Donald Campbell
Project Manager

February 2, 2011

Mr. Henry Willems
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway, 12th Floor
Albany, New York 12233-7013

Subject: **Remedial Investigation Work Plan Addendum (No. 2)**
Deep Monitoring Well Installation
Metropolitan Former Manufactured Gas Plant (MGP) Site, Brooklyn, NY
NYSDEC Site No.: 224046, Order on Consent Index #: A2-0552-0606

Dear Mr. Willems:

National Grid is submitting the following Remedial Investigation Work Plan Addendum for the Metropolitan former manufactured gas plant (MPG) site (the Site), located at 124 - 136 2nd Avenue in Brooklyn, New York. This addendum describes work to be performed in the Pathmark Supermarket parking lot located at 137 12th Street. The former Metropolitan MGP was operated by The Brooklyn Union Gas Company (BUG), a predecessor company to National Grid, from at least the late 1880s until approximately 1938. As you are aware, the Remedial Investigation of the Site is being conducted by National Grid pursuant to a Multi-site Order on Consent and Administrative Settlement with the NYSDEC, Index # A2-0552-0606, executed on February 22, 2007 and modified on August 10, 2007, and in accordance with applicable guidelines of the New York State Department of Environmental Conservation (NYSDEC) and the New York State Department of Health (NYSDOH). Specifics of the RI scope of work are presented in the NYSDEC approved work plan (Remedial Investigation Work Plan, Metropolitan Former MGP Works) produced by AECOM in May 2009 and in a previous Remedial Investigation Work Plan Addendum for off-site property located at 381/539 Smith Street submitted to NYSDEC in June 2010.

The scope of work presented in this letter supplements the May 2009 NYSDEC-approved Remedial Investigation Work Plan (the RIWP). The goal of this RIWP Addendum (No. 2) is to advance a pair of deep monitoring wells adjacent to the recently installed MW-4 S/I well pair shown on attached Figure 1. Each monitoring well will be installed in a separate borehole. Monitoring well pairs will be installed approximately 5 feet apart laterally. The data from these wells will provide deep soil and groundwater information at the Metropolitan former MGP site and will be compiled with data being collected by National Grid at other sites along the Gowanus Canal.

RIWP Addendum Scope of Work

Borehole Advancement and Monitoring Well Installation

Deep well (designated “MW-4 D1”) will be installed directly above the Gardiners Clay confining unit (if present). The top of the Gardiner’s Clay was encountered at depths ranging from approximately 127 to 131 feet below ground surface [or approximately -120 feet North American Vertical Datum of 1988 (NAVD88)] during previous drilling activities at the National Grid Citizens Gas Works former MGP site which is located to the north of the Metropolitan former MPG site. The second proposed deep well will target the Jameco Gravel formation and will be installed below the Gardiners Clay (designated “MW-4 D2”). The targeted screen depth intervals are provided in Table 1. Prior to advancement, each boring location will be cleared for utilities following National Grid pre-clear protocols involving geophysical practices and low energy excavation techniques. Once cleared, soil borings will be advanced by sonic

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drilling techniques, which allows for greater drilling efficiencies and well installation options. The actual drilling locations and screen intervals will be determined based upon field conditions encountered and subsurface utility clearance activities. Soils from the deepest well within the well cluster will be logged continuously and screened with a photo ionization detector (PID) from the terminus depth of existing boring SB-4 to the terminus of the borehole. Each deep monitoring well will be constructed with 2-inch-diameter riser and 0.10-inch slot well screen. Well components will be constructed of PVC, except where DNAPL is present in the soil column, at which interval(s) well materials will be constructed of stainless steel.

The annular space between the well screen and borehole wall for each monitoring well will be backfilled with chemically inert No. 0-sized, or equivalent, sand. A bentonite clay seal will be constructed using bentonite chips placed above the sand pack. The bentonite clay seal will be a minimum of 2-feet thick. The remaining annular space will be filled to grade with a cement/bentonite grout that is tremmied from the top of the bentonite clay seal to the surface. Each monitoring well will be fitted with a lockable cap and finished with a flush-mounted curb box secured with a cement pad.

Drilling equipment (e.g. drilling rods and casing,) will be decontaminated using a non-phosphate soap wash and/or steam cleaning between each sample location. Non-disposable soil sampling devices (split-spoon samplers, core samplers, etc.) will be decontaminated using a non-phosphate soap wash, methanol, dilute nitric acid rinse, and distilled/deionized water final rinse between each use. Soil cuttings, decontamination fluids, and other investigation derived wastes (IDW) will be contained within United States Department of Transportation (US DOT) 55-gallon drums and disposed of at an approved off-site disposal facility.

The newly installed monitoring wells will be developed no sooner than 24 hours following installation. Each monitoring well will be developed using alternative surging and pumping methods as outlined in the existing RI Work Plan.

Soil Sampling

Soil sampling will be performed during soil boring advancement of the MW-4 D2 well boring. In summary, soil samples may be collected at the following depth intervals based on field observations:

- At the depth interval exhibiting the highest PID readings or visual evidence of impacts between the base of existing boring SB-4/MW-4 at 60 feet below ground surface (bgs) and the top of the Gardiner's Clay unit. If no impacts are noted, this sample will not be collected;
- In soils at the approximate mid-point of the screened interval above the contact with the Gardiner's Clay unit;
- In soils at the approximate mid-point of the screened interval within the Jameco Gravel unit underlying the Gardiner's Clay unit; and
- At the base of the borehole (if boring extended deeper than base of MW-4 D2 well) if field observations show evidence of impacts (not anticipated). If no impacts are noted, this sample will not be collected.

Actual soil sampling depths may be adjusted based on field conditions or in consultation with NYSDEC field oversight personnel. Soil samples will be analyzed for:

- Target compound list (TCL) organics suite:
  - VOCs via EPA Method 8260B
  - Semivolatile organic compounds (SVOCs) via EPA Method 8270C

- Target analyte list (TAL) metals (including mercury) via EPA Method 6020 and EPA Method 7471A; and
- Free cyanide extraction by EPA Method 9013A and analysis by Microdiffusion American Society for Testing and Materials (ASTM-D4282-02).

Groundwater Gauging and Sampling

Both of the newly installed monitoring wells will be gauged and sampled following EPA's low-flow groundwater sampling procedures in accordance with the RI Work Plan. Prior to sampling, groundwater levels will be collected at high and low tides levels based upon Gowanus Canal tidal elevations. Each monitoring well will be gauged with an oil-water interface probe to detect the presence of non-aqueous phase liquid (NAPL). While not expected based on available data collected at the site, if NAPL is present, a groundwater sample will not be collected.

Field measurements will be collected during the sampling of each monitoring well. The following parameters will be monitored: salinity, pH, specific conductance, dissolved oxygen (DO), oxidation reduction potential (ORP), temperature, and turbidity.

Groundwater samples will be collected from the newly installed monitoring wells at least two weeks after well development and may be coordinated with sampling at nearby sites managed by National Grid. Groundwater samples will be collected using low flow groundwater sampling procedures. Groundwater samples will be analyzed for:

- VOCs via EPA Method 8260B
- SVOCs via EPA Method 8270C and
- Total cyanide via EPA Method 9012B.

Quality assurance and quality control (QA/QC) samples of soil and groundwater will be collected and submitted for analyses in accordance with the RIWP.

In Situ Hydraulic Conductivity Testing

Following groundwater sampling, in-situ conductivity tests (slug tests) will be performed at the two deep (MW-4 D1 and MW-4 D2) well locations. These data will be used to calculate the hydraulic conductivity of the deeper portions of the aquifer to support the evaluation of the fate and transport of Site impacts and potential remedial alternatives. The data will also support National Grid's regional groundwater evaluation using a larger network of wells along the Gowanus Canal.

Slug tests will be performed by pneumatic testing methods timing the equilibration to the static water level. The general steps to be performed during pneumatic slug testing are as follows:

- Static water level will be measured to the nearest 0.01 foot.
- A pressure transducer, attached to a data logger, will be placed into the well and the water level allowed to equilibrate to static conditions.
- The water column in the well will be pressurized while simultaneously measuring and recording water levels with the pressure transducer and data logger until the water level has equilibrated ("falling head test").
- The pressure in the well will then be rapidly removed and the water level will be measured and recorded ("rising head test").

The data from these tests will be analyzed by AQTESOLV® according to the Bouwer and Rice method (1989) or equivalent methods to calculate average hydraulic conductivity values for the aquifer.

Community Air Monitoring Plan

A Community Air Monitoring Plan (CAMP) has been developed for this project that will be followed during all invasive fieldwork (soil borings, borings for well installations, and test pitting). The CAMP will monitor concentrations of VOCs and particulate matter less than 10 microns in size (PM-10) in accordance with NYSDEC and New York State Department of Health (NYSDOH) guidance. The CAMP will monitor these parameters upwind and downwind of the work area. Included in the CAMP is a description of methods that may be used to control odors during the RI if needed. The CAMP is included in the approved RI Work Plan for the site.

Surveying

A survey of the investigation sampling points will be conducted at the end of the fieldwork by a licensed NY-State surveying contractor. All horizontal locations will be reported in the New York State Plane Coordinate System, Long Island Zone (NAD83) in feet. All vertical measurements will be reported in NAVD88 in feet, to the nearest 0.1 ft. and 0.01 ft. for soil borings and monitoring wells respectively.

Schedule

Field work can commence following the approval of this Work Plan. AECOM and the drilling subcontractors are ready to initiate field activities as early as February 2011.

The proposed scope is designed to provide additional soil and groundwater data from depth at the site and it will augment regional data being collected by National Grid in the site area. Additional investigation or sampling may be proposed in subsequent RI Work Plan Addendums to obtain the requisite data set to complete the RI process.

Yours sincerely,

Donald Campbell

Cc: T. Bell (National Grid)
C. Doroski (NYSDOH)
P. Cox (AECOM)

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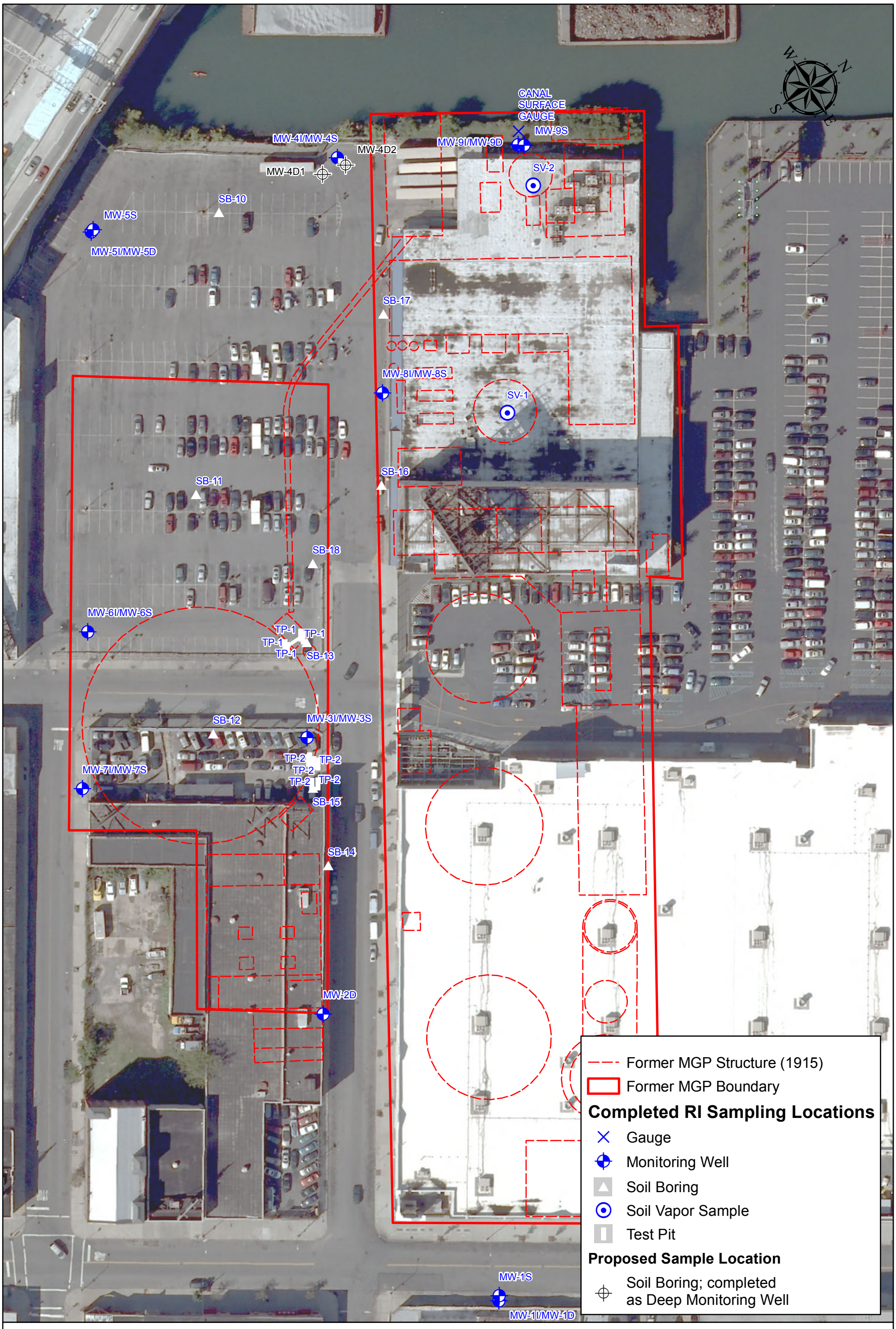
Table 1
Deep Monitoring Well Installation Work Plan Addendum
Metropolitan MGP Site
Brooklyn, New York

Sample I.D.	Location	Target Depth for Well Screen [1] (ft bgs)
Deep Monitoring Wells		
MW-4D1	Private property Block 1025, lot 1 (Pathmark)	5 feet above Gardiner's Clay
MW-4D2		5-10 feet below Gardiner's Clay interface

Notes:
ft bgs - feet below ground surface
[1] - Target well screen depths are approximate and will be installed based upon observed field conditions



AECOM

NATIONAL GRID
METROPOLITAN FORMER MGP SITE

1:900 1 Inch = 75 ft

0 37.5 75 150 Feet

Proposed RI Addendum Deep Well Sampling Locations

Figure 1