Jessica Phillips
Project Manager
Site Investigation and Remediation

April 24, 2020

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

RE: Monitoring Well Reconnaissance and Baseline Groundwater Monitoring Work Plan
Former Inwood Gas Holder Site
Nassau Ave & Sheridan Blvd Property
Inwood, New York
NYSDEC Site No.: 1-30-121, Order on Consent Index #: A2-0552-0606

Dear Mr. Pratt:

This Monitoring Well Reconnaissance and Baseline Groundwater Monitoring Work Plan (Work Plan) has been prepared by National Grid for the Former Inwood Gas Holder (Site) located in Inwood, Nassau County, New York (Figure 1). The Work Plan is developed pursuant to the Multi-site Order on Consent and administrative settlement between National Grid and the New York State Department of Environmental Conservation (NYSDEC), Index # A2-0552-0606 (NYSDEC, 2007), and in accordance with applicable guidelines of the NYSDEC and the New York State Department of Health (NYSDOH).

The Site has been delineated for constituents of concerns (COCs) in groundwater during previous site characterization (SC) and remedial investigation (RI) efforts. Various monitoring wells have been installed on the Site in phases to delineate and monitor the COCs. Site COCs include benzene, toluene, ethylbenzene, and xylenes (BTEX), polyaromatic hydrocarbons (PAHs), cyanide, and RCRA metals. Based on the historic investigation activities, petroleum and chlorinated volatile organic compounds (VOCs) related impacts from off-site sources have also been detected in soil and groundwater at various locations.

The Site has not been actively used by National Grid in the recent years, and had been overgrown with vegetation. During recent vegetation removal, monitoring wells were located, inspected and gauged for headspace, depth to water, depth to product, depth to bottom. Following inspection and gauging, results were compared to as-built well construction logs to determine wells needing redevelopment, repair, potential replacement and/or abandonment. The primary objective of this Work Plan is to define likely monitoring well rehabilitation and/or replacement efforts and outline a

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plan to conduct an updated round of groundwater monitoring for the COCs. This Work Plan provides background information regarding historical site use and current conditions, and provides details of the proposed activities and the methods and procedures by which the anticipated activities will be completed.

SITE HISTORY AND DESCRIPTION

The Site is located to the southwest of the intersection of Sheridan Boulevard and Nassau Avenue in Inwood, Nassau County, New York (Figure 1). The Site encompasses approximately 27 acres, and is bounded by Nassau Avenue and Waterfront Boulevard to the north, Sheridan Boulevard to the east, to the west by Cerro Street, a building operated by the Village of Inwood, and a projected extension of Alameda Avenue, and to the south by Motts Basin, a tributary to Jamaica Bay. The Site is secured by a chain link fence and numerous gates. The majority of the Site is undeveloped and overgrown with trees and brush. The concrete foundations of the former 6,000,000 cubic feet water sealed gas holder, pump house, boiler house, and engine room are visible and located in the northeastern area of the parcel. Two concrete supports indicate the former location of nine horizontal liquid propane tanks in the east central portion of the Site. A natural gas metering and regulation station is in operation and located east of the holder foundation and adjacent to Sheridan Boulevard. Adjacent to the former gas holder area, to the north and east– eight gasoline filling stations or garages with gasoline tanks are located up gradient and within one block of the Site. A single residential property appears to be located on Nassau Avenue directly north of the Site.

INVESTIGATION ACTIVITIES

The Site was a remote gas distribution holder, and is understood to have had no manufactured gas production facilities. Previous investigations from the 1990's suggest that the majority of the residual manufacture gas plant (MGP)-related material and petroleum related materials at the Site may be associated with the disposal of these materials from offsite locations rather than from the structures and operational activities associated with the former holder station. Former structures that may have impacted the Site include the gas holder, boiler house, engine room, pump house, and propane tanks.

AECOM conducted a Remedial Investigation (RI) in 2010-2011 to identify sources of manufactured gas products and petroleum contamination, delineate the associated extent of impacts, determine the surface and subsurface characteristics of the Site, and to evaluate potential migration pathways and human or ecological receptors in the immediate vicinity of the Site. During the RI, a total of thirty (30) wells were installed for groundwater monitoring. There were thirteen (13) pre-existing wells that were also included in the monitoring plan during the RI effort, and the results were reported in the 2015 NYSDEC submission of the RI report (AECOM, February 2015).

Groundwater beneath the Site is present in one continuous upper aquifer zone extending from the water table (between 3 and 8 ft below ground surface [bgs]) to the top of the clay / silty clay unit. The groundwater flow is generally from north and northeast to south and southwest across the Site.

OBJECTIVES

The objectives of this Work Plan are to collect a set of baseline groundwater data from the Site monitoring wells following well rehabilitation and/or replacement efforts. A well reconnaissance was performed in March 2020 to evaluate the integrity of each well compared to as-built conditions (Table 1). At wells where significant sedimentation was observed, the wells will be redeveloped by

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pumping and surging to restore the well to as-built conditions. The well redevelopment program will also determine which wells are no longer viable and will identify locations where abandonment and replacement wells may be required. Following this step, baseline sampling will be performed a minimum of two weeks following well redevelopment to further obtain an updated dataset necessary to support preparation of a FS evaluation of remedial alternatives for the Site.

SCOPE OF WORK

The tasks outlined in this Work Plan includes the following:

- Complete well redevelopment at wells with significant sedimentation compared to as-built conditions, as summarized in Table 1. Wells determined to be no longer viable during redevelopment due to significant sedimentation or well blockage will be abandoned. Consequently, an on-site evaluation will be made and reviewed with the NYSDEC to identify locations where replacement wells may be required.
- A Community Air Monitoring Program (CAMP) will be performed as outlined below during any well replacement activities. In addition, any investigation derived waste (IDW) generated during the well replacement or redevelopment process will be managed as outlined in the Field Activities section below.
- Conversion of GW-13, MW-13I, GW-14, MW-14I, and MW-52I from stick-up monitoring wells to flush mounts.
- Completion of a baseline groundwater sampling event including COC data, as outlined below.

Table 1 provides the construction summary of all the documented monitoring wells for the Site. The Site wells are as shown in Figure 2. All field work will follow methods and guidelines provided in the NYSDEC approved AECOM 2010 Remedial Investigation Work Plan (RIWP), the Quality Assurance Protection Plan (QAPP), Health and Safety Plan (HASP), and Field Sampling Procedures presented in the AECOM RIR dated February 2015, unless otherwise specified in this document.

FIELD ACTIVITIES

A summary of the proposed field activities are outlined in the following sections.

- **Well Redevelopment** – Thirteen (13) wells were found to contain significant sedimentation and will be redeveloped using a combination of surging and pumping, including GW-1, GW-13, GW-14, MW-4R, MW-8I, GW-6R, MW-15S, MW-38I, MW-12S, MW-50S, MW-51S, MW-52S, and MW-52I (Table 1). During redevelopment, wells determined to be no longer viable due to significant sedimentation or well blockage will be abandoned. Consequently, an on-site evaluation will be made and reviewed with the NYSDEC to identify locations where replacement wells may be required. Figure 2 displays the wells that will be redeveloped.

- **Monitoring Well Replacement and/or Abandonment** – Two (2) wells, GW-10 and MW-14I, were found destroyed during the March 2020 vegetation removal operations and will be replaced. Six (6) wells with significant sedimentation that may potentially be replaced include GW-1, GW-14, GW-6R, MW-15S, MW-52S and MW-52I. If any of these wells are found

non-viable during for development, an on-site evaluation will be made and reviewed with the NYSDEC for abandonment and/or replacement. Any monitoring wells determined as requiring replacement will be advanced using direct-push methods or sonic drilling methods consistent with monitoring well installation and development procedures provided in the February 2010 RIWP. All wells will be constructed of 2-inch schedule 40 PVC with 10-foot, 10-slot (0.01-inch) well screens with a two-foot sump at the base of the well. Pre-packed screens may be used. If pre-packed screens are not used, bentonite will be placed around the sumps and quartz sand appropriately sized for the screen slot size will be emplaced to a minimum of one-foot above the screened interval of the well and a two-foot bentonite seal will be emplaced above the sand pack. Grout will be emplaced above the bentonite seal to grade. Expandable locking caps will be emplaced at the top of each monitoring well. Flush-mounted, limited access road boxes or locking stickups will be used at the ground surface to complete the wells and the surface will be restored to pre-existing conditions.

Following installation, all monitoring wells will be developed a minimum of 24 hours after installation to evacuate silts and other fine-grained sediments which may have accumulated within the well during its installation.

Following development, wells will be allowed to stabilize for a minimum of two weeks prior to groundwater sampling. The wells will be sampled using low-flow sampling methods in accordance with the groundwater sampling procedures provided in the February 2010 RIWP.

Upon NYSDECs concurrence, wells proposed for abandonment will be abandoned by tremie grouting in place using a standard grout mix (Type I Portland cement with 4% bentonite by weight) and removing the upper portion of each well and replacing with material similar to natural soils in accordance with NYSDEC CP-43 protocols.

- **Community Air Monitoring** – Community air monitoring will be performed, including real-time monitoring for VOCs, particulates (i.e., dust), and MGP-related odors at the downwind perimeter of the designated work area during intrusive drilling activities. The CAMP provided in Appendix E of the February 2010 RIWP specifies action levels which require increased monitoring, corrective actions to abate emissions, and/or work shutdown. 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.
- **Site Survey –** A site survey of all replacement monitoring wells and wells converted from stick-up to flush mount will be conducted at the end of the fieldwork by a New York State-licensed surveyor under the direct supervision of AECOM. Vertical elevations will be surveyed to an accuracy of 0.01 of a foot. The horizontal locations of each point will be established from directly measuring from site features with an accuracy of 0.1 foot. Elevations will be referenced to the North American Vertical Datum of 1988 (NAVD88) and horizontal locations will be based upon the North American Datum of 1983 Long Island Grid of the New York State Coordinate System (NAD83 N.Y.L.I. – 3104).
- **Investigation Derived Waste (IDW)** – Any soils, well development water, and sampling purge water generated during the program will be drummed in properly labeled United States Department of Transportation (USDOT) approved storage containers (55-gallon drums) and managed by National Grid at an approved off-site disposal facility following completion of

the field activities. Unless understood to be covered with impacted materials, the PPE/plastic debris can be disposed in the Site dumpster.

- **Baseline Groundwater Sampling** – Approximately forty-two (42) wells will be sampled based on existing Site wells and potential new replacements, with the exception of well GW-9 which contains non-aqueous phase liquid (NAPL). The final number of wells to be sampled may change based on NYSDEC's input on proposed well abandonment or replacements as the on-site work progresses. Groundwater samples will be collected from the monitoring wells using low-flow purging and sampling techniques. Specifically, peristaltic pumps will be used for purging and sampling each well and disposable polyethylene tubing will be used for transferring the groundwater to the ground surface. The sampling will follow methods and guidelines provided in the NYSDEC approved AECOM 2015 RIR. The samples will be collected a minimum of two weeks after development and submitted for laboratory analysis for the following parameters:

  - TCL VOCs by United States Environmental Protection Agency (USEPA) SW-846 Method 8260B;
  - TCL SVOCs by USEPA SW-846 Method 8270C;
  - Resource Conservation and Recovery Act (RCRA) 8 Metals by U.S. EPA SW-846 Method 6000-7000 Series; and,
  - Free Cyanide by USEPA SW-846 Method 9016 or equivalent ASTM method.

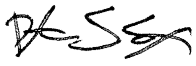
DELIVERABLES

Following completion of the site activities, a letter report will be submitted to the NYSDEC containing the results from the redevelopment efforts, a summary of well replacement and/or abandonment work performed, and a summary of the sampling results from the Site wells.

PROJECT SCHEDULE

Field work will be completed following approval of this Work Plan. If you have any questions, or require any additional information, feel free to contact me at 516-581-7313.

Sincerely,


for

Jessica Phillips
Environmental Department
sa/pc

Enclosure

cc: D. Hettrick, NYSDOH (Electronic Copy Only)
S. Aldridge, National Grid
S. Pandya, AECOM (Electronic Copy Only)
S. Mantri, AECOM (Electronic Copy Only)
P. Cox, AECOM (Electronic Copy Only)

Attachments

Table

Table 1 – Site Monitoring Wells – Summary and Recommendations

Figures

Figure 1 – Site Location
Figure 2 – Site Monitoring Wells

References

AECOM, 2017. Remedial Investigation Report Addendum (No. 1), National Grid K – Inwood Holder, Nassau County, New York, Site ID: 130121, Order on Consent Index #: A2-0552-0606, April, 2017.

AECOM, 2016. Draft Interim Site Management Plan, Former Inwood Gas Holder Site (K – Inwood), Inwood, New York NYSDEC Site No.: 1-30-121, Order on Consent Index #: A2-0522, June 1, 2016.

AECOM, 2015. Remedial Investigation Report, Former Inwood Gas Holder Site, Inwood, New York, NYSDEC Site No.: 1-30-121, Index # A2-0552-0606, May 2014.

AECOM, 2010. Remedial Investigation Work Plan, Former Inwood Gas Holder Site, Inwood, New York, NYSDEC Site No.: 1-30-121, Index # A2-0552-0606, February 2010.

Earthtech, 1997. Closure Certification Report, Inwood Gas Holder Site, Inwood, New York, January 1997.

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TABLE

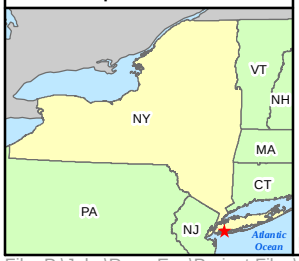
Table 1
Site Monitoring Wells Summary and Recommendations
Former Inwood Gas Holder Manufactured Gas Plant (MGP) Site

Well ID	Well Type	Ground Surface Elevation (ft)	Top of Casing Elevation (ft)	Well Diameter	Screen Slot	Screened Interval (ft bgs)	Sump Interval (ft bgs)	Depth to Water - 2020 Data (ft bgs)	Total Depth (ft bgs)	Total Depth (ft from TOC)	Depth to Bottom - 2020 Data (ft from TOC)	% Silting 2020	Depth to Product 2020 (ft bgs)	Notes	Recommendations (Y/N)	
															Well Development Required	Potential Well Replacement
GW-1	Shallow	7.849	10.871	4"	NA	3-18	NA	4.98	18	21.02	12.10	42.44%	-	Soft bottom	Y^	Y^
GW-2	Shallow	10.881	12.091	4"	NA	3-18	NA	5.87	18.3	19.51	20.21	-3.59%	-	Soft bottom	N	N
GW-3	Shallow	11.815	14.139	4"	NA	3-18	NA	9.54	18.1	20.42	20.74	-1.55%	-	Soft bottom	N	N
GW-5	Shallow	8.963	11.389	4"	NA	1-11	NA	6.00	11	13.43	14.50	-8.00%	-	Soft bottom	N	N
GW-7	Shallow	11.96	14.573	4"	NA	5-20	NA	13.17	20	22.61	21.10	6.69%	-	Soft bottom	N	N
GW-8*	Shallow	11.628	13.263	4"	NA	1-11	NA	NA	NA	NA	NA	NA	-	NA	N	N
GW-9	Shallow	9.654	12.132	4"	NA	3-13	NA	-	13	15.48	NA	NA	3.83	LNAPL	N	N
GW-10	Shallow	5.673	8.297	4"	NA	3-16	NA	-	16	18.62	Destroyed			Destroyed	N	Y
GW-11*	Shallow	7.813	10.928	4"	NA	1-11	NA	NA	NA	NA	NA	NA	-	NA	N	N
GW-12	Intermediate	8.83	11.3	4"	NA	5-20	NA	6.10	20	22.47	21.34	5.03%	-	Soft bottom	N	N
GW-13	Shallow	5.89	8.763	4"	NA	3-16	NA	3.76	15	17.87	14.35	19.71%	-	Firm bottom	Y	N
GW-14	Shallow	5.735	8.024	4"	NA	5-20	NA	2.88	20	22.29	5.16	76.85%	-	Firm bottom	Y^	Y^
GW-15	Shallow	10.4	13.26	4"	NA	NA	NA	5.69	NA	NA	16.19	NA	-	Soft bottom	N	N
MW-4R	Shallow	5.755	8.74	2"	20	2-7	NA	3.52	7	9.99	6.71	32.80%	-	Firm bottom	Y	N
MW-21S	Shallow	7.902	10.09	2"	20	3-8	8-10	3.79	10	12.19	13.39	-9.86%	13.39	Soft bottom, DNAPL present	N	N
MW-4I*	Intermediate	5.592	8.645	2"	20	11-21	NA	NA	NA	NA	NA	NA	-	NA	N	N
MW-14I	Intermediate	6.408	9.479	2"	20	11-21	NA	-	21	24.07	Destroyed			Destroyed. Bent stickup.	N	Y
MW-1I	Intermediate	8.486	10.954	2"	20	15-25	NA	8.13	27	29.47	30.47	-3.40%	-	Soft bottom	N	N
MW-3I	Intermediate	12.005	14.729	2"	20	18-28	28-30	13.45	30	32.72	33.89	-3.56%	-	Soft bottom	N	N
MW-1D	Deep	8.427	10.87	2"	20	25-35	35-37	8.11	37	39.44	39.28	0.41%	-	Soft bottom	N	N
MW-8I	Intermediate	12.057	14.316	2"	20	17-27	27-30	12.72	30	32.26	28.37	12.06%	-	Firm bottom	Y	N
MW-11S	Shallow	10.48	13.002	2"	20	2-11	NA	7.81	11	13.52	13.97	-3.31%	-	Firm bottom	N	N
MW-11I	Intermediate	10.448	13.341	2"	20	16-26	26-28	11.12	28	30.89	33.39	-8.08%	-	Soft bottom	N	N
MW-16S	Shallow	8.583	11.36	2"	20	2-11	NA	3.25	13	15.78	14.52	7.97%	-	Soft bottom	N	N
MW-16I	Intermediate	8.798	11.664	2"	20	16-26	26-28	8.64	28	30.87	31.92	-3.41%	-	Soft bottom	N	N
GW-6R	Shallow	10.71	13.88	2"	20	2-11	NA	5.39	11	14.17	5.70	59.77%	-	Firm, may be obstructed	Y^	Y^
MW-9S*	Shallow	9.842	12.831	2"	20	4-9	9-11	NA	NA	NA	NA	NA	-	NA	N	N
MW-9I	Intermediate	9.601	12.653	2"	20	17-27	27-29	10.67	29	32.05	31.86	0.60%	-	Soft bottom	N	N
MW-15S	Shallow	7.725	9.995	2"	20	2-11	NA	3.50	11	13.27	5.15	61.19%	-	Soft bottom	Y^	Y^
MW-19S	Shallow	8.235	11	2"	20	2-9	9-11	4.20	11	13.77	14.00	-1.71%	13.90	Soft bottom, LNAPL present	N	N
MW-38I	Intermediate	9.91	12.88	2"	20	18-28	28-30	10.46	30	32.97	21.96	33.39%	-	Firm bottom	Y	N
MW-38D	Deep	10.54	13.91	2"	20	28-38	38-40	11.42	40	43.37	39.90	8.00%	-	Soft bottom	N	N
MW-12S	Shallow	8.7	11.45	2"	20	7-17	17-19	5.77	19	21.75	16.13	25.84%	-	Soft bottom	Y	N
GW-11I	Intermediate	6.36	9.38	2"	20	14-24	24-26	5.96	26	29.02	29.13	-0.38%	-	Soft bottom	N	N
MW-13I	Intermediate	6.5	8.79	2"	20	17-27	27-29	4.29	29	31.29	31.30	-0.03%	-	Soft bottom	N	N
MW-5I	Intermediate	9.91	13.07	2"	20	18-28	28-30	11.13	30	33.16	30.26	8.75%	-	Soft bottom	N	N
MW-50S	Shallow	5.89	8.65	2"	20	12-22	22-24	6.25	24	26.76	19.22	28.18%	-	Soft bottom	Y	N
MW-50I	Intermediate	6.19	8.8	2"	20	22-32	32-34	6.35	34	36.61	33.30	9.04%	-	Soft bottom	N	N
MW-5D	Deep	9.93	13.29	2"	20	28-38	38-40	11.22	40	43.36	42.05	3.02%	-	Soft bottom	N	N
MW-51S	Shallow	5.05	4.31	2"	20	12-22	22-24	1.20	24	23.26	20.64	11.26%	-	Firm bottom	Y	N
MW-51I	Intermediate	5.29	4.87	2"	20	22-32	32-34	1.43	34	33.58	32.25	3.96%	-	Soft bottom	N	N
MW-52S	Shallow	6.1	5.59	2"	20	1-11	11-13	0.21	13	12.49	1.50	87.99%	-	Soft, seems to be packed with mud	Y^	Y^
MW-52I	Intermediate	6.26	8.92	2"	20	13-23	23-25	-	25	27.66	3.82	86.19%	-	Hard bottom, no water	Y^	Y^

Notes:
Monitoring wells with silting in excess of 10%
* - Well needs further evaluation during the next field activities
^ - Attempt redevelopment, if unsuccessful well will be abadoned and replaced if determined to be in a critical location for future remedial decisions.
bgs - Below Ground Surface
NA - Not available, Not applicable.
GW-4 - Was destroyed prior to the start of the RI. Replacement well MW-4R installed on May 10, 2010.
GW-6 - Was determined to be compromised and abandoned. It was replaced with a 2-inch diameter well, GW-6R on May 25, 2010. Measurements were not obtained.
GW-9 - Contains LNAPL. Water level and total depth measurments were not obtained.
GW-15 - No boring log was available. Type of well based upon National Grid correspondence to NYSDEC.
Y/N - Yes/No

FIGURES

Map Location



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Site Location
National Grid
Former Inwood Gas Holder Site
Nassau Ave/Sheridan Blvd, Inwood, NY

0 500 1,000 2,000 3,000 4,000 Feet

0 100 200 400 600 800 1,000 Meters

Map Projection: State Plane, NAD 83, Feet.

Scale: 1:12,000

AECOM

Figure 1

Date: March 2020

Project #: 60137359

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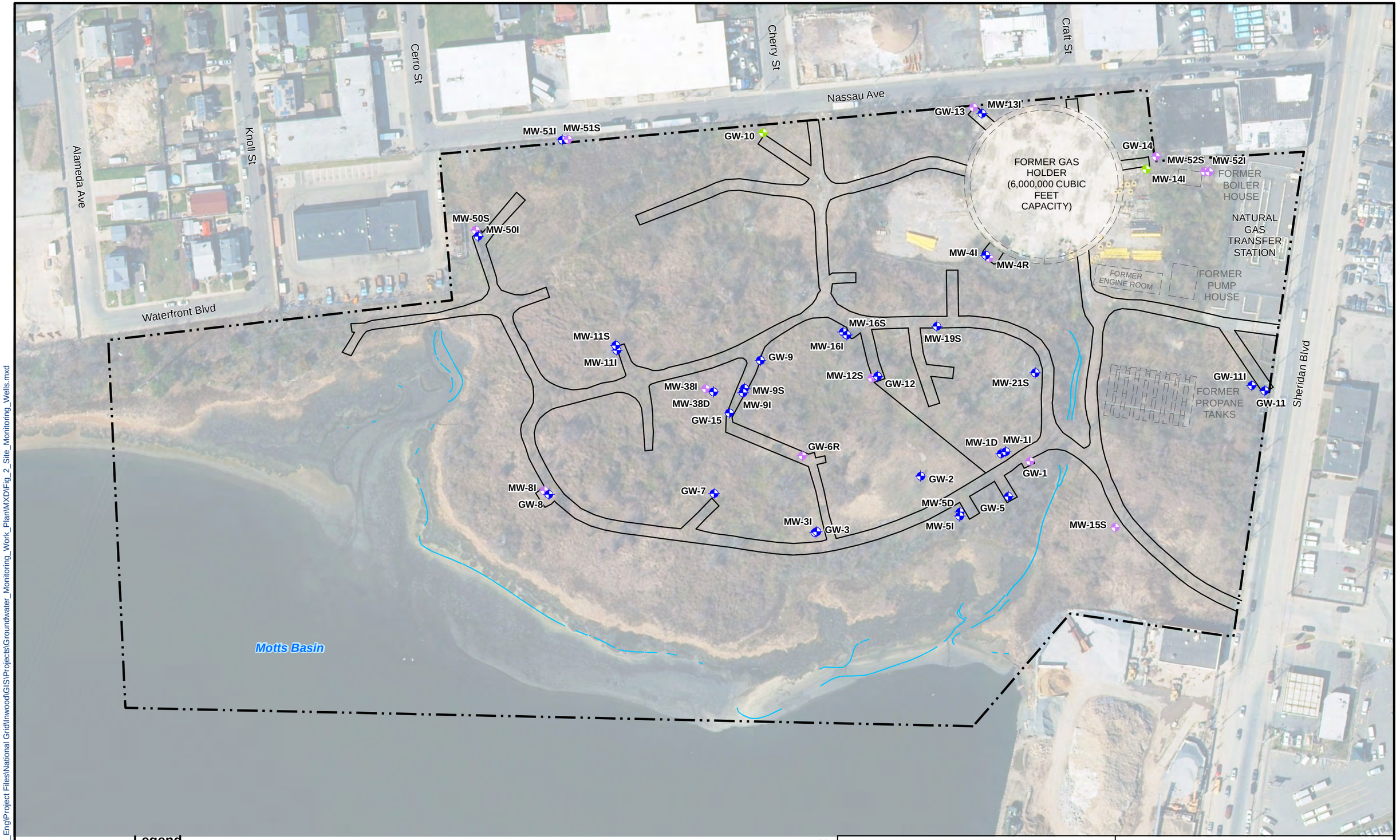

Legend

- Monitoring Well Location
- Monitoring Well to be redeveloped and/or replaced
- Monitoring Well to be replace
- Property Boundary
- Historic Structures
- Access Road
- Waterfront

N

1 inch = 120 feet

0 60 120 Feet

AECOM

National Grid Former Inwood Gas Holder Site Nassau Ave/Sheridan Blvd Inwood, NY			Site Monitoring Wells
Date: 4/22/2020	Drawn: JB	Job #: 60137359	Figure 2

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