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Date: September 6, 2022

Our Ref: 30004014.00002

Subject: August 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 August 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.

The periodic DNAPL monitoring and recovery program continued at the Site in August 2022. Table 2 summarizes the fluid level measurements collected on August 31, 2022 as well as the total estimated volume of fluids (DNAPL and groundwater) removed from the wells in August 2022. As indicated in Table 2, approximately 1,506 gallons of fluids in total were recovered during this period from monitoring well CGMW-51I (Parcel I) and recovery wells CGRW-02 (Parcel I), CGRW-03 (Parcel II), CGRW-04 (Parcel II), CGRW-06I (Parcel III), CGRW-06D (Parcel III), CGRW-08 (Parcel I), CGRW-09 (Parcel I), CGRW-12 (Parcel I), CGRW-13 (Parcel II), CGRW-16 through CGRW-18 (Parcel II), CGRW-19D (Parcel III), CGRW-20I (Parcel III), CGRW-20D (Parcel III), CGRW-21I (Parcel III), CGRW-21D (Parcel III), CGRW-22I (Parcel III), CGRW-22D (Parcel III), and CGRW-206 (Parcel I). Since post-remediation DNAPL recovery operations were initiated on February 10, 2022, a total of approximately 4,386 gallons of fluids have been recovered at the Site.

The August 2022 field activities also included the following:

- Installation of additional dedicated pneumatic pumps (AutoPump AP4+ by QED Environmental Systems, Inc.) in recovery wells CGRW-18 (Parcel II), CGRW-20D (Parcel III), CGRW-21I (Parcel III), CGRW-21D (Parcel III), and CGRW-22I (Parcel III);
- Performance of bail-down tests at recovery wells CGRW-20D (Parcel III), CGRW-21I (Parcel III), CGRW-21D (Parcel III), and CGRW-22I (Parcel III); and
- Collection of DNAPL and groundwater samples from recovery wells CGRW-03 (Parcel II), CGRW-04 (Parcel II), CGRW-06I (Parcel III), CGRW-06D (Parcel III), CGRW-13 (Parcel II), CGRW-16 through CGRW-18

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(Parcel II), CGRW-19D (Parcel III), CGRW-21I (Parcel III), CGRW-21D (Parcel III), CGRW-22I (Parcel III), and CGRW-22D (Parcel III) for density, viscosity, and interfacial tension testing in accordance with ASTM D1481, ASTM D445, and ASTM D971, respectively.

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

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

Sincerely,
Arcadis of New York, Inc.



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Principal Environmental Engineer

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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 August 31, 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
August 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
August 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 August 31, 2022
August 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)	August 31, 2022						August 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)			
Parcel I													
CGMW-51I	33.69 - 43.69	2.00	45.69	9.88	ND	45.68	0.00	Trace product observed on probe.	1	1	1		
CGRW-02	29.95 - 44.95	5.00	49.95	15.50	ND	50.78	0.00	Trace product observed on probe.	1	4	16		
CGRW-08	49.77 - 79.77	15.00	94.77	26.77	87.49	92.19	4.70	--	1	6	18		
CGRW-09	49.79 - 79.79	15.00	94.79	26.73	ND	96.27	0.00	Trace product observed on probe.	1	3	26		
CGRW-10	43.73 - 73.73	15.00	88.73	20.84	ND	89.59	0.00	Trace product observed on probe.	--	--	22		
CGRW-12	38.69 - 68.69	15.00	83.69	16.58	ND	87.05	0.00	--	1	2	2		
CGRW-203	39.44 - 59.44	2.00	61.44	25.76	ND	61.66	0.00	--	--	--	22		
CGRW-206	44.76 - 64.76	2.00	66.76	15.01	ND	67.35	0.00	--	1	4	15		
Parcel I Subtotal										19	120		
Parcel II													
CGRW-03	21.72 - 51.72	5.00	56.72	7.27	52.94	54.42	1.48	--	2	24	139		
CGRW-04	26.94 - 66.94	5.00	71.94	8.46	67.57	69.20	1.63	--	2	18	127		
CGRW-13	26.20 - 56.20	15.00	71.20	4.60	68.23	72.19	3.96	--	1	7	87		
CGRW-14	26.90 - 56.90	15.00	71.90	4.45	ND	72.46	0.00	--	--	--	0		
CGRW-15	38.13 - 68.13	15.00	83.13	4.52	ND	83.02	0.00	Trace product observed on probe.	--	--	0		
CGRW-16	30.26 - 70.26	15.00	85.26	7.14	75.56	83.48	7.92	--	7	170	640		
CGRW-17	31.47 - 61.47	15.00	76.47	8.42	67.83	73.80	5.97	--	2	34	124		
CGRW-18	31.75 - 61.75	15.00	76.75	8.87	64.51	72.40	7.89	--	4	56	315		
Parcel II Subtotal										310	1,432		
Parcel III													
CGMW-42I	36.84 - 46.84	2.00	48.84	15.64	48.40	48.76	0.36	--	--	--	5		
CGRW-06I	31.37 - 61.37	5.00	66.37	7.51	59.73	66.61	6.88	--	8	134	275		
CGRW-06D	79.73 - 89.73	5.00	94.73	7.42	82.66	92.35	9.69	--	8	179	366		
CGRW-19I	33.60 - 73.60	15.00	88.60	6.41	ND	87.47	0.00	--	--	--	0		
CGRW-19D	73.02 - 103.02	15.00	118.02	6.71	ND	113.16	0.00	--	7	104	487		
CGRW-20I	42.40 - 72.40	15.00	87.40	6.72	82.50	86.90	4.40	--	2	4	33		
CGRW-20D	72.49 - 102.49	15.00	117.49	6.58	ND	108.86	0.00	--	5	101	190		
CGRW-21I	41.97 - 71.97	15.00	86.97	7.30	78.16	88.92	10.76	--	7	106	255		
CGRW-21D	72.89 - 102.89	15.00	117.89	7.16	95.45	118.64	23.19	--	6	201	353		
CGRW-22I	31.26 - 71.26	15.00	86.26	7.41	73.14	87.94	14.80	--	6	87	200		
CGRW-22D	73.08 - 103.08	15.00	118.08	6.99	89.04	118.06	29.02	--	6	262	671		
Parcel III Subtotal										1,177	2,834		
SITE TOTAL										1,506	4,386		

Table 2

**Well Gauging and Product Recovery Summary for August 31, 2022
August 2022 Post-Remediation DNAPL Monitoring Status Report**

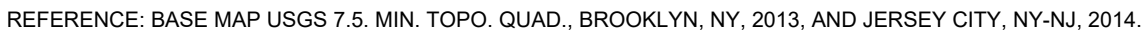
National Grid

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

Notes:

1. bmp: below measuring point.
2. ND: not detected.

Figures



100 ft.

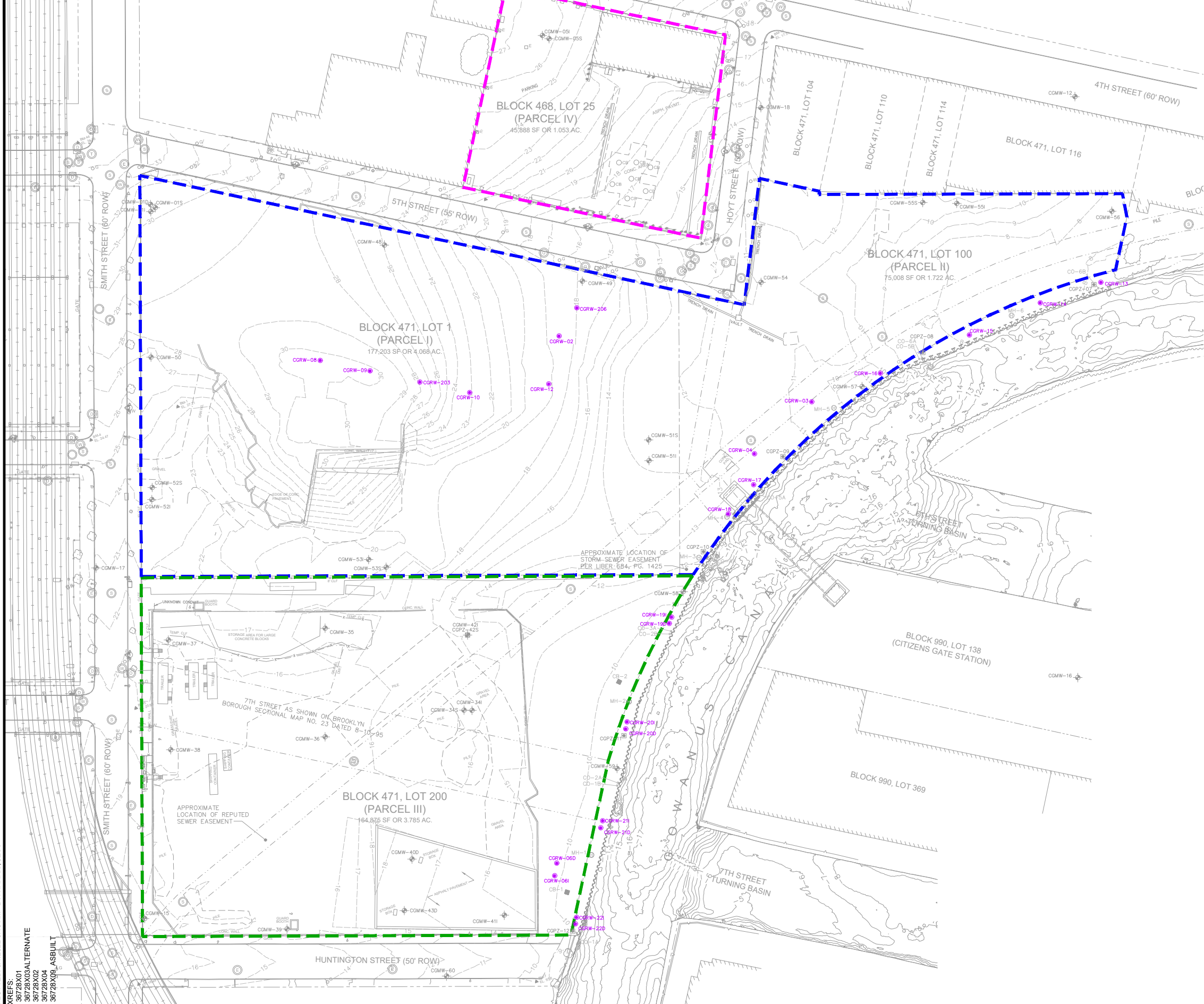
SITE LOCATION

NEW YORK

SITE LOCATION MAP



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)
 - PROPERTY LINE (APPROXIMATE)
 - EASEMENT LINE (APPROXIMATE)
 - TOPOGRAPHIC CONTOUR (1-FOOT INTERVAL)
 - BATHYMETRIC CONTOUR (1-FOOT INTERVAL)
 - EDGE OF WATER
 - * TREE
 - EDGE OF VEGETATION
 - EDGE OF PAVEMENT/CONCRETE
 - EDGE OF GRAVEL
 - EDGE OF SOIL/AGGREGATE PILE (APPROXIMATE)
 - EDGE OF BULKHEAD
 - CHAIN-LINK FENCE
 - BUILDING
 - MTA RAILROAD TRACK
 - CONCRETE WALL
 - BOLLARD
 - SIGN
 - UTILITY POLE
 - HYDRANT
 - SANITARY SEWER MANHOLE
 - STORM SEWER MANHOLE
 - WATER MANHOLE
 - GAS MANHOLE
 - TELECOMMUNICATIONS MANHOLE
 - ELECTRICAL MANHOLE
 - MANHOLE (TYPE UNKNOWN)
 - CATCH BASIN
 - ELECTRICAL BOX
 - WATER VALVE
 - GAS VALVE
 - HYDRAULIC RELIEF SYSTEM MANHOLE
 - HYDRAULIC RELIEF SYSTEM CLEANOUT
 - SEALED BULKHEAD BARRIER WALL
 - PIEZOMETER
 - MONITORING WELL
 - RECOVERY WELL

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

SITE PLAN

