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**Interim Remedial Measure  
Design and Implementation Plan  
for the 50 Kent Avenue Parcel  
Former Williamsburg Works MGP Site  
Site ID No. 224055  
Brooklyn, Kings County, New York**

*Prepared for:*

**National Grid**

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**Final  
April 2013**

**INTERIM REMEDIAL MEASURE  
DESIGN AND IMPLEMENTATION PLAN  
FOR THE  
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FORMER WILLIAMSBURG WORKS MGP SITE  
SITE ID NO. 224055  
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**FINAL**

**APRIL 2013**

## TABLE OF CONTENTS

	<u>Page No.</u>
1. Introduction .....	1-1
1.1 Site History .....	1-1
1.2 IRM description .....	1-4
1.3 Supplemental Pre-Design Investigation/Utility Search .....	1-5
2. IRM Design .....	2-1
2.1 Recovery Well Design .....	2-1
2.2 Soil Excavation 50% Submittal .....	2-1
2.3 Soil Excavation 95% Submittal .....	2-2
2.4 Soil Excavation 100% Submittal .....	2-2
3. Implementation .....	3-1
3.1 NAPL Collection System .....	3-1
3.2 Soil Excavation Contractor Selection .....	3-1
3.3 Soil Excavation Implementation .....	3-1
4. Schedule .....	4-1

## TABLES

Table 4-1	IRM Design and Implementation Schedule
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## FIGURES

Figure 1-1	Site Location Map
Figure 1-2	Former MGP Structures and Site Features
Figure 1-3	Previous Sample Locations
Figure 1-4	Location of IRM Activities

## GLOSSARY

bgs	below ground surface
IDIP	IRM Design and Implementation Plan
IRM	Interim Remedial Measure
MGP	Manufactured Gas Plant
NAPL	Non-Aqueous Phase Liquid
NYSDEC	New York State Department of Environmental Conservation
PDI	Pre-Design Investigation
POTW	Publicly Owned Treatment Plant
RI	Remedial Investigation

## EXECUTIVE SUMMARY

On behalf of National Grid, URS Corporation (URS) has prepared this Interim Remedial Measure (IRM) Design and Implementation Plan (IDIP) for the 50 Kent Avenue property (“the Site”) of the former Williamsburg Works Manufactured Gas Plant (MGP) site. The former Williamsburg Works MGP site consists of four properties located along North 12<sup>th</sup> and North 11<sup>th</sup> Streets, Kent Avenue, and the East River in the Williamsburg neighborhood of Brooklyn, New York. The purpose of the IRM is to address MGP-related source material at the Site.

The Williamsburg Works former MGP site is covered under an administrative order on consent and administrative settlement, #A2-0552-0606, which was entered into by KeySpan Corporation, the predecessor to National Grid, and New York State Department of Environmental Conservation (NYSDEC).

The conceptual approach for the IRM would be to excavate the former holder foundations, and the soils below them, excavate shallow soils elsewhere on the Site, and install NAPL collection wells along N. 12<sup>th</sup> Street, north of the Site and along the 55-foot zone between the western edge of shallow excavation and the CitiStorage building. Because of the depth of the holder foundations and their extent below the groundwater table, shoring and dewatering will be required. The excavations will be backfilled with a combination of site soils with concentrations of total polycyclic aromatic hydrocarbons less than 500 milligrams per kilogram (deeper backfill) and clean imported soil (shallow backfill).

This IDIP describes the steps to be followed to produce the IRM design and to implement the IRM.

## 1. Introduction

URS Corporation – New York (URS) has prepared this Interim Remedial Measure (IRM) Design and Implementation Plan (IDIP) to describe the process National Grid will follow to prepare for the design and implementation of an IRM for a portion of the former Williamsburg Works manufactured gas plant (MGP).

### 1.1 Site History

The former Williamsburg Works MGP operated from approximately 1863 through the late 1930s., and was located along North 12th and North 11th Streets, Kent Avenue, and the East River in the Williamsburg neighborhood of Brooklyn, New York. All MGP structures were dismantled prior to 1941. Today, the footprint of the former MGP site occupies four properties: North 12<sup>th</sup> Street, North 13<sup>th</sup> Street, 35 Kent Avenue, and 50 Kent Avenue.

The IRM will address only the 50 Kent Avenue component of the former MGP footprint. This component, referred in this report as “the Site” is at Block 2287, Lot 1 and was the location for purifying operations, condensers and three gas holders. The 50 Kent Avenue property is bordered by North 12th Street to the northeast, Kent Avenue to the southeast, North 11th Street to the southwest, and Block 2287, Lot 16 to the northwest. Figure 1-1 shows the location of the Site.

Following the closure of the MGP, the above-ground structures were dismantled. However, the holder tanks and other structures remain underground.

Most recently, the Site was used by the New York City Department of Sanitation (NYCDOS) and included a NYCDOS garage on the northwestern half of the Site. The garage was demolished in 2009 and the Site is currently a vacant lot owned by the New York City Parks Department. Figure 1-2 shows the Site location with the outlines of the historic MGP structures.

The investigation history of the Site is summarized in detail in the Final Interim Remedial Measure Design Work Plan (GEI 2011). In brief, attention was initially drawn to the Site through the operations of NYCDOS. Prompted by observations of fuel-related free product in wells, remedial actions, including limited excavation and in situ treatment with oxygen release compound, bionutrient addition, and vacuum enhanced fluid recovery, were performed in the late 1990s and early 2000s. Figure 1-3 shows the location of previous sample locations on and near the Site.

A comprehensive investigation for portions of the former MGP, including the Site, was performed in 2006 by Metcalf and Eddy for the City of New York in anticipation of transforming properties into a part of the planned Bushwick Inlet Park. This investigation studied the former NYCDOS property, the accessible corridors along 11th and 12th streets between the Site and the East River, and sediments in the East River adjacent to the former MGP. Results of the investigation were summarized in a Site Investigation Report (Metcalf and Eddy, 2006).

The 2006 investigation advanced 28 soil borings and 9 sediment borings, installed 9 monitoring wells, and sampled the 9 new and 2 existing wells. Historic fill was observed to be present at depths of 9 to 42 feet below ground surface (bgs), consisting mainly of sand with gravel, brick, ash, and cinders. Field observations for 18 of the 28 soil borings indicated that petroleum and coal tar contamination was found to exist throughout the subsurface from the ground surface to the top of the clay layer. Petroleum contamination was found to be more prevalent in the historic fill material, while MGP contamination was encountered at depths below the water table to approximately 50 feet bgs. Free coal tar product was observed in two new monitoring wells. Sediment samples collected from the East River contained petroleum and coal tar contamination, with petroleum contamination closer to the surface transitioning to coal tar contamination as the borings were advanced further.

In August 2007 National Grid's predecessor, KeySpan, entered into a modification of Order on Consent and Administrative Settlement #A2-0552-0606 (the Order) with the New York State Department of Environmental Conservation (NYSDEC). The modification included the former Williamsburg Works MGP in the Order. During 2009-2010, National Grid's consultant GEI performed a Remedial Investigation (RI) of the former Williamsburg Works MGP, including the Site. RI activities included advancement of 56 soil borings and 7 sediment borings, excavation of 6 test pits, groundwater sampling from 16 monitoring wells and surface soil sampling at 9 locations (see Figure 1-3 for sample location on and near the Site). The results of this investigation were reported by National Grid in an interim data transmittal letter to NYSDEC dated August 2010 (GEI, 2010).

Soil borings exhibited petroleum impacts to as deep as 43 feet bgs, but were primarily in the zone up to 20 feet bgs. Coal tar impacts, including sheen, staining, blebs, globs, coating, tar lenses, and tar saturation were observed as deep as 65 feet below grade. However, no impacts were observed below the clay layer present at approximately 55 to 65 feet bgs, and only one sample taken from just above the clay layer exceeded NYSDEC Part 375 commercial use soil cleanup objectives (SCOs).

URS performed a PDI in 2012 in support of the planned IRM for the Site. The PDI field work primarily consisted of the following activities:

- Delineation Soil Borings
- Geotechnical Borings
- Monitoring Well Installation
- Test Pits
- Groundwater Level and NAPL Gauging
- Hydraulic Conductivity Testing
- Utility and Subsurface Infrastructure Investigation
- Bench-Scale Treatability Testing
- Baseline Groundwater Modeling
- Noise and Vibration Study
- Adjacent Building Foundation Assessment

URS installed eleven borings for delineation and/or geotechnical analyses, installed three monitoring wells, and excavated 14 test pits throughout the Site. Observations during these activities revealed the presence of MGP waste characterization from odors to tar saturated soils. No simply-described pattern of contamination was observed, but the contaminant extent was consistent with the existing site conceptual model that describes coal tar contamination migrating vertically downward from the former holders until reaching lower permeability lenses whereupon the NAPL would migrate horizontally downgradient.

Slug testing indicated that the soils have moderate to low permeability. This information was used in the groundwater modeling effort to suggest that closely spaced wells or sumps would be required to lower the water table, if necessary, for soil excavation.

The geotechnical evaluation concluded that the soils are poorly sorted and are considered moderately to very dense based on blow counts. Cobble lenses were encountered. The basal clay layer was observed to be very stiff.

The geotechnical properties of the soil are conducive to the installation of shoring to aid in excavation, with the fines content assisting to improve strength and reduce permeability. The clay layer would provide a firm base for shoring installation and would integrate with wall in providing

hydraulic control.. However, the presence of cobbles and fill debris would make some technologies such as sheet pile difficult to install.

The test pits were installed along the perimeter of the east end of the Site and revealed frequent obstacles such as walls, pipes, and former holder foundations that would require removal prior to subsurface activities in these areas.

## 1.2 IRM description

The intent of the Interim Remedial Measure (IRM) is to implement a remedy at the Site where such remedy would be considered final and be considered interim only from the standpoint that it would be part of a larger remedy that would be implemented later. A “final” IRM would allow for the Site to be used by the property owner (the New York City (NYC) Parks Department) with few or no restrictions before the entire former Manufactured Gas Plant (MGP) footprint, which occupies properties beyond the Site, is remediated. The IRM is therefore a remedy that shall not require any re-work/removal in the future and where there is minimal risk that implementing the IRM might be redundant as far as an eventual remedy of the entire former MGP is concerned, thereby creating a cost-efficient IRM.

The IRM will comprise excavation of the gas holder/foundations, contaminated soil immediately below the gas holder foundations, and excavation of shallow soils elsewhere on the site. Product recovery would be pursued through installation of NAPL collection wells along N. 12th Street, north of the Site and along the 55-foot zone between the western edge of shallow excavation and the CitiStorage building. The locations of these activities are shown on Figure 1-4.

The gas holder/foundations and associated contamination are expected to extend approximately 26-28 feet bgs. Dewatering would be required to excavate these structures and soils. This would be accomplished through construction of excavation support barrier walls hydraulically confining the areas of excavation. Because these excavation support walls would be keyed into a deeper low permeability layer and left in place following completion of the IRM, they would additionally serve as containment mechanisms for deeper, unexcavated source material.

Shallow soils would be excavated from the Site west of the holder area and in the portion of the site near the intersection of Kent Ave. and 12<sup>th</sup> St. There is only limited data on the extent of contamination of the shallow soils throughout the Site. However, to prepare the Site for future use as



parkland, shallow soil will be removed throughout the Site and be replaced with appropriate backfill, eliminating direct contact exposure pathways from surface soil. None of the borings installed demonstrated the presence of source material in soil above the water table, therefore excavation of soil to the groundwater table (depth varies, but averages approximately 4 feet bgs west of the holders and less near the intersection of Kent Ave. and 12<sup>th</sup> St.) throughout the Site, apart from the gas holder locations, is sufficient, as discussed in Section 4.7.

In summary, the major components of the IRM, include the following:

- Installation of passive product recovery wells;
- Installation of excavation support to act as both temporary structure and a final barrier wall;
- Dewatering during construction including treatment, as necessary, and discharge to a Publicly-Owned Treatment Works (POTW) or off-site disposal;
- Excavation and removal of gas holders and soil immediately below the holder foundations;
- Backfill with a combination of site soils with concentrations of total polycyclic aromatic hydrocarbons less than 500 milligrams per kilogram and/or site-derived concrete rubble less than four inches in size (deeper backfill) and clean imported soil (shallow backfill);
- Restoration to include removal of excavation support portion above the average groundwater surface (for prevention of bathtub mounding effect within IRM area), grading and approved surface topping.
- Excavation, disposal, and backfill of shallow soils (above groundwater surface) in the western portion of the Site and near the intersection of Kent Ave. and N. 12<sup>th</sup> St.

### 1.3 Supplemental Pre-Design Investigation/Utility Search

The 2012 PDI allowed URS and National Grid to develop the conceptual approach for the IRM. Now that this conceptual approach has been established, URS has identified the supplemental specific data needed to prepare the design. These data will be collected via a Supplemental PDI. A separate work plan was submitted in parallel with the IRM Design and Implementation Plan (IDIP) describing the data needed and the techniques to be used to collect the data. These data are planned to be collected in March and April 2013, and the results reported in May 2013.

## 2. IRM Design

IRM design will be a formal design process that presents the evolution of the design to National Grid and NYSDEC at three discrete milestones or phases – 50%, 95%, and 100% for the soil excavation component. The design of the NAPL recovery wells, which is smaller and can be implemented ahead of the rest of the IRM, will be prepared only at the 95% and 100% phases. The phases do not preclude the need for informal submittals between URS and National Grid during each phase. Note that the term “design drawing” also shall be understood to mean bid drawing or construction drawing. That is, drawings will be presented in a form suitable for bidding and construction. Each major milestone phase is described below.

### 2.1 Recovery Well Design

Because the NAPL Recovery wells can be installed independently of the soil excavation effort, URS will prepare a separate design, submitted at only the 95% and 100% level, of the recovery wells. The Recovery Well Design will comprise a scope of work and drawings for well installation, suitable for competitive procurement by a drilling contractor. URS will submit one set of 95% design documents to National Grid for initial review. Following resolution of National Grid’s comments on this draft, URS will submit a set of the revised 95% design documents to NYSDEC. Once comments are received, URS will prepare a 100% design for National Grid and NYSDEC review.

### 2.2 Soil Excavation 50% Submittal

During the preparation of the 50% submittal document for soil excavation, URS will prepare a list of proposed drawings, specifications and bid items, at a “conceptual level” of design for National Grid review. These items, along with a list of key design assumptions if necessary, will ensure efficient and effective design preparation during the 50% level design process. The 50% submittal will consist of the following items:

- A draft Basis of Design (BOD) Report - A draft report presented to 50% level will be provided that describes the regulatory and technical bases of the design to date.
- Design Drawings – a complete set of drawings prepared to at least a 50% completion level, measured as an average case on the whole. At a minimum, at least a template of some drawings may be appropriate depending on the level of design achieved.
- Specifications – Similar to drawings, bid specifications will be completed to an average completion level of 50%.

- Bid Items and Measurement and Payment – A refined list of bid items and associated M&P specification section completed to 50% level on average will be prepared.
- Construction Cost Evaluation – An order of magnitude construction cost evaluation, short of a full estimate, will be prepared to illustrate cost comparison of major options such as slurry wall concrete wall versus secant pile concrete wall, open cut excavation versus vertically shored excavation, etc.
- Calculations – All major calculations will commence and be ongoing, although not necessarily finished in any form nor suitable for 50% level submittal. The only portion of calculations that may be appropriate for submittal are major assumptions and these would be presented in other portions of the submittal. Major calculations to be performed include dewatering/treatment capacity design, vertical shoring, and vapor management system for the TCB (TCB design is the purview of the construction contractor's TCB supplier).

URS will submit one set of 50% design documents to National Grid for initial review. Following resolution of National Grid's comments on this draft, URS will submit a set of the revised 50% design documents to NYSDEC.

### 2.3 Soil Excavation 95% Submittal

The 95% submittal will essentially be a document that takes the items described in the 50% level – including resolving NYSDEC 50% level review comments – to a “draft final” stage devoid of any outstanding items. This phase will be considered the phase to eliminate any outstanding questions and concerns. It is the full intent to have at this point calculations that are checked final and that URS internal technical reviews have been completed and approved. URS will submit one set of 95% design documents to National Grid for initial review. Following resolution of National Grid's comments on this draft, URS will submit a set of the revised 95% design documents to NYSDEC.

### 2.4 Soil Excavation 100% Submittal

The 100% submittal will be a document that takes the items described in the 95% level – including resolving National Grid and NYSDEC 95% level review comments - to a final stage with no “punch list” items so that the documents are ready for placing into complete collated form. National Grid will work with its purchasing department to combine these documents with contract Terms and Conditions and solicit proposals from selected construction contractors.

### 3. Implementation

#### 3.1 NAPL Collection System

National Grid intends to install the NAPL collection wells prior to the excavation work. A drilling contractor will install the wells within the Product Recovery Area shown on Figure 1-4.

#### 3.2 Soil Excavation Contractor Selection

National Grid and URS will review the bids and proposals received from the prospective construction contractors and select the most cost-effective qualified bidder, negotiate final terms, and issue a contract to the selected bidder.

#### 3.3 Soil Excavation Implementation

Following contractor selection and execution of the contract, initial activities will consist of plan and submittal review.

#### 4. Schedule

The proposed schedule for designing and implementing the IRM is in the following table.

Table 4-1 IRM Design and Implementation Schedule		
ACTIVITY		DATE
RECOVERY WELLS		
	95% design submittal	6/28/2013
	National Grid Review	7/12/2013
	URS revisions	7/26/2013
	NYSDEC Review	8/2/2013
	100% design submittal	8/12/2013
	National Grid Review	8/26/2013
	URS revisions	9/9/2013
	NYSDEC Review	9/16/2013
RECOVERY WELL INSTALLATION (START)		Winter 2014
50% DESIGN (Excavation)		
	50% design submittal	8/13/2013
	National Grid Review	9/12/2013
	URS revisions	9/19/2013
	NYSDEC Review	10/21/2013
95% DESIGN (Excavation)		
	95% design submittal	1/20/2014
	National Grid Review	2/19/2014
	URS revisions	2/26/2014
	NYSDEC Review	3/28/2014
100% DESIGN (Excavation)		
	50% design submittal	5/12/2014
	National Grid Review	5/26/2014
	URS revisions	6/2/2014
	NYSDEC Review	7/2/2014
CONSTRUCTION (START)		Fall 2014

## FIGURES



New York State



Site Location



Source: Google Earth Pro - © 2012 Google

APPROXIMATE SCALE IN FEET



IRM DESIGN AND IMPLEMENTATION PLAN  
50 KENT AVENUE PARCEL OF THE  
WILLIAMSBURG WORKS FORMER MGP SITE  
BOROUGH OF BROOKLYN, NEW YORK  
SITE LOCATION MAP

FIGURE 1-1









