Monitoring Point														
FW-SB-01	Inside the 270 Nevins Street Building [Block 425, Lot 1], within footprint of the former circular oil tank	Evaluate soil conditions within the former oil tank footprint	Between 0 to 5' bgs with greatest observed impact/ at greatest observed impact/beneath observed impacts at the end of boring.	3	0	0	X	X	X	X ²	X ¹	X ¹	X ¹	
FW-SB-02	Inside the 270 Nevins Street Building [Block 425, Lot 1], within footprint of the former tar oil tank footprint	Evaluate soil conditions within the former tar oil tank footprint	Between 0 to 5' bgs with greatest observed impact/ at greatest observed impact/beneath observed impacts at the end of boring.	3	0	0	X	X	X	X ²	X ¹	X ¹	X ¹	
FW-SB-03	Inside the 270 Nevins Street Building [Block 425, Lot 1] adjacent to the former condenser house and catch basin	Evaluate soil conditions adjacent to the former condenser house and catch basin	Between 0 to 5' bgs with greatest observed impact/ at greatest observed impact/beneath observed impacts at the end of boring.	3	0	0	X	X	X	X ²	X ¹	X ¹	X ¹	
FW-SB-04	Inside the 270 Nevins Street Building [Block 425, Lot 1] within the footprint of the former oil press/oil room	Evaluate soil conditions within the footprint of the oil press/oil room	Between 0 to 5' bgs with greatest observed impact/ at greatest observed impact/beneath observed impacts at the end of boring.	3	0	0	X	X	X	X ²	X ¹	X ¹	X ¹	

**Table 2
Sample Descriptions, Rationale and Analysis
Fulton Municipal Works MGP Site
Brooklyn, New York**

Sample I.D.	Sample Location	Sample Rationale	Sample Depth	Number of Samples			VOCs (EPA 8260B)	SVOCs (EPA 8270C)	TAL Metals (6000/7000)	Total CN (EPA 9012B) ²	Herbicides (EPA 8151A)	PCBs (EPA 8082)	Pesticides (EPA 8081A)	VOCs (Expanded) (Modified TO-15)
				Soil	Groundwater	Soil Vapor/ Indoor Air/ Outdoor Air								
FW-SB-05	Inside the 270 Nevins Street Building [Block 425, Lot 1] within footprint of the former tar separator tank	Evaluate soil conditions within the footprint of the former tar separator tank	Between 0 to 5' bgs with greatest observed impact/ at greatest observed impact/beneath observed impacts at the end of boring.	3	0	0	X	X	X	X ²	X ¹	X ¹	X ¹	
FW-SB-06	Within Degraw Street ROW adjacent to former GC-GP-06, to the north/adjacent to 270 Nevins Street [Block 425, Lot 1]	Evaluate the vertical extent of tar impacts encountered in GC-GP-06 at 38 to 45 feet	Between 0&5', depth at greatest suspected impact and beneath impacts	3	0	0	X	X	X	X ²	X ¹	X ¹	X ¹	
FW-SB-07	Within Degraw Street ROW, to north/adjacent to 270 Nevins Street [Block 425, Lot 1]	Evaluate non-aqueous phase liquid with diesel odors in soil boring KSF-SB-24 soil and groundwater conditions	Between 0 to 5' bgs with greatest observed impact/ at greatest observed impact/Beneath observed impacts at the end of boring.	3	1	0	X	X	X	X ²	X ¹	X ¹	X ¹	
FW-SB-08	Within Degraw/Nevins Street ROW within the footprint of the retort house adjacent to 270 Nevins Street [Block 425, Lot 1]	Evaluate soil conditions within the footprint of the retort house	Between 0 to 5' bgs with greatest observed impact/ at greatest observed impact/beneath observed impacts at the end of boring.	3	0	0	X	X	X	X ²	X ¹	X ¹	X ¹	
FW-SB-09	Located near the Sackett Street and Nevins Street intersection	Evaluate the vertical extent of impacts encountered at KSF-SB-27/MW-4 from 24 to 26 feet to the south of the site	Between 0 to 5' bgs with greatest observed impact/ at greatest observed impact/beneath observed impacts at the end of boring.	3	0	0	X	X	X	X ²	X ¹	X ¹	X ¹	
FW-SB-10	Located in the Degraw Street ROW to the north of and adjacent to 537 Sackett Street [Block 426, Lot 1]	Evaluate the vertical extent diesel and tar impacts encountered in KSF-SB-21 and KSF-SB-22/MW-7 to the north of the purifying house	Between 0 to 5' bgs with greatest observed impact/ at greatest observed impact/beneath observed impacts at the end of boring.	3	0	0	X	X	X	X ²	X ¹	X ¹	X ¹	
FW-SB-11	Inside the 537 Sackett Street Building [Block 426, Lot 1], downgradient of the former gas holder footprint	Evaluate soil and groundwater conditions downgradient of the former gas holder	Between 0 to 5' bgs with greatest observed impact/ at greatest observed impact/beneath observed impacts at the end of boring.	3	1	0	X	X	X	X ²	X ¹	X ¹	X ¹	
FW-SB-12	Inside the 537 Sackett Street Building [Block 426, Lot 1] within the footprint of the former gas holder	Evaluate soil conditions within the gas holder footprint and evaluate if the former holder structure is present	Between 0 to 5' bgs with greatest observed impact/ at greatest observed impact/beneath observed impacts at the end of boring.	3	0	0	X	X	X	X ²	X ¹	X ¹	X ¹	
FW-SB-13	Inside the 537 Sackett Street Building [Block 426, Lot 1] within the footprint of the former gas holder	Evaluate soil conditions within the gas holder footprint and evaluate if the holder structure is present	Between 0 to 5' bgs with greatest observed impact/ at greatest observed impact/beneath observed impacts at the end of boring.	3	0	0	X	X	X	X ²	X ¹	X ¹	X ¹	

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				Soil	Groundwater	Soil Vapor/ Indoor Air/ Outdoor Air								
FW-SB-14	560 Degraw Street [Block 426, Lot 17] within the footprint of the former gas holder	Evaluate soil conditions within the former gas holder footprint and evaluate if the former holder structure is present	Between 0 to 5' bgs with greatest observed impact/ At greatest observed impact/ Beneath observed impacts at the end of boring.	3	0	0	X	X	X	X ²	X ¹	X ¹	X ¹	
FW-SB-15	560 Degraw Street [Block 426, Lot 17] within the footprint of the former gas holder	Evaluate soil and groundwater conditions within the gas holder footprint and evaluate if the former holder structure is present	Between 0 to 5' bgs with greatest observed impact/ at greatest observed impact/beneath observed impacts at the end of boring.	3	1	0	X	X	X	X ²	X ¹	X ¹	X ¹	
FW-SB-16	560 Degraw Street [Block 426, Lot 17] downgradient of the footprint of the former gas holder	Evaluate soil and groundwater conditions downgradient of the former gas holder footprint	Between 0 to 5' bgs with greatest observed impact/ at greatest observed impact/beneath observed impacts at the end of boring.	3	1	0	X	X	X	X ²	X ¹	X ¹	X ¹	
FW-SB-17	225 Nevin Street (Thomas Greene Playground) Block 419, Lot 1, adjacent to the footprint of the former oil tank footprint	Evaluate soil conditions adjacent to the oil tank	Between 0 to 5' bgs with greatest observed impact/ at greatest observed impact/beneath observed impacts at the end of boring.	3	0	0	X	X	X	X ²	X ¹	X ¹	X ¹	
FW-SB-18	225 Nevin Street (Thomas Greene Playground) Block 419, Lot 1, within oil tank footprint	Evaluate soil conditions within the former oil tank footprint and confirm impact observed in KSF-SB-12	Between 0 to 5' bgs with greatest observed impact/ At greatest observed impact/ Beneath observed impacts at the end of boring.	3	0	0	X	X	X	X ²	X ¹	X ¹	X ¹	
FW-SB-19	225 Nevin Street (Thomas Greene Playground) Block 419, Lot 1, north of the site	Evaluate soil conditions north of the site and bound NAPL impacts observed in KSF-SB-10	Between 0 to 5' bgs with greatest observed impact/ at greatest observed impact/beneath observed impacts at the end of boring.	3	0	0	X	X	X	X ²	X ¹	X ¹	X ¹	
FW-SB-20	225 Nevin Street (Thomas Greene Playground-Pool Area) Block 419, Lot 1, within the footprint of the former oil/purge tank footprint	Evaluate soil and groundwater conditions within the footprint of the former oil/purge tank footprint and impacts encountered in KSF-SB-03	Between 0 to 5' bgs with greatest observed impact/ At greatest observed impact/ Beneath observed impacts at the end of boring.	3	1	0	X	X	X	X ²	X ¹	X ¹	X ¹	
FW-SB-21	225 Nevin Street (Thomas Greene Playground) Block 419, Lot 1, adjacent to the former gas oil/ naphtha tanks	Evaluate soil conditions adjacent to the former gas oil/naphtha tanks and impacts encountered in KSF-SB-21	Between 0 to 5' bgs with greatest observed impact/ at greatest observed impact/beneath observed impacts at the end of boring.	3	0	0	X	X	X	X ²	X ¹	X ¹	X ¹	
FW-SB-22	225 Nevin Street (Thomas Greene Playground-Pool Area) Block 419, Lot 1, within the footprint of the former oil tanks	Evaluate soil conditions within the footprint of the former oil tanks	Between 0 to 5' bgs with greatest observed impact/ at greatest observed impact/beneath observed impacts at the end of boring.	3	0	0	X	X	X	X ²	X ¹	X ¹	X ¹	

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				Soil	Groundwater	Soil Vapor/ Indoor Air/ Outdoor Air								
FW-SB-23	225 Nevin Street (Thomas Greene Playground) Block 419, Lot 1, within the footprint of the former gas oil/ naphtha tanks	Evaluate soil conditions within the footprint of the former gas oil/ naphtha tanks	Between 0 to 5' bgs with greatest observed impact/ at greatest observed impact/beneath observed impacts at the end of boring.	3	0	0	X	X	X	X ²	X ¹	X ¹	X ¹	
FW-SB-24	225 Nevin Street (Thomas Greene Playground- Pool Area) Block 419, Lot 1, north of the former MGP footprint	Evaluate soil conditions impacts encountered in KSF-SB-03	Between 0 to 5' bgs with greatest observed impact/ at greatest observed impact/beneath observed impacts at the end of boring.	3	0	0	X	X	X	X ²	X ¹	X ¹	X ¹	
FW-SB-25	225 Nevin Street (Thomas Greene Playground- Pool Area) Block 419, Lot 1, north of the former MGP footprint	Evaluate soil the vertical extent of impacts encountered at KSF-SB- 02/ KSF-SB-07	Between 0 to 5' bgs with greatest observed impact/ at greatest observed impact/beneath observed impacts at the end of boring.	3	0	0	X	X	X	X ²	X ¹	X ¹	X ¹	
FW-SB-26	225 Nevin Street (Thomas Greene Playground- Pool Area) Block 419, Lot 1, north of the former MGP footprint	Evaluate soil conditions downgradient of the hydrogen and oil tanks	Between 0 to 5' bgs with greatest observed impact/ at greatest observed impact/beneath observed impacts at the end of boring.	3	0	0	X	X	X	X ²	X ¹	X ¹	X ¹	
FW-SB-27	At the intersection of Degraw Street and Sackett Street, north of and adjacent to Block 425, Lot 1	Evaluate soil impacts to the west of KSF-SB-22	Between 0 to 5' bgs with greatest observed impact/ at greatest observed impact/beneath observed impacts at the end of boring.	3	0	0	X	X	X	X ²	X ¹	X ¹	X ¹	
FW-SB-28	Douglass Street ROW, north of the footprint of the former MGP site	Evaluate soil impacts encountered in KSF-SB-14/MW-2	Between 0 to 5' bgs with greatest observed impact/ at greatest observed impact/beneath observed impacts at the end of boring.	3	0	0	X	X	X	X ²	X ¹	X ¹	X ¹	
FW-SB-29	Nevins Street ROW, downgradient of and to the east of the footprint of the former MGP site	Evaluate soil conditions downgradient of the site	Between 0 to 5' bgs with greatest observed impact/ at greatest observed impact/beneath observed impacts at the end of boring.	3	1	0	X	X	X	X ²	X ¹	X ¹	X ¹	
FW-SB-30	225 Nevin Street (Thomas Greene Playground- handball courts) Block 419, Lot 1, to the north of the footprint of the former MGP site	Evaluate soil the lateral and vertical extent of soil impacts to the west of KSF-SB-08	Between 0 to 5' bgs with greatest observed impact/ at greatest observed impact/beneath observed impacts at the end of boring.	3	0	0	X	X	X	X ²	X ¹	X ¹	X ¹	
FW-SB-31	225 Nevin Street (Thomas Greene Playground- handball courts) Block 419, Lot 1, within the footprint of the former MGP site	Evaluate soil the lateral and vertical extent of soil impacts to the west of KSF-SB-02	Between 0 to 5' bgs with greatest observed impact/ at greatest observed impact/beneath observed impacts at the end of boring.	3	0	0	X	X	X	X ²	X ¹	X ¹	X ¹	

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				Soil	Groundwater	Soil Vapor/ Indoor Air/ Outdoor Air								
FW-SB-32	225 Nevin Street (Thomas Greene Playground- handball courts) Block 419, Lot 1, within the footprint of the former MGP site	Evaluate soil the lateral and vertical extent of soil impacts to the west of KSF-SB-06	Between 0 to 5' bgs with greatest observed impact/ at greatest observed impact/beneath observed impacts at the end of boring.	3	0	0	X	X	X	X ²	X ¹	X ¹	X ¹	
FW-SB-33	Inside Building at 191 3rd Avenue [Block 420, Lot 1] within the footprint of the former gas holder	Evaluate soil and groundwater conditions within the former gasometer footprint	Between 0 to 5' bgs with greatest observed impact/ at greatest observed impact/beneath observed impacts at the end of boring.	3	1	0	X	X	X	X ²	X ¹	X ¹	X ¹	
FW-SB-34	Inside Building at 191 3rd Avenue [Block 420, Lot 1] within the footprint of the former gas holder	Evaluate soil conditions within the former gasometer footprint	Between 0 to 5' bgs with greatest observed impact/ at greatest observed impact/beneath observed impacts at the end of boring.	3	0	0	X	X	X	X ²	X ¹	X ¹	X ¹	
FW-MW-01	Block 432, Lot 15, south of the site and adjacent to Gowanus Canal	Evaluate soil and groundwater conditions south of the former MGP site	Between 0 to 5' bgs with greatest observed impact/ at greatest observed impact/beneath observed impacts at the end of boring.	3	1	0	X	X	X	X ²	X ¹	X ¹	X ¹	
FW-MW-02	Block 432, Lot 15, south of the site	Evaluate soil and groundwater conditions south of the site	Between 0 to 5' bgs with greatest observed impact/ at greatest observed impact/beneath observed impacts at the end of boring.	3	1	0	X	X	X	X ²	X ¹	X ¹	X ¹	
FW-MW-03	Within the Nevins Street ROW, downgradient of the site	Evaluate soil and groundwater conditions downgradient the former holders and purifiers	Between 0 to 5' bgs with greatest observed impact/ at greatest observed impact/beneath observed impacts at the end of boring.	3	1	0	X	X	X	X ²	X ¹	X ¹	X ¹	
FW-MW-04	Within the Sackett Street, adjacent to and south of the site	Evaluate soil and groundwater conditions south of the site	Between 0 to 5' bgs with greatest observed impact/ at greatest observed impact/beneath observed impacts at the end of boring.	3	1	0	X	X	X	X ²	X ¹	X ¹	X ¹	
FW-MW-05	560 Sackett Street [Block 426, Lot 17] within eastern part of the site	Evaluate soil and groundwater conditions upgradient of the former gas holder footprint	Between 0 to 5' bgs with greatest observed impact/ at greatest observed impact/beneath observed impacts at the end of boring.	3	1	0	X	X	X	X ²	X ¹	X ¹	X ¹	
FW-MW-06	225 Nevin Street (Thomas Greene Playground) Block 419, Lot 1, upgradient of the former oil tank tanks	Evaluate soil and groundwater conditions upgradient of the former oil tank footprint	Between 0 to 5' bgs with greatest observed impact/ at greatest observed impact/beneath observed impacts at the end of boring.	3	1	0	X	X	X	X ²	X ¹	X ¹	X ¹	

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				Soil	Groundwater	Soil Vapor/ Indoor Air/ Outdoor Air								
FW-MW-07	Within the Douglass Street ROW, to the north of the former MGP site	Evaluate soil and groundwater conditions to the north of KSF-SB-11 north of the former MGP site	Between 0 to 5' bgs with greatest observed impact/ at greatest observed impact/beneath observed impacts at the end of boring.	3	1	0	X	X	X	X ²	X ¹	X ¹	X ¹	
FW-MW-08	Within the Douglass Street ROW, to the north of the former MGP site	Evaluate soil and groundwater conditions north of KSF-SB-08 to the north of the site	Between 0 to 5' bgs with greatest observed impact/ at greatest observed impact/beneath observed impacts at the end of boring.	3	1	0	X	X	X	X ²	X ¹	X ¹	X ¹	
FW-MW-09	Within the Nevins Street ROW, to the northwest of the former MGP site	Evaluate soil and groundwater conditions north of KSF-SB-08 and to the north of KSF-SB-14/ MW-4	Between 0 to 5' bgs with greatest observed impact/ at greatest observed impact/beneath observed impacts at the end of boring.	3	1	0	X	X	X	X ²	X ¹	X ¹	X ¹	
FW-MW-10	Block 418, Lot 1, downgradient of the site adjacent to the Gowanus Canal	Evaluate soil and groundwater conditions downgradient of KSF-SB-14/ MW-2	Between 0 to 5' bgs with greatest observed impact/ at greatest observed impact/beneath observed impacts at the end of boring.	3	1	0	X	X	X	X ²	X ¹	X ¹	X ¹	
FW-MW-11	Block 418, Lot 1, downgradient of the site adjacent to the on-site building	Evaluate soil and groundwater conditions downgradient of KSF-SB-14/ MW-2	Between 0 to 5' bgs with greatest observed impact/ at greatest observed impact/beneath observed impacts at the end of boring.	3	1	0	X	X	X	X ²	X ¹	X ¹	X ¹	
FW-MW-12	Within the Douglass Degraw Street ROW, adjacent 191 3rd Avenue	Evaluate soil and groundwater conditions to the south (adjacent) to the former gasometer	Between 0 to 5' bgs with greatest observed impact/ at greatest observed impact/beneath observed impacts at the end of boring.	3	1	0	X	X	X	X ²	X ¹	X ¹	X ¹	
FW-MW-13	Within the 3rd Avenue ROW, adjacent 191 3rd Avenue	Evaluate soil and groundwater conditions to the west (adjacent) to the former gasometer	Between 0 to 5' bgs with greatest observed impact/ at greatest observed impact/beneath observed impacts at the end of boring.	3	1	0	X	X	X	X ²	X ¹	X ¹	X ¹	
FW-MW-14	Block 420, Lot 58, upgradient of the gasometer	Evaluate soil and groundwater conditions to the north (adjacent) to the former gasometer	Between 0 to 5' bgs with greatest observed impact/ at greatest observed impact/beneath observed impacts at the end of boring.	3	1	0	X	X	X	X ²	X ¹	X ¹	X ¹	
FW-MW-15	Block 420, Lot 58, upgradient of the gasometer	Evaluate soil and groundwater upgradient and adjacent to the footprint of the former gasometer	Between 0 to 5' bgs with greatest observed impact/ at greatest observed impact/beneath observed impacts at the end of boring.	3	1	0	X	X	X	X ²	X ¹	X ¹	X ¹	

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				Soil	Groundwater	Soil Vapor/ Indoor Air/ Outdoor Air								
Previous NYSDEC Site Characterization Monitoring Wells														
MW-1	Degraw Street, adjacent to Gowanus Canal to the northwest of the Former MGP site	Evaluate groundwater concentrations within the monitoring well	At the depth of the previously installed NYSDEC SC monitoring well	0	1	0	X	X	X	X	X		X	
MW-2	Within the Nevins Street ROW, downgradient of site	Evaluate groundwater concentrations within the monitoring well	At the depth of the previously installed NYSDEC SC monitoring well	0	1	0	X	X	X	X	X		X	
MW-3	Within the Nevins Street ROW, adjacent to and downgradient of site	Evaluate groundwater concentrations within the monitoring well	At the depth of the previously installed NYSDEC SC monitoring well	0	1	0	X	X	X	X	X		X	
MW-4	Within the Nevins and Sackett Streets ROWs, south of former MGP site	Evaluate groundwater concentrations within the monitoring well	At the depth of the previously installed NYSDEC SC monitoring well	0	1	0	X	X	X	X	X		X	
MW-5	Within the Degraw Street ROW, adjacent to Thomas Greene Playground upgradient of the former MGP site	Evaluate groundwater concentrations within the monitoring well	At the depth of the previously installed NYSDEC SC monitoring well	0	1	0	X	X	X	X	X		X	
MW-6	Within the Degraw Street ROW adjacent to Thomas Greene Playground	Evaluate groundwater concentrations within the monitoring well	At the depth of the previously installed NYSDEC SC monitoring well	0	1	0	X	X	X	X	X		X	
MW-7	Within the Degraw Street ROW Degraw Street, adjacent to 537 Sackett Street Block 426, Lot 1	Evaluate groundwater concentrations within the monitoring well	At the depth of the previously installed NYSDEC SC monitoring well	0	1	0	X	X	X	X	X		X	
Surface Soil Sample Locations														
FW-SS-01	560 Sackett Street [Block 426, Lot 17] within the gas holder footprint	Soil sample to evaluate surface soil conditions within the footprint of the former gas holder	0-2"	1	0	0	X	X	X	X ²	X	X	X	
FW-SS-02	560 Sackett Street [Block 426, Lot 17] western portion of the property	Soil sample to evaluate surface soil conditions within the footprint of the former gas holder	0-2"	1	0	0	X	X	X	X ²	X	X	X	
FW-SS-03	560 Sackett Street [Block 426, Lot 17] eastern portion of the property	Soil sample to evaluate surface soil conditions within the footprint of the former gas holder	0-2"	1	0	0	X	X	X	X ²	X	X	X	
FW-SS-04	Within the Degraw Street ROW, south of and adjacent to 225 Nevins Street (Thomas Greene Playground) Block 419, Lot 1	Soil sample to evaluate exposed surface soil conditions adjacent to the site	0-2"	1	0	0	X	X	X	X ²	X	X	X	
FW-SS-05	225 Nevins Street (Thomas Greene Playground) Block 419, Lot 1	Soil sample to evaluate exposed surface soil conditions on the eastern portion of the former site	0-2"	1	0	0	X	X	X	X ²	X	X	X	
FW-SS-06	Block 432, Lot 15, downgradient of the site	Soil sample to evaluate surface soil conditions adjacent to the site and Gowanus Canal	0-2"	1	0	0	X	X	X	X ²	X	X	X	
FW-SS-07	Adjacent to 560 Sackett Street [Block 426, Lot 17]	Soil sample to evaluate surface soil conditions south of and adjacent to the former MGP site	0-2"	1	0	0	X	X	X	X ²	X	X	X	

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Brooklyn, New York**

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				Soil	Groundwater	Soil Vapor/ Indoor Air/ Outdoor Air								
Soil Vapor Sample Locations														
FW-SV-01	Inside the 270 Nevins Street Building [Block 425, Lot 1]	Soil vapor sample to screen the soil conditions within the footprint of the former generators and gasoline house	Beneath the building slab	0	0	1								X
FW-SV-02	Inside the 270 Nevins Street Building [Block 425, Lot 1]	Soil vapor sample to screen the soil conditions within the footprint of the former generator house	Beneath the building slab	0	0	1								X
FW-SV-03	Inside the 270 Nevins Street Building [Block 425, Lot 1]	Soil vapor sample to screen the soil conditions adjacent to the former condenser house and catch basin	Beneath the building slab	0	0	1								X
FW-SV-04	Inside the 270 Nevins Street Building [Block 425, Lot 1]	Soil vapor sample to screen the soil conditions adjacent to the former tar oil/oil and circular oil tank	Beneath the building slab	0	0	1								X
FW-SV-05	Inside 537 Sackett Street building [Block 426, Lot 1]	Soil vapor sample to screen the soil conditions within the footprint of the former gas holder	Beneath the building slab	0	0	1								X
FW-SV-06	Inside 537 Sackett Street building [Block 426, Lot 1].	Soil vapor sample to screen the soil conditions within the footprint of the former purifying house	Beneath the building slab	0	0	1								X
FW-SV-07	Inside 537 Sackett Street building [Block 426, Lot 1]	Soil vapor sample to screen the soil conditions adjacent to the footprint of the purifying house	Beneath the building slab	0	0	1								X
FW-SV-08	560 Sackett Street [Block 426, Lot 17]	Soil vapor sample to screen the soil conditions within the footprint of the former gas holder	Approximately 5 feet bgs or 1 foot above the water table	0	0	1								X
FW-SV-09	560 Sackett Street [Block 426, Lot 17]	Soil vapor sample to screen the soil conditions upgradient of the former gas holder	Approximately 5 feet bgs or 1 foot above the water table	0	0	1								X
FW-SV-10	225 Nevins Street (Thomas Greene Playground) Block 419, Lot 1, adjacent to pool buildings	Soil vapor sample to screen the soil vapor adjacent soil borings KSF-SB-07	Beneath the concrete slab	0	0	1								X
FW-SV-11	191 3rd Avenue [Block 420, Lot 1]	Soil vapor sample to screen the soil conditions within the footprint of the former gasometer	Beneath the building slab	0	0	1								X
FW-SV-12	191 3rd Avenue [Block 420, Lot 1]	Soil vapor sample to screen the soil conditions within the footprint of the former gasometer	Beneath the building slab	0	0	1								X
FW-SV-13	191 3rd Avenue [Block 420, Lot 1]	Soil vapor sample to screen the soil conditions adjacent to the former gasometer	Beneath the building slab	0	0	1								X

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				Soil	Groundwater	Soil Vapor/ Indoor Air/ Outdoor Air								
Indoor Air Sample Locations														
FW-IA-01	Inside the 270 Nevins Street Building [Block 425, Lot 1]	Sample to evaluate indoor air conditions at the building located at 270 Nevins Street	At 3 to 5 feet above ground surface	0	0	1								X
FW-IA-02	Inside the 270 Nevins Street Building [Block 425, Lot 1]	Sample to evaluate indoor air conditions at the building located at 270 Nevins Street	At 3 to 5 feet above ground surface	0	0	1								X
FW-IA-03	Inside the 537 Sackett Street Building [Block 426, Lot 1]	Sample to evaluate indoor air conditions at the building located at 537 Sackett Street	At 3 to 5 feet above ground surface	0	0	1								X
FW-IA-04	Inside the 537 Sackett Street Building [Block 426, Lot 1]	Sample to evaluate indoor air conditions at the building located at 537 Sackett Street	At 3 to 5 feet above ground surface	0	0	1								X
FW-IA-05	191 3rd Avenue [Block 420, Lot 1]	Sample to evaluate indoor air conditions at the building located at 191 3rd Avenue	At 3 to 5 feet above ground surface	0	0	1								X
FW-IA-06	191 3rd Avenue [Block 420, Lot 1]	Sample to evaluate indoor air conditions at the building located at 191 3rd Avenue	At 3 to 5 feet above ground surface	0	0	1								X
Outdoor Air Sample Locations														
FW-OA-01	Degraw Street ROW, adjacent to 270 Nevin Street +B65 [Block 425, Lot 1]	Sample to evaluate ambient air conditions outside of the building located at 270 Nevin Street	At 3 to 5 feet above ground surface	0	0	1								X
FW-OA-02	Degraw Street ROW, adjacent to 537 Sackett Street [Block 426, Lot 1]	Sample to evaluate ambient air conditions outside of the 537 Sackett Street building	At 3 to 5 feet above ground surface	0	0	1								X
FW-OA-03	Degraw Street ROW and 3rd Avenue adjacent to 191 3rd Avenue [Block 420 Lot 1]	Sample to evaluate ambient air conditions outside of the building located at 191 3rd Avenue	At 3 to 5 feet above ground surface	0	0	1								X

Notes:

Chemical analysis test methods specified are from U.S. EPA SW-846 test methods

EPA TO-15 analysis will include VOCs and naphthalene

EPA - Environmental Protection Agency

VOC - volatile organic compounds

SVOC - semivolatle organic compounds

CN - cyanide

TAL - target analyte list

PCBs - polychlorinated biphenyls

NYSDEC - New York State Department of Environmental Conservation

SC- Site Characterization

bgs - below ground surface

ROW - right-of-way

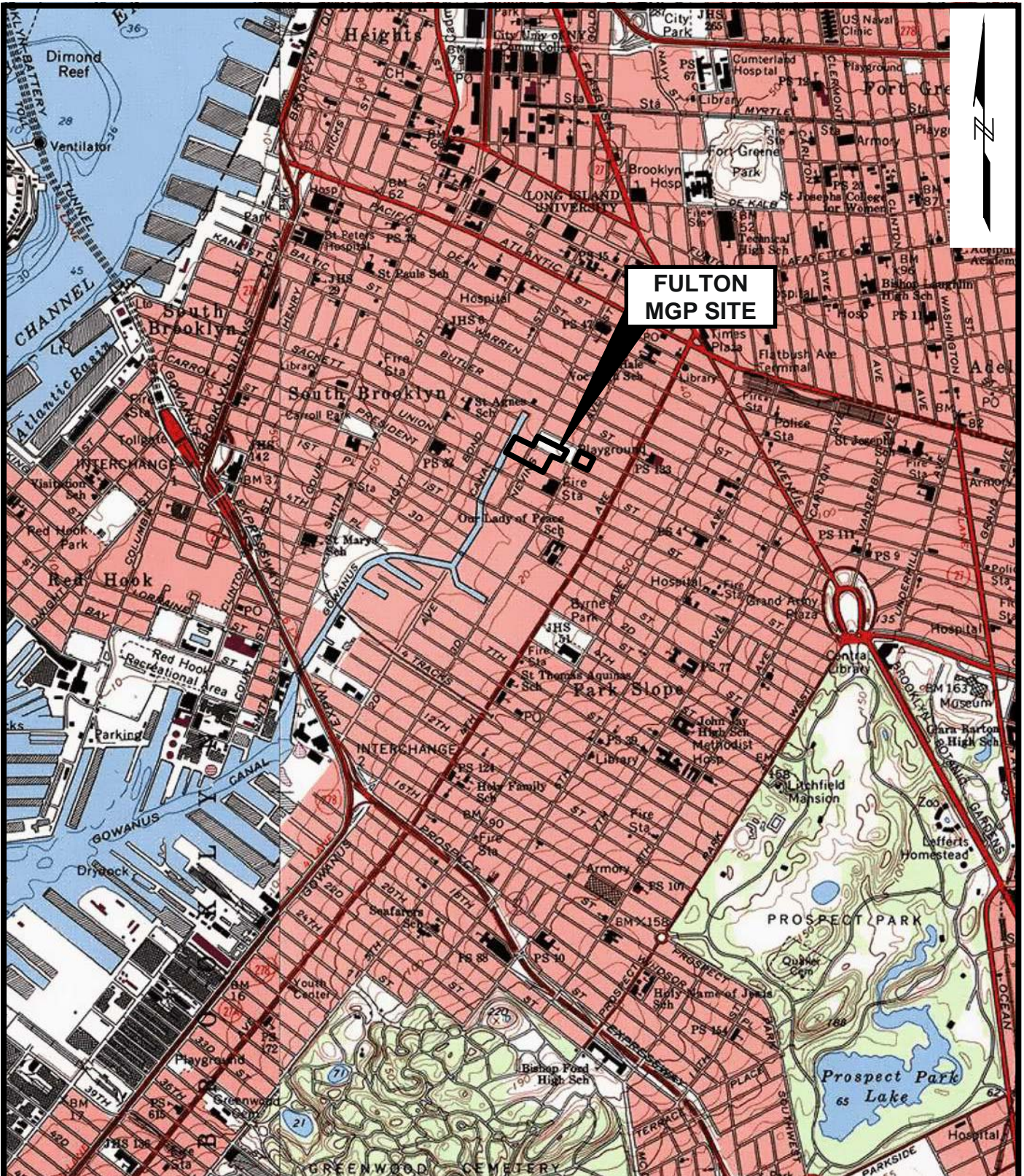
¹-One sample from within the fill (approximately first 15 feet bgs) in each soil boring

²-If elevated cyanide readings are present in a sample, then analysis for cyanide speciation may be completed

³-Environmental forensic analysis of polycyclic aromatic hydrocarbons (PAHs) may be used to evaluate co-mingled or non-MGP related impacts

Prepared by: MJF

Figures



**FULTON
MGP SITE**

SOURCE: Map created with TOPO!® ©2001 National Geographic
(www.nationalgeographic.com/topo)

DRAFT



SCALE, FEET

REMEDIAL INVESTIGATION WORK PLAN
FULTON MUNICIPAL WORKS MGP
BROOKLYN, NEW YORK

KEYSPAN CORPORATION
BROOKLYN, NEW YORK





PROJECT 080090-1001

SITE LOCATION MAP






February 2008

Figure 1







LEGEND

-  APPROXIMATE FORMER MGP BOUNDARY
-  APPROXIMATE CURRENT PROPERTY BOUNDARY

RECENT REGULATORY RECORDS

-  RCRA (TSD, CORRACTS), CERCLIS, VCP, LANDFILL, DISPOSAL SITE
-  RCRA (LQG, SQG)
-  MAJOR OIL OR CHEMICAL STORAGE
-  MINOR OIL STORAGE
-  SPILLS, TRIS

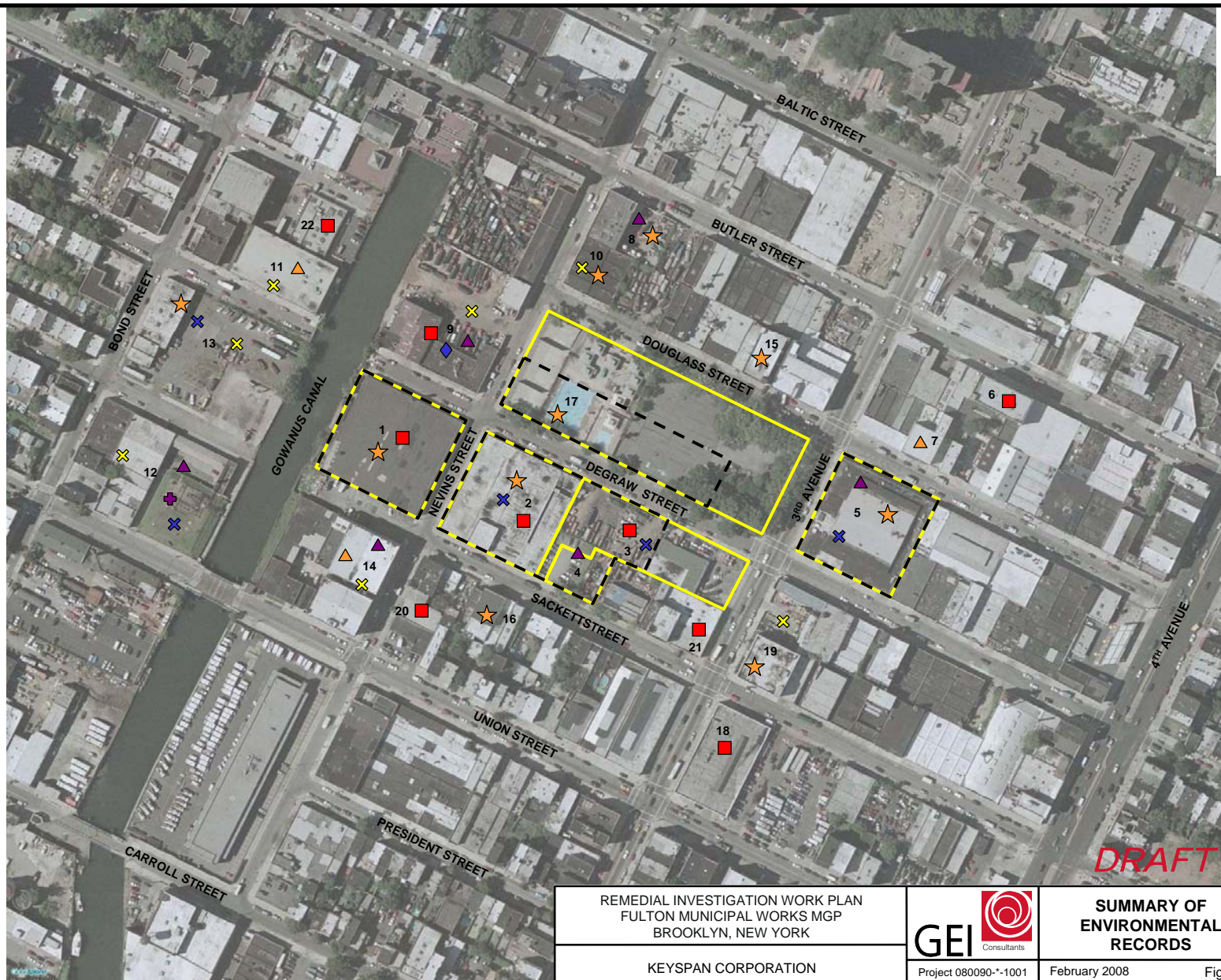
HISTORIC LAND USE

-  COAL YARD/LUMBER YARD
-  ASPHALT PLANT/COAL TAR PRODUCT CO.
-  MANUFACTURING AND COMMERCIAL
-  OIL/PETROCHEMICAL
-  CHEMICAL/PAINT/FERTILIZER/PLASTIC
-  MULTIPLE

NOTE:
SEE TABLE 1 FOR INFORMATION ABOUT THESE SITES.

SOURCE:
Copyright 2005. GlobeXplorer and Partners.
All rights reserved. Image date: 7/2/01.

NOTE: NOT TO SCALE



REMEDIAL INVESTIGATION WORK PLAN
FULTON MUNICIPAL WORKS MGP
BROOKLYN, NEW YORK

KEYSPAN CORPORATION



Project 080090-7-1001

SUMMARY OF
ENVIRONMENTAL
RECORDS

February 2008

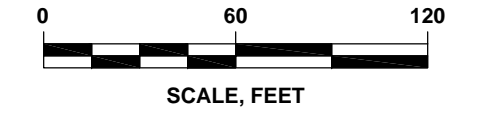
Figure 2

Plate



LEGEND

- APPROXIMATE CURRENT PROPERTY BOUNDARY
- APPROXIMATE BOUNDARY OF FORMER MANUFACTURED GAS PLANT (MGP) SITE
- HISTORIC STRUCTURE
- PREVIOUS SAMPLES**
- NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYSDEC) SITE CHARACTERIZATION (SC) BORING LOCATION
- NYSDEC SC MONITORING WELL LOCATION
- KEYSpan GOWANUS CANAL INVESTIGATION BORING LOCATION
- PROPOSED SAMPLES**
- PROPOSED REMEDIAL INVESTIGATION (RI) MONITORING WELL LOCATION
- PROPOSED RI SOIL BORING LOCATION
- PROPOSED SOIL BORING WITH TEMPORARY GROUNDWATER SAMPLE LOCATION
- PROPOSED SURFACE SOIL SAMPLE LOCATION
- PROPOSED SOIL VAPOR POINT
- PROPOSED TEST PIT LOCATION
- PROPOSED INDOOR AIR SAMPLE LOCATION
- PROPOSED OUTDOOR AIR SAMPLE LOCATION



- SOURCES:**
- PHOTOGRAPH OBTAINED FROM BLUE SKY INTERNATIONAL LTD. ALL RIGHTS RESERVED. COPYRIGHT 2006.
 - SANBORN FIRE INSURANCE MAPS (1886 THROUGH 1996).
 - SITE CHARACTERIZATION REPORT, FULTON FORMER MANUFACTURED GAS PLANT, BROOKLYN (II), KING'S COUNTY, NEW YORK, SITE No. 2-24-051, SEPTEMBER 2007, PREPARED BY NYSDEC REMEDIAL BUREAU C., DIVISION OF ENVIRONMENTAL REMEDIATION.
 - NEW YORK CITY OPEN ACCESSIBLE SPACE INFORMATION SYSTEM <http://www.oasisnyc.net>, ACCESSED JANUARY 2008.
- NOTE:**
- THE LOCATION OF THE PREVIOUS NYSDEC SC BORINGS AND MONITORING WELLS HAVE NOT BEEN SURVEYED AND SHOULD BE CONSIDERED APPROXIMATE.

DRAFT

REMEDIAL INVESTIGATION WORK PLAN
 FULTON FORMER MGP SITE
 BOROUGH OF BROOKLYN, NEW YORK

KEYSPAN CORPORATION

PROJECT 080090-1001



PROPOSED SAMPLE LOCATIONS

February 2008

Plate 1

DRAFT REMEDIAL INVESTIGATION WORK PLAN
FULTON MUNICIPAL WORKS
FORMER MANUFACTURED GAS PLANT (MGP) SITE
BROOKLYN, NEW YORK
FEBRUARY 2008

Appendix A

**New York State Department of Environmental Conservation Site Characterization
Report and Correspondence (electronic only)**

Appendix B

Historical Documents (electronic only)

Appendix C

Environmental Records Information (electronic only)

Appendix D

Community Air Monitoring Plan

Community Air Monitoring Plan Fulton Former MGP Site

In accordance with NYSDEC and NYSDOH requirements for a CAMP, a perimeter air-monitoring plan will be implemented at the site during each phase of the field activities. The objective of the perimeter air-monitoring plan 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 involved with the site field activities) from potential airborne contaminant releases as a direct result of field activities. The perimeter air-monitoring plan is a stand-alone document and will be available on site. The VOC Monitoring, Response Levels, and Actions are presented as follows.

Air Monitoring Response Levels and Actions

<i>VOCs</i>	
Response Level	Actions
>5 ppm above background for 15-minute average	<ul style="list-style-type: none"> ▪ Temporarily halt work activities ▪ Continue monitoring ▪ If VOC levels decrease (per instantaneous readings) below 5 ppm over background, work activities can resume
Persistent levels >5 ppm over background <25 ppm	<ul style="list-style-type: none"> ▪ Halt work activities ▪ Identify source of vapors ▪ Corrective action to abate emissions ▪ Continue monitoring ▪ Resume work activities if VOC levels 200 feet downwind of the property boundary or half the distance to the nearest potential receptor is <5 ppm for a 15-minute average ▪ If VOC levels are >25 ppm at the perimeter of the work area, activities must be shutdown

<i>Particulates</i>	
Response Level	Actions
>100 mcg/m3 above background for 15-minute average or visual dust observed leaving the site	<ul style="list-style-type: none"> ▪ Apply dust suppression ▪ Continue monitoring ▪ Continue work if downwind PM-10 particulate levels are <150 mcg/m3 above upwind levels and no visual dust leaving site
>150 mcg/m3 above background for 15-minute average	<ul style="list-style-type: none"> ▪ Stop work ▪ Re-evaluate activities ▪ Continue monitoring ▪ Continue work if downwind PM-10 particulate levels are <150 mcg/m3 above upwind levels and no visual dust leaving site

Sources:

New York State Department of Health Community Air Monitoring Plan, June 20, 2000.
 New York State Department of Environmental Conservation Division Technical and Administrative Guidance Memorandum - Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites, October 27, 1989.

During excavating and materials handling operations, the air in work areas will also be sampled periodically for the presence of contaminants. A portable PID will be utilized to periodically monitor the levels of organic vapors in the ambient air and a Mini RAM™ PM-10 (or equivalent) particle detector will be used to count inhalable particles (0.1-10 micrometer range) of dust during the fieldwork. PID and

Mini RAM readings will be taken hourly during excavation or more frequently if air quality measurements approach action levels as defined herein. Measurements will be monitored from the breathing zone (4 to 5 feet above ground level) at worker locations to determine working conditions (and whether there is a need to change levels of worker protection).

In addition to VOCs and particulates, cyanide will be monitored in the work zone and at the perimeter of the work area. The cyanide monitoring methods will be determined prior to mobilization, but at a minimum, will include Draeger® tube sampling.

In order to make a conservative assessment of when different levels of respiratory protection are needed during the fieldwork, it will be assumed that the organic vapors detected by the air monitoring instruments consist of the most toxic volatile compounds expected to be found on the site. Preliminary evaluation of the risks expected at the site indicates that the most toxic volatiles that are probably present are VOCs (particularly Benzene, Toluene, Ethylbenzene, Xylene [BTEX]). Based on data published by the Occupational Safety and Health Administration (OSHA) and the American Conference of Government Industrial Hygienists (ACGIH), and previous experience with manufactured gas plant (MGP) wastes, the following personal protective equipment (PPE) will be employed when the given concentrations of organic vapor are detected in the breathing zone.

Compound of Concern	Level D	Level C	Level B
Chemical Name	M<X	X<M<Y	M>Y
BTEX and other photoionizable VOCs	M <5 ppm	5 ppm <M <50 ppm	M >50 ppm
Where: M = concentration of organic vapor measured in the field.			
X, Y = concentrations at which different levels of respiratory protection are necessary.			

The PPE requirements may be modified based on compound-specific monitoring results information, with the written approval of the Corporate Health and Safety Specialist (CHSS).

Respiratory protection from dusts will be required when inhalable particulate concentrations from potentially contaminated sources exceed 150 µg/m³.

Odors or dusts derived from site contaminants may cause nausea in some site workers, even though the contaminants are at levels well below the safety limits as defined above. Workers may use dust masks or respirators to mitigate nuisance odors with the approval of the site safety officer (SSO).

Whenever practical, work areas should be positioned upwind of organic vapor and dust sources to reduce the potential for worker exposure.

Appendix E

Field Sampling Plan (electronic only)

Appendix F

Health and Safety Plan (electronic only)

Appendix G

Quality Assurance Project Plan (electronic only)