

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, 2022

Our Ref: 30004014.00002

Subject: November 2022 Post-Remediation DNAPL Monitoring Status Report
Former Citizens Gas Works Manufactured Gas Plant Site
Borough of Brooklyn, Kings County, New York
NYSDEC Site Nos. 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 November 2022 dense non-aqueous phase liquid (DNAPL) monitoring results for the former Citizens Gas Works manufactured gas plant (MGP) site (hereinafter, the "Site") in Brooklyn, New York (Figure 1). As shown on Figure 2, the DNAPL recovery well network includes a total of 25 wells, which are being used to monitor and remove recoverable DNAPL from intermediate and deep soils on Block 471, Lot 1 (hereinafter, "Parcel I"), Block 471, Lot 100 (hereinafter, "Parcel II"), and Block 471, Lot 200 (hereinafter, "Parcel III") of the Site. Recovery well construction details are summarized in Table 1. Table 2 summarizes the fluid level measurements collected on November 30, 2022 as well as the total estimated volume of fluids (DNAPL and groundwater) removed from the wells in November 2022.

As indicated in Table 2, approximately 1,863 gallons of fluids in total were recovered in November 2022 from recovery wells CGRW-03 (Parcel II), CGRW-04 (Parcel II), CGRW-06I (Parcel III), CGRW-06D (Parcel III), CGRW-08 through CGRW-10 (Parcel I), CGRW-13 (Parcel II), CGRW-16 through CGRW-18 (Parcel II), CGRW-19D (Parcel III), CGRW-21I (Parcel III), CGRW-21D (Parcel III), CGRW-22I (Parcel III), and CGRW-22D (Parcel III). Since post-remediation DNAPL recovery operations were initiated on February 10, 2022, a total of approximately 9,751 gallons of fluids have been recovered at the Site.

The November 2022 field activities also included the off-Site disposal of recovered fluids and used personal protective equipment/consumables on November 2, November 11, and November 15, 2022 in accordance with applicable laws and regulations.

Post-remediation DNAPL monitoring and recovery operations will continue in December 2022 in accordance with the *Post-Remediation DNAPL Monitoring Status Report* (Arcadis 2022).

Mr. Patrick Van Rossem
National Grid
December 8, 2022

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. Recovery Well Construction Summary

Table 2. Well Gauging and Product Recovery Summary for November 30, 2022

Figures:

Figure 1. Site Location Map

Figure 2. Site Plan

References:

Arcadis. 2022. *Post-Remediation DNAPL Monitoring Status Report*. Former Citizens Gas Works MGP Site, Brooklyn, New York. Prepared for National Grid. May 13.

Tables

Table 1
Recovery Well Construction Summary
November 2022 Post-Remediation DNAPL Monitoring Status Report

National Grid
Former Citizens Gas Works Manufactured Gas Plant Site
Borough of Brooklyn, Kings County, New York
NYSDEC Site Nos. C224012 and C224012B

Well ID	Date Completed	Easting (feet NAD83)	Northing (feet NAD83)	Ground Surface Elevation (feet NAVD88)	Measuring Point Elevation (feet NAVD88)	Casing Type	Screen Type	Nominal Diameter (inches)	Screen Slot Size (inches)	Screen Length (feet)	Screened Interval				Sump Length (feet)	Total Depth of Well (feet bgs)		
											Depth (feet bgs)		Elevation (feet NAVD88)					
Parcel I																		
CGRW-02	8/27/2009	632130.95	671769.29	18.72	18.24	Sch. 10 SS	SS Vee-Wire	6.00	0.020	15.00	30.43	-	45.43	-11.71	-	-26.71	5.00	50.43
CGRW-08	10/24/2019	631902.84	671826.90	30.19	29.86	Sch. 40 PVC	Sch. 40 PVC	4.00	0.020	30.00	50.10	-	80.10	-19.91	-	-49.91	15.00	95.10
CGRW-09	10/23/2019	631945.16	671800.56	30.28	29.96	Sch. 40 PVC	Sch. 40 PVC	4.00	0.020	30.00	50.10	-	80.10	-19.82	-	-49.82	15.00	95.10
CGRW-10	10/23/2019	632029.75	671747.24	23.82	23.55	Sch. 40 PVC	Sch. 40 PVC	4.00	0.020	30.00	44.00	-	74.00	-20.18	-	-50.18	15.00	89.00
CGRW-12	10/21/2019	632105.42	671728.64	19.68	19.38	Sch. 40 PVC	Sch. 40 PVC	4.00	0.020	30.00	39.00	-	69.00	-19.32	-	-49.32	15.00	84.00
CGRW-203	5/23/2012	631987.35	671773.60	28.75	28.51	Sch. 40 PVC	Sch. 40 PVC	4.00	0.020	20.00	39.68	-	59.68	-10.93	-	-30.93	2.00	61.68
CGRW-206	7/12/2012	632156.81	671789.36	18.19	17.84	Sch. 40 PVC	Sch. 40 PVC	4.00	0.020	20.00	45.11	-	65.11	-26.92	-	-46.92	2.00	67.11
Parcel II																		
CGRW-03	8/30/2009	632341.72	671624.07	10.61	10.18	Sch. 10 SS	SS Vee-Wire	6.00	0.020	30.00	22.15	-	52.15	-11.54	-	-41.54	5.00	57.15
CGRW-04	8/28/2009	632271.48	671595.37	11.42	11.08	Sch. 10 SS	SS Vee-Wire	6.00	0.020	40.00	27.28	-	67.28	-15.86	-	-55.86	5.00	72.28
CGRW-13	12/29/2021	632648.03	671637.19	8.03	7.31	Sch. 10 SS	SS Vee-Wire	6.00	0.020	30.00	26.92	-	56.92	-18.89	-	-48.89	15.00	71.92
CGRW-14	1/3/2022	632585.34	671638.65	7.93	7.39	Sch. 10 SS	SS Vee-Wire	6.00	0.020	30.00	27.44	-	57.44	-19.51	-	-49.51	15.00	72.44
CGRW-15	1/5/2022	632509.28	671632.75	7.86	7.48	Sch. 10 SS	SS Vee-Wire	6.00	0.020	30.00	38.50	-	68.50	-30.64	-	-60.64	15.00	83.50
CGRW-16	1/7/2022	632414.49	671627.33	10.13	9.85	Sch. 10 SS	SS Vee-Wire	6.00	0.020	40.00	30.54	-	70.54	-20.41	-	-60.41	15.00	85.54
CGRW-17	2/10/2022	632260.34	671567.13	11.65	11.12	Sch. 10 SS	SS Vee-Wire	6.00	0.020	30.00	32.00	-	62.00	-20.35	-	-50.35	15.00	77.00
CGRW-18	2/15/2022	632227.16	671548.68	11.79	11.54	Sch. 10 SS	SS Vee-Wire	6.00	0.020	30.00	32.00	-	62.00	-20.21	-	-50.21	15.00	77.00
Parcel III																		
CGRW-06I	6/11/2009	631945.95	671273.58	9.38	9.19	Sch. 10 SS	SS Vee-Wire	6.00	0.020	30.00	31.56	-	61.56	-22.18	-	-52.18	5.00	66.56
CGRW-06D	7/9/2009	631952.12	671284.41	9.35	9.63	Sch. 10 SS	SS Vee-Wire	6.00	0.030	10.00	79.45	-	89.45	-70.10	-	-80.10	5.00	94.45
CGRW-19I	12/27/2021	632140.38	671472.64	9.89	9.19	Sch. 10 SS	SS Vee-Wire	6.00	0.020	40.00	34.29	-	74.29	-24.40	-	-64.40	15.00	89.29
CGRW-19D	12/21/2021	632136.11	671467.64	9.98	9.55	Sch. 10 SS	SS Vee-Wire	6.00	0.020	30.00	73.45	-	103.45	-63.47	-	-93.47	15.00	118.45
CGRW-20I	12/14/2021	632064.28	671391.12	9.90	9.30	Sch. 10 SS	SS Vee-Wire	6.00	0.020	30.00	43.00	-	73.00	-33.10	-	-63.10	15.00	88.00
CGRW-20D	12/10/2022	632060.61	671385.05	9.97	9.25	Sch. 10 SS	SS Vee-Wire	6.00	0.030	30.00	73.21	-	103.21	-63.24	-	-93.24	15.00	118.21
CGRW-21I	12/1/2021	632008.62	671308.14	9.19	9.73	Sch. 10 SS	SS Vee-Wire	6.00	0.020	30.00	41.42	-	71.42	-32.23	-	-62.23	15.00	86.42
CGRW-21D	12/2/2022	632004.49	671302.25	9.32	9.49	Sch. 10 SS	SS Vee-Wire	6.00	0.030	30.00	72.71	-	102.71	-63.39	-	-93.39	15.00	117.71
CGRW-22I	12/7/2022	631952.18	671227.89	8.86	9.45	Sch. 10 SS	SS Vee-Wire	6.00	0.020	40.00	30.67	-	70.67	-21.81	-	-61.81	15.00	85.67
CGRW-22D	11/29/2021	631948.96	671222.22	8.97	9.43	Sch. 10 SS	SS Vee-Wire	6.00	0.030	30.00	72.62	-	102.62	-63.65	-	-93.65	15.00	117.62

Table 1
Recovery Well Construction Summary
November 2022 Post-Remediation DNAPL Monitoring Status Report

National Grid
Former Citizens Gas Works Manufactured Gas Plant Site
Borough of Brooklyn, Kings County, New York
NYSDEC Site Nos. C224012 and C224012B

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. The horizontal locations, ground surface elevations, and measuring point elevations listed in this table reflect surveys conducted by Louis J. Weber & Associates, Inc. on November 11, 2019, March 1, 2022, March 31, 2022, and April 18, 2022. Screened intervals and well depths for pre-existing recovery wells CGRW-02, CGRW-03, CGRW-04, CGRW-06I, CGRW-06D, CGRW-203, and CGRW-206 have been adjusted based on the ground surface elevations recorded during those surveys.
4. bgs: below ground surface.
5. PVC: polyvinyl chloride.
6. Sch.: Schedule.
7. SS: stainless steel.

Table 2
Well Gauging and Product Recovery Summary for November 30, 2022
November 2022 Post-Remediation DNAPL Monitoring Status Report

National Grid
Former Citizens Gas Works Manufactured Gas Plant Site
Borough of Brooklyn, Kings County, New York
NYSDEC Site Nos. C224012 and C224012B

Well ID	Screened Interval (feet bmp)	Sump Length (feet)	Total Depth of Well (feet bmp)	November 30, 2022					Notes	November 2022		Total Estimated Volume of Fluids Recovered to Date (gallons)	
				Depth to Groundwater (feet bmp)	Depth to Product (feet bmp)	Depth to Bottom of Well (feet bmp)	Measured Product Thickness (feet)	Total Number of Recovery Events		Total Estimated Volume of Fluids Recovered (gallons)			
Parcel I													
CGMW-51I	33.69 - 43.69	2.00	45.69	10.19	43.19	43.88	0.69	--	--	--	2		
CGRW-02	29.95 - 44.95	5.00	49.95	15.74	47.61	50.08	2.47	--	--	--	38		
CGRW-08	49.77 - 79.77	15.00	94.77	26.89	85.90	93.70	7.80	--	1	20	52		
CGRW-09	49.79 - 79.79	15.00	94.79	26.82	90.96	96.45	5.49	--	1	29	57		
CGRW-10	43.73 - 73.73	15.00	88.73	20.87	86.02	88.41	2.39	--	1	6	33		
CGRW-12	38.69 - 68.69	15.00	83.69	16.82	84.58	84.86	0.28	--	--	--	2		
CGRW-203	39.44 - 59.44	2.00	61.44	25.91	ND	60.48	0.00	Trace product observed on probe.	--	--	25		
CGRW-206	44.76 - 64.76	2.00	66.76	15.22	ND	65.47	0.00	--	--	--	25		
Parcel I Subtotal									3	55	234		
Parcel II													
CGMW-57	10.54 - 20.54	2.00	22.54	10.61	23.61	23.80	0.19	--	--	--	6		
CGRW-03	21.72 - 51.72	5.00	56.72	8.64	52.00	56.63	4.63	--	2	14	174		
CGRW-04	26.94 - 66.94	5.00	71.94	NM	NM	NM	NM	Well inaccessible at time of gauging.	2	24	171		
CGRW-13	26.20 - 56.20	15.00	71.20	5.08	67.15	72.03	4.88	--	1	9	117		
CGRW-14	26.90 - 56.90	15.00	71.90	5.08	ND	72.65	0.00	Trace product observed on probe.	--	--	0		
CGRW-15	38.13 - 68.13	15.00	83.13	5.05	83.02	83.27	0.25	--	--	--	0		
CGRW-16	30.26 - 70.26	15.00	85.26	7.80	76.19	85.32	9.13	--	6	128	1,010		
CGRW-17	31.47 - 61.47	15.00	76.47	9.97	62.72	76.71	13.99	--	2	33	216		
CGRW-18	31.75 - 61.75	15.00	76.75	10.46	68.57	70.40	1.83	--	6	64	480		
Parcel II Subtotal									19	273	2,175		
Parcel III													
CGMW-34I	51.19 - 61.19	2.00	63.19	13.86	ND	63.52	0.00	--	--	--	6		
CGMW-42I	36.84 - 46.84	2.00	48.84	15.85	46.63	48.80	2.17	--	--	--	10		
CGMW-59	10.29 - 20.29	2.00	22.29	9.08	ND	23.21	0.00	--	--	--	3		
CGRW-06I	31.37 - 61.37	5.00	66.37	6.78	64.21	66.27	2.06	--	17	173	735		
CGRW-06D	79.73 - 89.73	5.00	94.73	6.82	82.57	94.12	11.55	--	18	397	1,367		
CGRW-19I	33.60 - 73.60	15.00	88.60	6.67	80.34	85.61	5.27	--	--	--	12		
CGRW-19D	73.02 - 103.02	15.00	118.02	6.88	106.68	115.60	8.92	--	7	91	731		
CGRW-20I	42.40 - 72.40	15.00	87.40	6.76	81.70	84.18	2.48	--	--	--	39		
CGRW-20D	72.49 - 102.49	15.00	117.49	6.72	100.36	116.52	16.16	--	--	--	224		
CGRW-21I	41.97 - 71.97	15.00	86.97	7.40	83.18	85.23	2.05	--	5	67	494		

Table 2
Well Gauging and Product Recovery Summary for November 30, 2022
November 2022 Post-Remediation DNAPL Monitoring Status Report

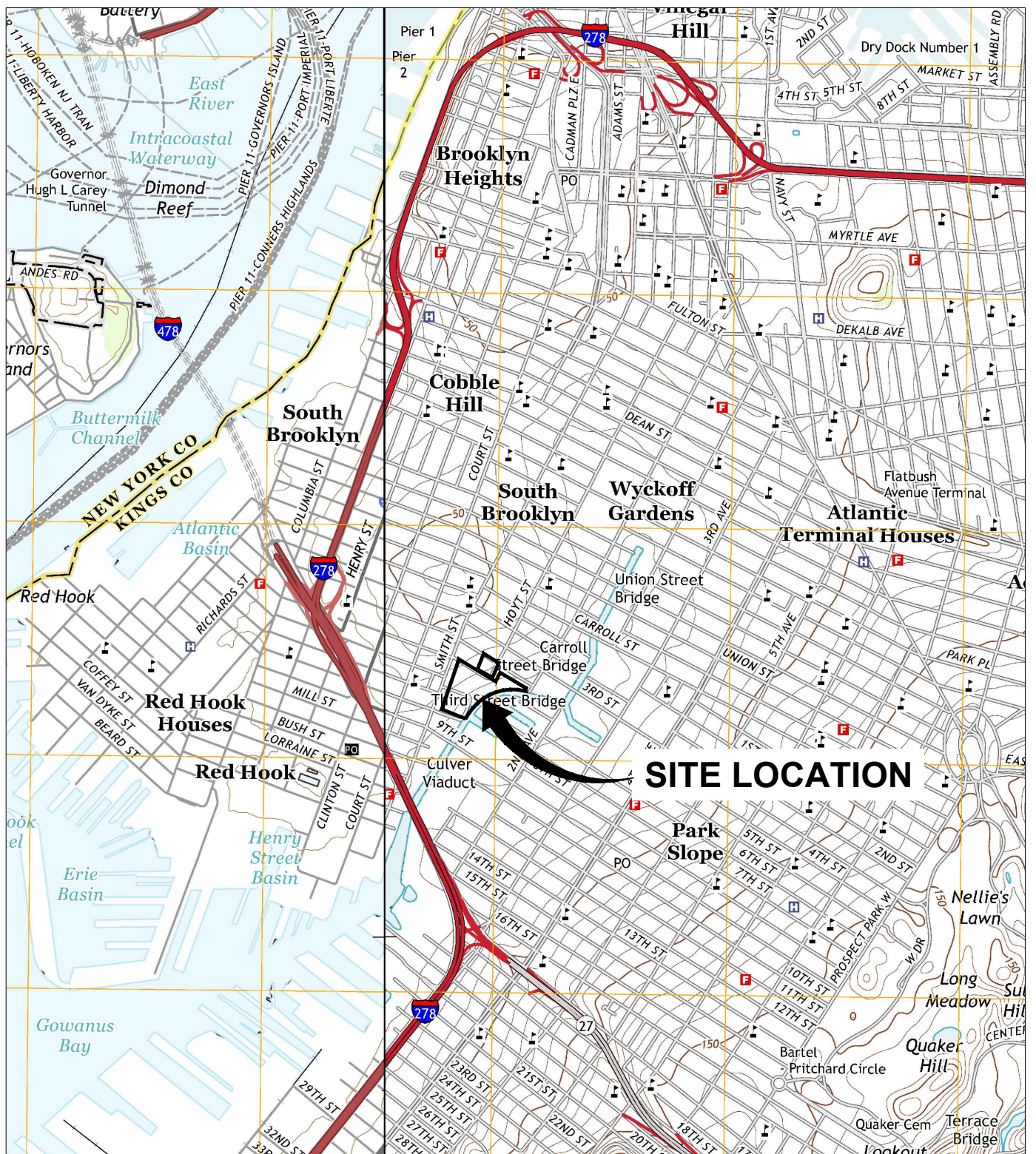
National Grid
Former Citizens Gas Works Manufactured Gas Plant Site
Borough of Brooklyn, Kings County, New York
NYSDEC Site Nos. C224012 and C224012B

Well ID	Screened Interval (feet bmp)	Sump Length (feet)	Total Depth of Well (feet bmp)	November 30, 2022					November 2022		Total Estimated Volume of Fluids Recovered to Date (gallons)
				Depth to Groundwater (feet bmp)	Depth to Product (feet bmp)	Depth to Bottom of Well (feet bmp)	Measured Product Thickness (feet)	Notes	Total Number of Recovery Events	Total Estimated Volume of Fluids Recovered (gallons)	
CGRW-21D	72.89 - 102.89	15.00	117.89	7.06	107.62	114.34	6.72	--	18	326	1,248
CGRW-22I	31.26 - 71.26	15.00	86.26	6.91	77.05	85.81	8.76	--	6	67	484
CGRW-22D	73.08 - 103.08	15.00	118.08	6.53	104.58	114.55	9.97	--	17	414	1,990
Parcel III Subtotal									88	1,535	7,342
SITE TOTAL									110	1,863	9,751

Notes:

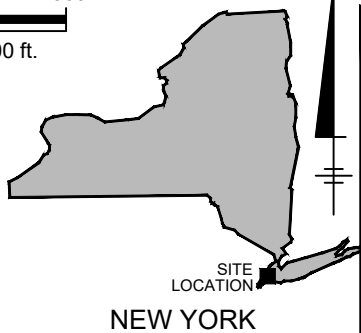
1. bmp: below measuring point.
2. ND: not detected.
3. NM: not measured.

Figures



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

Approximate Scale: 1 in. = 2000 ft.



NATIONAL GRID
FORMER CITIZENS GAS WORKS MANUFACTURED GAS PLANT SITE
BOROUGH OF BROOKLYN, KINGS COUNTY, NEW YORK
**NOVEMBER 2022 POST-REMEDiation DNAPL
MONITORING STATUS REPORT**

SITE LOCATION MAP



FIGURE

1



SITE PLAN

