

Mr. Patrick Van Rossem
National Grid
175 East Old Country Road
Hicksville, New York 11801

Arcadis of New York, Inc.
One Lincoln Center
110 West Fayette Street
Suite 300
Syracuse
New York 13202
Phone: 315 446 9120
Fax: 315 449 0017
www.arcadis.com

Date: December 8, 2021
Our Ref: 30004014.00002
Subject: Baseline Groundwater Monitoring Work Plan
Former Citizens Gas Works Manufactured Gas Plant Site
Borough of Brooklyn, Kings County, New York
NYSDEC Site Nos. 224012, C224012, and C224012B

Dear Mr. Van Rossem,

This letter has been prepared by Arcadis of New York, Inc. (Arcadis), on behalf of National Grid, to present the proposed scope of baseline (post-remediation) groundwater monitoring for the former Citizens Gas Works manufactured gas plant (MGP) site (hereinafter, the "Site") in Brooklyn, New York (Figure 1). As you are aware, the majority of the groundwater monitoring wells on Parcels I and II of the Site were previously damaged/destroyed by others or were formally decommissioned by National Grid during the on-going Site remediation project to facilitate the remedial excavation work. Accordingly, the proposed scope of work includes the installation of several new shallow and intermediate groundwater monitoring wells on these properties (as well as Parcel III) that, together with the existing monitoring wells at the Site and in the off-Site area, will be used to: (1) establish initial, post-remediation conditions with respect to groundwater quality and elevations; and (2) monitor the natural attenuation of residual dissolved-phase concentrations of the Site-related constituents of concern in groundwater.

Proposed Field Activities

As described below, the field activities will include the: (1) installation of several new monitoring wells on Parcels I, II, and III of the Site; (2) collection of a synoptic round of groundwater level measurements from certain accessible piezometers and monitoring wells; and (3) collection and analysis of groundwater samples from the new monitoring wells and certain existing monitoring wells. Monitoring well locations are shown on Figure 2 and the well construction details are summarized in Table 1. Wells may be relocated in the field and construction details may be modified based on accessibility, obstructions (refusal), observed conditions, and related factors. As appropriate, the field activities described herein will be conducted in accordance with the NYSDEC-approved Quality Assurance Project Plan and Field Sampling Plan for the Site.

Drilling, Soil Sampling, and Monitoring Well Installation

New monitoring wells CGMW-48 through CGMW-50, CGMW-51S, CGMW-51I, CGMW-52S, CGMW-52I, CGMW-53S, CGMW-53I, CGMW-54, CGMW-55S, CGMW-55I, and CGMW-56 through CGMW-59 (Figure 2) will be installed on Parcels I, II, and III of the Site to monitor post-remediation groundwater quality and elevations. Before initiating drilling activities, the New York City one-call service (New York 811) will be contacted and each location will be hand-cleared to a depth of approximately 7 feet below ground surface to facilitate the identification of potential near-surface utilities and shallow obstructions. The borehole for each new monitoring well will be drilled using sonic drilling methods. At each location, soil samples will be collected in continuous intervals to the bottom of the boring. Each sample will be screened for volatile organic compound vapors with a photoionization detector and will be visually examined and logged. In general, the following information will be recorded for each soil sample:

- Depth interval;
- Length of recovered sample;
- PID headspace;
- Soil type/composition (principal and minor components);
- Moisture content;
- Consistency/density;
- Color;
- Odors, if any; and
- Visual impacts, if any, in the form of staining, sheens, non-aqueous phase liquid (NAPL) blebs/globs, NAPL coatings, and/or NAPL-saturated materials.

As indicated in Table 1, new monitoring wells will be constructed of nominal 2-inch diameter Schedule 40 polyvinyl chloride riser and 0.010-inch slotted screen. Upon completion of drilling, the sump, screen, and riser will be assembled, centered, and plumbed within the borehole. The filter pack will be constructed around the screen by filling the annular space between the screen and wall of the borehole over the selected screened interval to a minimum of 2 feet above the top of the screen. After the filter pack has been installed, a minimum 2-foot thick hydrated bentonite seal will be placed directly on top of the filter pack. The annular space between the riser and wall of the borehole above the hydrated bentonite seal will then be filled with cement-bentonite grout. Each well will be finished with a flush-mounted well manhole set in a concrete pad. In conjunction with these activities, existing off-Site monitoring well CGMW-25 (Figure 2), which was previously installed/screened shallower than the water table, will be over-drilled and re-installed (as monitoring well CGMW-25R) with a deeper well screen set within the upper approximately 10 feet of saturated soil.

Following installation, each new monitoring well will be developed and surveyed to record its actual ground surface elevation, measuring point elevation, and horizontal location, referenced to Site datum. Existing monitoring wells CGMW-01S, CGMW-01I, CGMW-01D, CGMW-05S, CGMW-05I, CGMW-06S, CGMW-12, CGMW-23, CGMW-24, CGMW-34S, CGMW-34I, CGMW-36, CGMW-37, CGMW-38, and CGMW-39 will also be redeveloped in advance of the groundwater sampling activities described below.

Soil cuttings, well purge water, and other investigation-derived waste generated during the well installation activities will be collected, stored in properly-labeled 55-gallon drums, and transported off-Site for disposal in accordance with applicable laws and regulations.

Well Gauging

Following the drilling, soil sampling, and monitoring well installation activities described above, a full synoptic round of groundwater level measurements will be collected from the accessible piezometers and monitoring wells at the Site and in the adjacent portion of the off-Site area located on the west side of the Gowanus Canal (Figure 2). At each location, an oil-water interface probe will be used to measure the depth to groundwater, depth to NAPL (where present), and total depth of the piezometer/well. Depths will be measured to the nearest 0.01 foot from the reference point at the top of the inner casing. To the extent practicable, groundwater levels will be measured during a single tidal stage (high tide or low tide) within a single work day. Water level measurements will also be collected in the Gowanus Canal.

Groundwater Sampling

Groundwater samples will be collected using low-flow purging and sampling techniques from all new monitoring wells and existing monitoring wells CGMW-01S, CGMW-01I, CGMW-01D, CGMW-05S, CGMW-05I, CGMW-06S, CGMW-12, CGMW-15 (CH1S, CH5I, and CH6D), CGMW-17 (if accessible; CH2S, CH4I, CH6D)¹, CGMW-18 (CH2S and CH6I), CGMW-23 (if accessible)¹, CGMW-24 (if accessible)¹, CGMW-34S, CGMW-34I, CGMW-36, CGMW-37, CGMW-38, CGMW-39, CGMW-44, CGMW-46, and CGW-47. Samples will not be collected from monitoring wells CGMW-40D², CGMW-41I², CGMW-42I², CGMW-43D², and any other well where NAPL is observed.

Each groundwater sample will be analyzed for the following Site-related constituents of concern:

- Benzene, toluene, ethylbenzene, xylenes (collectively, "BTEX") in accordance with United States Environmental Protection Agency (USEPA) SW-846 Method 8260;
- Polycyclic aromatic hydrocarbons, consisting of acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene, in accordance with USEPA SW-846 Method 8270; and
- Total cyanide in accordance with USEPA SW-846 Method 9012.

Quality assurance/quality control samples, including trip blanks, rinse blanks, field duplicates, matrix spikes, and matrix spike duplicates, will also be collected and analyzed in accordance with the Quality Assurance Project Plan.

Reporting

The results of the field activities described herein will be presented in a Baseline Groundwater Monitoring Report. The contents of the report are anticipated to include, at a minimum, the following:

¹ As shown on Figure 2, monitoring wells CGMW-17, CGMW-23, and CGMW-24 are located within/along the shoulders of Smith Street, Nelson Street, and Luquer Street, respectively, and may not be accessible due to parked vehicles.

² NAPL has been consistently observed in monitoring wells CGMW-40D, CGMW-41I, CGMW-42I, and CGMW-43D during previous (pre-remediation) gauging events. Accordingly, groundwater samples will not be collected from these monitoring wells.

Mr. Patrick Van Rossem
National Grid
December 8, 2021

- Brief narrative describing the field activities and groundwater sample results;
- Tables summarizing the piezometer/well construction details, groundwater level measurements, and validated groundwater sample data;
- Site location map;
- Figure(s) showing the piezometer and monitoring well locations, measured shallow groundwater elevations, and interpolated shallow groundwater contours;
- Boring and well construction logs for each new monitoring well;
- Groundwater sampling logs; and
- NYSDEC Analytical Services Protocol Category B laboratory deliverable and data usability summary report for the groundwater sample data.

The Baseline Groundwater Monitoring Report will be submitted to NYSDEC within 60 days after the completion of the field activities and receipt of all laboratory data. As appropriate, the information presented in the Baseline Groundwater Monitoring Report will also be incorporated into the forthcoming Interim Site Management Plans.

Schedule

Arcadis is prepared to initiate the field activities described herein within 15 working days of NYSDEC's approval of this work plan and upon securing access to Parcel IV. To the extent practicable, the well gauging and groundwater sampling activities will be conducted following the installation of the new sheet pile closure wall on Parcel II of the Site.

Please let me know if you have any questions regarding the information presented herein.

Sincerely,
Arcadis of New York, Inc.



Michael Benoit, PE
Principal Environmental Engineer

Email: michael.benoit@arcadis.com
Direct Line: 315.671.9298

CC. Andrew Prophete, National Grid
John Alonzo, de maximis
Terry Young, PE, Arcadis

Enclosures:

Tables:

Table 1. Well Construction Summary

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Figure 1. Site Location Map

Figure 2. Plan of Site and Off-Site Area

Tables

Table 1
Well Construction Summary
Baseline Groundwater Monitoring Work Plan

National Grid
Former Citizens Gas Works Manufactured Gas Plant Site
Borough of Brooklyn, Kings County, New York

Location ID	Property or General Location	Easting (feet NAD83)	Northing (feet NAD83)	Measuring Point Elevation (feet NAVD88)	Ground Surface Elevation ³ (feet NAVD88)	Surface Completion	Casing Type	Screen Type	Nominal Diameter (inches)	Screen Slot Size (inches)	Screen Length (feet)	Screened Interval		Sump Length (feet)	Total Depth (feet bgs)
												Depth (feet bgs)	Elevation (feet NAVD88)		
Piezometers															
CGPZ-07	Parcel II	632655.12	671637.07	TBD	8.03	Flush-Mount	Sch. 40 PVC	Sch. 40 PVC	2.0	0.010	13.00	2.00 - 15.00	6.03 - -6.97	0.00	15.00
CGPZ-08	Parcel II	632460.49	671632.35	TBD	8.55	Flush-Mount	Sch. 40 PVC	Sch. 40 PVC	2.0	0.010	13.00	2.00 - 15.00	6.55 - -6.45	0.00	15.00
CGPZ-09	Parcel II	632296.84	671583.21	TBD	11.42	Flush-Mount	Sch. 40 PVC	Sch. 40 PVC	2.0	0.010	13.00	2.00 - 15.00	9.42 - -3.58	0.00	15.00
CGPZ-10	Parcel II	632191.74	671522.32	TBD	12.20	Flush-Mount	Sch. 40 PVC	Sch. 40 PVC	2.0	0.010	13.00	2.00 - 15.00	10.20 - -2.80	0.00	15.00
CGPZ-11	Parcel III	632056.78	671379.14	TBD	10.00	Flush-Mount	Sch. 40 PVC	Sch. 40 PVC	2.0	0.010	13.00	2.00 - 15.00	8.00 - -5.00	0.00	15.00
CGPZ-12	Parcel III	631943.23	671217.21	TBD	10.02	Flush-Mount	Sch. 40 PVC	Sch. 40 PVC	2.0	0.010	13.00	2.00 - 15.00	8.02 - -4.98	0.00	15.00
CGPZ-42S	Parcel III	631945.83	671525.84	18.49	15.36	Stick-Up	Sch. 40 PVC	Sch. 40 PVC	1.0	0.010	10.00	13.00 - 23.00	2.36 - -7.64	0.00	23.00
Monitoring Wells															
Existing Monitoring Wells															
CGMW-01S	Parcel I	631801.80	672023.00	31.64	29.61	Stick-Up	Sch. 40 PVC	Sch. 40 PVC	2.0	0.010	10.00	28.00 - 38.00	1.61 - -8.39	2.00	40.00
CGMW-01I	Parcel I	631796.60	672020.90	31.58	29.67	Stick-Up	Sch. 40 PVC	Sch. 40 PVC	2.0	0.010	10.00	74.00 - 84.00	-44.33 - -54.33	2.00	86.00
CGMW-01D	Parcel I	631798.60	672027.70	31.56	29.59	Stick-Up	Sch. 40 PVC	Sch. 40 PVC	2.0	0.010	10.00	126.00 - 136.00	-96.41 - -106.41	2.00	138.00
CGMW-05S	Parcel IV	632221.50	672046.60	25.68	26.10	Flush-Mount	Sch. 40 PVC	Sch. 40 PVC	2.0	0.010	10.00	25.00 - 35.00	1.10 - -8.90	2.00	37.00
CGMW-05I	Parcel IV	632216.53	672051.80	26.14	26.40	Flush-Mount	Sch. 40 PVC	Sch. 40 PVC	2.0	0.010	10.00	54.00 - 64.00	-27.60 - -37.60	2.00	66.00
CGMW-06S	Huntington Street ROW	631824.40	671213.10	10.07	10.57	Flush-Mount	Sch. 40 PVC	Sch. 40 PVC	2.0	0.010	10.00	10.00 - 20.00	0.57 - -9.43	2.00	22.00
CGMW-12	4th Street ROW	632686.36	671816.80	9.09	9.39	Flush-Mount	Sch. 40 PVC	Sch. 40 PVC	2.0	0.010	10.00	8.08 - 18.08	1.31 - -8.69	2.00	20.08
CGMW-15 CH1	Parcel III	631553.36	671371.65	16.91	17.31	Flush-Mount	PE CMT	SS Mesh	0.44	NA	0.25	22.01 - 22.26	-4.70 - -4.95	0.00	22.26
CGMW-15 CH2	Parcel III	631553.36	671371.65	16.91	17.31	Flush-Mount	PE CMT	SS Mesh	0.44	NA	0.25	NA - NA	NA - NA	0.00	NA
CGMW-15 CH3	Parcel III	631553.36	671371.65	16.91	17.31	Flush-Mount	PE CMT	SS Mesh	0.44	NA	0.25	34.71 - 34.96	-17.40 - -17.65	0.00	34.96
CGMW-15 CH4	Parcel III	631553.36	671371.65	16.91	17.31	Flush-Mount	PE CMT	SS Mesh	0.44	NA	0.25	58.84 - 59.09	-41.53 - -41.78	0.00	59.09
CGMW-15 CH5	Parcel III	631553.36	671371.65	16.91	17.31	Flush-Mount	PE CMT	SS Mesh	0.44	NA	0.25	68.84 - 69.09	-51.53 - -51.78	0.00	69.09
CGMW-15 CH6	Parcel III	631553.36	671371.65	16.91	17.31	Flush-Mount	PE CMT	SS Mesh	0.44	NA	0.25	131.05 - 131.30	-113.74 - -113.99	0.00	131.30
CGMW-15 CH7	Parcel III	631553.36	671371.65	16.91	17.31	Flush-Mount	PE CMT	SS Mesh	0.38	NA	0.25	146.95 - 147.20	-129.64 - -129.89	0.00	147.20
CGMW-16 CH1	65 6th Street	632501.52	671286.89	6.64	7.22	Flush-Mount	PE CMT	SS Mesh	0.44	NA	0.25	12.01 - 12.26	-4.79 - -5.04	0.00	12.26
CGMW-16 CH2	65 6th Street	632501.52	671286.89	6.64	7.22	Flush-Mount	PE CMT	SS Mesh	0.44	NA	0.25	18.01 - 18.26	-10.79 - -11.04	0.00	18.26
CGMW-16 CH3	65 6th Street	632501.52	671286.89	6.64	7.22	Flush-Mount	PE CMT	SS Mesh	0.44	NA	0.25	29.05 - 29.30	-21.83 - -22.08	0.00	29.30
CGMW-16 CH4	65 6th Street	632501.52	671286.89	6.64	7.22	Flush-Mount	PE CMT	SS Mesh	0.44	NA	0.25	48.13 - 48.38	-40.91 - -41.16	0.00	48.38
CGMW-16 CH5	65 6th Street	632501.52	671286.89	6.64	7.22	Flush-Mount	PE CMT	SS Mesh	0.44	NA	0.25	68.90 - 69.15	-61.68 - -61.93	0.00	69.15
CGMW-16 CH6	65 6th Street	632501.52	671286.89	6.64	7.22	Flush-Mount	PE CMT	SS Mesh	0.44	NA	0.25	122.13 - 122.38	-114.91 - -115.16	0.00	122.38
CGMW-16 CH7	65 6th Street	632501.52	671286.89	6.64	7.22	Flush-Mount	PE CMT	SS Mesh	0.38	NA	0.25	140.03 - 140.28	-132.81 - -133.06	0.00	140.28
CGMW-17 CH1	Smith Street ROW	631626.90	671710.78	22.11	22.51	Flush-Mount	PE CMT	SS Mesh	0.44	NA	0.25	16.74 - 16.99	5.77 - 5.52	0.00	16.99
CGMW-17 CH2	Smith Street ROW	631626.90	671710.78	22.11	22.51	Flush-Mount	PE CMT	SS Mesh	0.44	NA	0.25	27.15 - 27.40	-4.64 - -4.89	0.00	27.40
CGMW-17 CH3	Smith Street ROW	631626.90	671710.78	22.11	22.51	Flush-Mount	PE CMT	SS Mesh	0.44	NA	0.25	34.23 - 34.48	-11.72 - -11.97	0.00	34.48
CGMW-17 CH4	Smith Street ROW	631626.90	671710.78	22.11	22.51	Flush-Mount	PE CMT	SS Mesh	0.44	NA	0.25	74.35 - 74.60	-51.84 - -52.09	0.00	74.60
CGMW-17 CH5	Smith Street ROW	631626.90	671710.78	22.11	22.51	Flush-Mount	PE CMT	SS Mesh	0.44	NA	0.25	84.15 - 84.40	-61.64 - -61.89	0.00	84.40
CGMW-17 CH6	Smith Street ROW	631626.90	671710.78	22.11	22.51	Flush-Mount	PE CMT	SS Mesh	0.44	NA	0.25	124.35 - 124.60	-101.84 - -102.09	0.00	124.60
CGMW-17 CH7	Smith Street ROW	631626.90	671710.78	22.11	22.51	Flush-Mount	PE CMT	SS Mesh	0.38	NA	0.25	137.35 - 137.60	-114.84 - -115.09	0.00	137.60

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Location ID	Property or General Location	Easting (feet NAD83)	Northing (feet NAD83)	Measuring Point Elevation (feet NAVD88)	Ground Surface Elevation ³ (feet NAVD88)	Surface Completion	Casing Type	Screen Type	Nominal Diameter (inches)	Screen Slot Size (inches)	Screen Length (feet)	Screened Interval		Sump Length (feet)	Total Depth (feet bgs)
												Depth (feet bgs)	Elevation (feet NAVD88)		
Existing Monitoring Wells (continued)															
CGMW-18 CH1	Hoyt Street ROW	632393.33	671911.98	14.07	14.33	Flush-Mount	PE CMT	SS Mesh	0.44	NA	0.25	13.10 - 13.35	1.23 - 0.98	0.00	13.35
CGMW-18 CH2	Hoyt Street ROW	632393.33	671911.98	14.07	14.33	Flush-Mount	PE CMT	SS Mesh	0.44	NA	0.25	22.10 - 22.35	-7.77 - -8.02	0.00	22.35
CGMW-18 CH3	Hoyt Street ROW	632393.33	671911.98	14.07	14.33	Flush-Mount	PE CMT	SS Mesh	0.44	NA	0.25	30.11 - 30.36	-15.78 - -16.03	0.00	30.36
CGMW-18 CH4	Hoyt Street ROW	632393.33	671911.98	14.07	14.33	Flush-Mount	PE CMT	SS Mesh	0.44	NA	0.25	13.10 - 13.35	1.23 - 0.98	0.00	13.35
CGMW-18 CH5	Hoyt Street ROW	632393.33	671911.98	14.07	14.33	Flush-Mount	PE CMT	SS Mesh	0.44	NA	0.25	55.11 - 55.36	-40.78 - -41.03	0.00	55.36
CGMW-18 CH6	Hoyt Street ROW	632393.33	671911.98	14.07	14.33	Flush-Mount	PE CMT	SS Mesh	0.44	NA	0.25	70.26 - 70.51	-55.93 - -56.18	0.00	70.51
CGMW-18 CH7	Hoyt Street ROW	632393.33	671911.98	14.07	14.33	Flush-Mount	PE CMT	SS Mesh	0.38	NA	0.25	77.11 - 77.36	-62.78 - -63.03	0.00	77.36
CGMW-19 CH1	56 2nd Avenue	632365.50	670895.90	8.25	8.50	Flush-Mount	PE CMT	SS Mesh	0.44	NA	0.25	10.60 - 10.85	-2.10 - -2.35	0.00	10.85
CGMW-19 CH2	56 2nd Avenue	632365.50	670895.90	8.25	8.50	Flush-Mount	PE CMT	SS Mesh	0.44	NA	0.25	23.59 - 23.84	-15.09 - -15.34	0.00	23.84
CGMW-19 CH3	56 2nd Avenue	632365.50	670895.90	8.25	8.50	Flush-Mount	PE CMT	SS Mesh	0.44	NA	0.25	30.65 - 30.90	-22.15 - -22.40	0.00	30.90
CGMW-19 CH4	56 2nd Avenue	632365.50	670895.90	8.25	8.50	Flush-Mount	PE CMT	SS Mesh	0.44	NA	0.25	74.60 - 74.85	-66.10 - -66.35	0.00	74.85
CGMW-19 CH5	56 2nd Avenue	632365.50	670895.90	8.25	8.50	Flush-Mount	PE CMT	SS Mesh	0.44	NA	0.25	84.60 - 84.85	-76.10 - -76.35	0.00	84.85
CGMW-19 CH6	56 2nd Avenue	632365.50	670895.90	8.25	8.50	Flush-Mount	PE CMT	SS Mesh	0.44	NA	0.25	115.60 - 115.85	-107.10 - -107.35	0.00	115.85
CGMW-19 CH7	56 2nd Avenue	632365.50	670895.90	8.25	8.50	Flush-Mount	PE CMT	SS Mesh	0.38	NA	0.25	116.60 - 116.85	-108.10 - -108.35	0.00	116.85
CGMW-22 CH1	37 9th Street	631973.28	671002.23	5.57	6.05	Flush-Mount	PE CMT	SS Mesh	0.44	NA	0.25	11.73 - 11.98	-5.68 - -5.93	0.00	11.98
CGMW-22 CH2	37 9th Street	631973.28	671002.23	5.57	6.05	Flush-Mount	PE CMT	SS Mesh	0.44	NA	0.25	27.80 - 28.05	-21.75 - -22.00	0.00	28.05
CGMW-22 CH3	37 9th Street	631973.28	671002.23	5.57	6.05	Flush-Mount	PE CMT	SS Mesh	0.44	NA	0.25	39.78 - 40.03	-33.73 - -33.98	0.00	40.03
CGMW-22 CH4	37 9th Street	631973.28	671002.23	5.57	6.05	Flush-Mount	PE CMT	SS Mesh	0.44	NA	0.25	51.89 - 52.14	-45.84 - -46.09	0.00	52.14
CGMW-22 CH5	37 9th Street	631973.28	671002.23	5.57	6.05	Flush-Mount	PE CMT	SS Mesh	0.44	NA	0.25	63.90 - 64.15	-57.85 - -58.10	0.00	64.15
CGMW-22 CH6	37 9th Street	631973.28	671002.23	5.57	6.05	Flush-Mount	PE CMT	SS Mesh	0.44	NA	0.25	81.83 - 82.08	-75.78 - -76.03	0.00	82.08
CGMW-22 CH7	37 9th Street	631973.28	671002.23	5.57	6.05	Flush-Mount	PE CMT	SS Mesh	0.38	NA	0.25	96.83 - 97.08	-90.78 - -91.03	0.00	97.08
CGMW-23	Nelson Street ROW	631427.72	671647.69	24.12	24.44	Flush-Mount	Sch. 40 PVC	Sch. 40 PVC	2.0	0.010	10.00	17.00 - 27.00	7.44 - -2.56	0.00	27.00
CGMW-24	Luquer Street ROW	631493.70	671869.90	33.12	33.33	Flush-Mount	Sch. 40 PVC	Sch. 40 PVC	2.0	0.010	10.00	18.00 - 28.00	15.33 - 5.33	0.00	28.00
CGMW-25	4th Place ROW	631611.70	672157.10	42.75	43.09	Flush-Mount	Sch. 40 PVC	Sch. 40 PVC	2.0	0.010	10.00	22.00 - 32.00	21.09 - 11.09	0.00	32.00
CGMW-29	7th Street ROW	632988.54	670748.59	8.53	8.93	Flush-Mount	Sch. 40 PVC	Sch. 40 PVC	2.0	0.010	10.00	3.00 - 13.00	5.93 - -4.07	0.00	13.00
CGMW-32	9th Street ROW	632059.30	670721.93	4.97	5.24	Flush-Mount	Sch. 40 PVC	Sch. 40 PVC	2.0	0.010	10.00	2.00 - 12.00	3.24 - -6.76	0.00	12.00
CGMW-34S	Parcel III	631917.80	671457.30	17.51	14.70	Stick-Up	Sch. 40 PVC	Sch. 40 PVC	2.0	0.010	10.00	11.00 - 21.00	3.70 - -6.30	2.00	23.00
CGMW-34I	Parcel III	631925.23	671454.78	17.17	15.10	Stick-Up	Sch. 40 PVC	Sch. 40 PVC	2.0	0.010	10.00	50.00 - 60.00	-34.90 - -44.90	2.00	62.00
CGMW-35	Parcel III	631817.70	671578.61	17.27	15.00	Stick-Up	Sch. 40 PVC	Sch. 40 PVC	2.0	0.010	10.00	6.00 - 16.00	9.00 - -1.00	2.00	18.00
CGMW-36	Parcel III	631781.02	671478.97	17.10	14.62	Stick-Up	Sch. 40 PVC	Sch. 40 PVC	2.0	0.010	10.00	4.00 - 14.00	10.62 - 0.62	2.00	16.00
CGMW-37	Parcel III	631668.41	671619.83	17.20	15.20	Stick-Up	Sch. 40 PVC	Sch. 40 PVC	2.0	0.010	10.00	4.00 - 14.00	11.20 - 1.20	2.00	16.00
CGMW-38	Parcel III	631634.17	671518.13	17.37	14.40	Stick-Up	Sch. 40 PVC	Sch. 40 PVC	2.0	0.010	10.00	4.00 - 14.00	10.40 - 0.40	2.00	16.00
CGMW-39	Parcel III	631681.82	671314.15	18.38	14.10	Stick-Up	Sch. 40 PVC	Sch. 40 PVC	2.0	0.010	10.00	8.00 - 18.00	6.10 - -3.90	2.00	20.00
CGMW-40	2nd Avenue ROW	633098.00	670998.60	7.59	7.89	Flush-Mount	Sch. 40 PVC	Sch. 40 PVC	2.0	0.010	10.00	10.00 - 20.00	-2.11 - -12.11	0.00	20.00
CGMW-40D	Parcel III	631820.16	671336.81	17.75	15.07	Flush-Mount	Sch. 40 PVC	Sch. 40 PVC	2.0	0.010	10.00	92.00 - 102.00	-76.93 - -86.93	2.00	104.00
CGMW-41I	Parcel III	631886.44	671254.04	17.29	15.22	Flush-Mount	Sch. 40 PVC	Sch. 40 PVC	2.0	0.010	10.00	50.00 - 60.00	-34.78 - -44.78	2.00	62.00
CGMW-42I	Parcel III	631945.83	671525.84	17.77	15.36	Stick-Up	Sch. 40 PVC	Sch. 40 PVC	2.0	0.010	10.00	34.00 - 44.00	-18.64 - -28.64	2.00	46.00
CGMW-43D	Parcel III	631795.81	671291.90	17.75	15.90	Flush-Mount	Sch. 40 PVC	Sch. 40 PVC	2.0	0.010	10.00	84.00 - 94.00	-68.10 - -78.10	2.00	96.00
CGMW-44	9th Street ROW	631320.70	671128.55	NA	14.86	Flush-Mount	Sch. 40 PVC	Sch. 40 PVC	2.0	0.010	10.00	10.00 - 20.00	4.86 - -5.14	2.00	22.00
CGMW-46	Garnet Street ROW	631262.83	670880.89	10.99	11.28	Flush-Mount	Sch. 40 PVC	Sch. 40 PVC	2.0	0.010	10.00	9.00 - 19.00	2.28 - -7.72	0.00	19.00
CGMW-47	Centre Street ROW	631191.63	670640.89	7.88	8.32	Flush-Mount	Sch. 40 PVC	Sch. 40 PVC	2.0	0.010	10.00	8.00 - 18.00	0.32 - -9.68	0.00	18.00

Table 1
Well Construction Summary
Baseline Groundwater Monitoring Work Plan

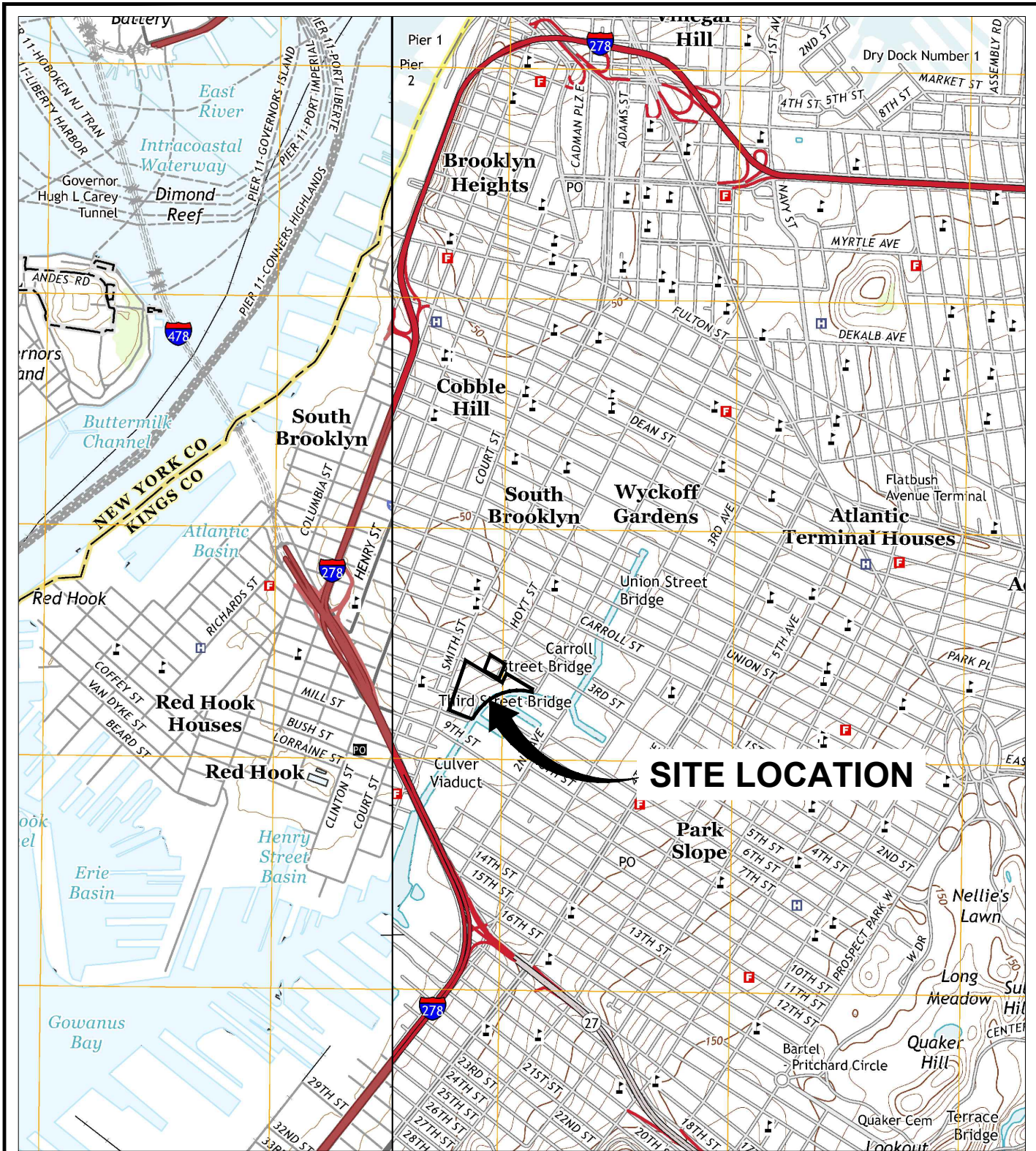
National Grid
Former Citizens Gas Works Manufactured Gas Plant Site
Borough of Brooklyn, Kings County, New York

Location ID	Property or General Location	Easting (feet NAD83)	Northing (feet NAD83)	Measuring Point Elevation (feet NAVD88)	Ground Surface Elevation ³ (feet NAVD88)	Surface Completion	Casing Type	Screen Type	Nominal Diameter (inches)	Screen Slot Size (inches)	Screen Length (feet)	Screened Interval		Sump Length (feet)	Total Depth (feet bgs)
												Depth (feet bgs)	Elevation (feet NAVD88)		
Proposed Monitoring Wells															
CGMW-25R	4th Place ROW	631611.70	672157.10	TBD	43.09	Flush-Mount	Sch. 40 PVC	Sch. 40 PVC	2.0	0.010	10.00	37.00 - 47.00	6.09 - -3.91	2.00	49.00
CGMW-48	Parcel I	632000.44	671911.76	TBD	25.96	Flush-Mount	Sch. 40 PVC	Sch. 40 PVC	2.0	0.010	10.00	20.00 - 30.00	5.96 - -4.04	2.00	21.00
CGMW-49	Parcel I	632171.25	671812.37	TBD	17.60	Flush-Mount	Sch. 40 PVC	Sch. 40 PVC	2.0	0.010	10.00	9.00 - 19.00	8.60 - -1.40	2.00	21.00
CGMW-50	Parcel I	631748.01	671886.22	TBD	26.98	Flush-Mount	Sch. 40 PVC	Sch. 40 PVC	2.0	0.010	10.00	21.00 - 31.00	5.98 - -4.02	2.00	33.00
CGMW-51S	Parcel I	632178.76	671643.44	TBD	13.45	Flush-Mount	Sch. 40 PVC	Sch. 40 PVC	2.0	0.010	10.00	7.00 - 17.00	6.45 - -3.55	2.00	19.00
CGMW-51I	Parcel I	632171.88	671624.32	TBD	13.60	Flush-Mount	Sch. 40 PVC	Sch. 40 PVC	2.0	0.010	10.00	35.00 - 45.00	-21.41 - -31.41	2.00	47.00
CGMW-52S	Parcel I	631705.08	671766.74	TBD	24.04	Flush-Mount	Sch. 40 PVC	Sch. 40 PVC	2.0	0.010	10.00	16.00 - 26.00	8.04 - -1.96	2.00	28.00
CGMW-52I	Parcel I	631701.34	671755.08	TBD	24.01	Flush-Mount	Sch. 40 PVC	Sch. 40 PVC	2.0	0.010	10.00	70.00 - 80.00	-45.99 - -55.99	2.00	82.00
CGMW-53S	Parcel I	631894.99	671614.22	TBD	19.02	Flush-Mount	Sch. 40 PVC	Sch. 40 PVC	2.0	0.010	10.00	8.00 - 18.00	11.02 - 1.02	2.00	20.00
CGMW-53I	Parcel I	631880.52	671627.35	TBD	19.57	Flush-Mount	Sch. 40 PVC	Sch. 40 PVC	2.0	0.010	10.00	65.00 - 75.00	-45.43 - -55.43	2.00	77.00
CGMW-54	Parcel II	632334.69	671751.18	TBD	11.05	Flush-Mount	Sch. 40 PVC	Sch. 40 PVC	2.0	0.010	10.00	3.00 - 13.00	8.05 - -1.95	2.00	15.00
CGMW-55S	Parcel II	632521.27	671766.68	TBD	10.76	Flush-Mount	Sch. 40 PVC	Sch. 40 PVC	2.0	0.010	10.00	5.00 - 15.00	5.76 - -4.24	2.00	17.00
CGMW-55I	Parcel II	632537.10	671760.91	TBD	10.84	Flush-Mount	Sch. 40 PVC	Sch. 40 PVC	2.0	0.010	10.00	56.00 - 66.00	-45.16 - -55.16	2.00	68.00
CGMW-56	Parcel II	632682.71	671703.54	TBD	8.00	Flush-Mount	Sch. 40 PVC	Sch. 40 PVC	2.0	0.010	10.00	3.00 - 13.00	5.00 - -5.00	2.00	15.00
CGMW-57	Parcel II	632393.10	671621.31	TBD	11.00	Flush-Mount	Sch. 40 PVC	Sch. 40 PVC	2.0	0.010	10.00	11.00 - 21.00	0.00 - -10.00	2.00	23.00
CGMW-58	Parcel III	632159.51	671492.21	TBD	10.69	Flush-Mount	Sch. 40 PVC	Sch. 40 PVC	2.0	0.010	10.00	11.00 - 21.00	-0.31 - -10.31	2.00	23.00
CGMW-59	Parcel III	632039.31	671351.77	TBD	10.00	Flush-Mount	Sch. 40 PVC	Sch. 40 PVC	2.0	0.010	10.00	10.00 - 20.00	0.00 - -10.00	2.00	22.00

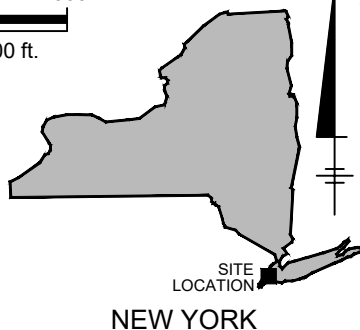
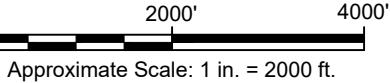
Notes:

1. Horizontal reference datum is the North American Datum of 1983 (NAD83), New York State Plane East Zone.
2. Vertical reference datum is the North American Vertical Datum of 1988 (NAVD88).
3. Elevations reflect ground surface at the time of installation. Current ground surface elevation may be different.
4. bgs: below ground surface.
5. CMT: continuous multichannel tubing.
6. NA: not available.
7. PE: polyethylene.
8. PVC: polyvinyl chloride.
9. Sch.: Schedule.
10. SS: stainless steel.
11. TBD: to be determined. Well or piezometer has not yet been installed.

Figures



REFERENCE: BASE MAP USGS 7.5. MIN. TOPO. QUAD., BROOKLYN, NY, 2013, AND JERSEY CITY, NY-NJ, 2014.



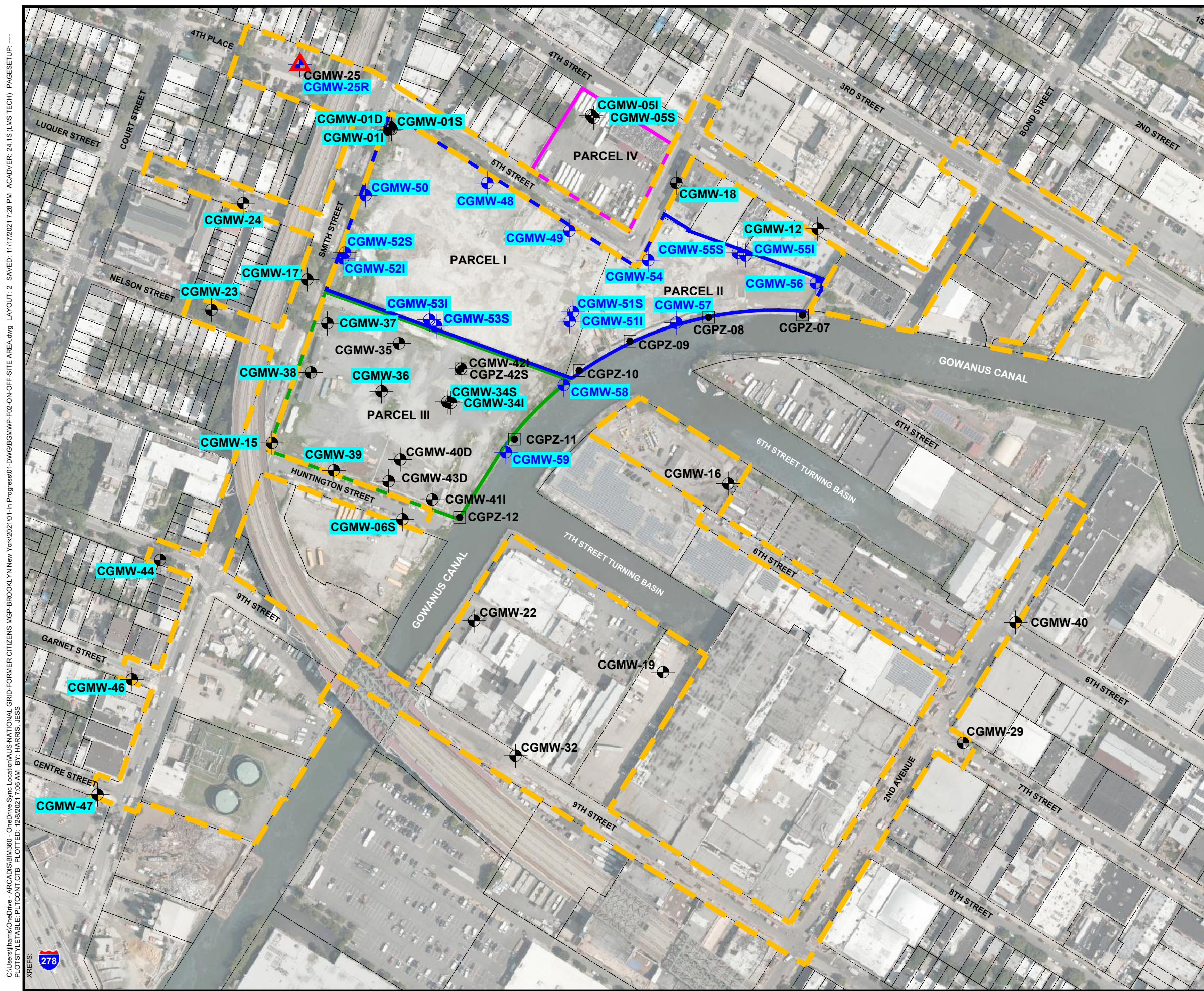
NATIONAL GRID
 FORMER CITIZENS GAS WORKS MANUFACTURED GAS PLANT SITE
 BOROUGH OF BROOKLYN, KINGS COUNTY, NEW YORK
BASELINE GROUNDWATER MONITORING WORK PLAN

SITE LOCATION MAP



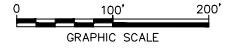
FIGURE

1



- LEGEND:**
- LIMIT OF BROWNFIELD CLEANUP PROGRAM SITE NO. C224012 (PARCELS I AND II)
 - LIMIT OF BROWNFIELD CLEANUP PROGRAM SITE NO. C224012B (PARCEL III)
 - LIMIT OF STATE SUPERFUND SITE NO. 224012 (PARCEL IV)
 - - - APPROXIMATE LIMIT OF OFF-SITE INVESTIGATION AREA
 - - - PROPERTY LINE (APPROXIMATE)
 - EXISTING PIEZOMETER
 - EXISTING MONITORING WELL
 - PROPOSED MONITORING WELL
 - ▲ EXISTING MONITORING WELL TO BE OVER-DRILLED AND REPLACED
 - MONITORING WELL TO BE SAMPLED

- NOTES:**
1. HORIZONTAL REFERENCE DATUM IS THE NORTH AMERICAN DATUM OF 1983 (NAD83), NEW YORK STATE PLANE EAST ZONE.
 2. AERIAL IMAGE PROVIDED BY BING MAPS.
 3. PARCEL BOUNDARIES DOWNLOADED FROM GIS OPEN DATA PORTAL, REVISED JULY 7, 2021 www.data.cityofnewyork.us



NATIONAL GRID
FORMER CITIZENS GAS WORKS MANUFACTURED GAS PLANT SITE
BOROUGH OF BROOKLYN, KINGS COUNTY, NEW YORK
BASELINE GROUNDWATER MONITORING WORK PLAN

PLAN OF SITE AND OFF-SITE AREA



C:\Users\jharris\OneDrive - Arcadis\BIM360 - OneDrive Sync Location\ALUS\NATIONAL GRID-FORMER CITIZENS MGP-BROOKLYN New York\20210114-1-in Progress\01-DWG\BGMWP-F02-ON-OFF-SITE AREA.dwg LAYOUT: 2 SAVED: 11/17/2021 7:28 PM ACADVER: 24.1S (LMS TECH) PAGESETUP: ----
PLOT STYLE TABLE: PLTCONT.CTB PLOTTED: 12/8/2021 1:08 AM BY: HARRIS, JESS
XREFS: 278