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Subject:
2018 Groundwater Sampling & Soil Cover Inspection Report
Waterville Former MGP Site
Waterville, New York

ENVIRONMENT

Dear Mr. Omorogbe:

On behalf of NYSEG, Arcadis is pleased to present this annual report summarizing the results of groundwater sampling and soil cover inspection activities conducted in 2018 at the Waterville manufactured gas plant (MGP) site. Relevant background information is provided below, followed by a discussion of the 2018 results and recommendations for the site.

Date:
October 18, 2018

Contact:
David Cornell

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315 671 9379

Email:
David.Cornell@arcadis.com

Our ref:
B0013053 #5

BACKGROUND

As required by the New York State Department of Environmental Conservation's (NYSDEC's) Record of Decision (ROD) issued in March 2002, NYSEG administered a 5-year post-IRM groundwater and soil cover monitoring program at the Waterville, New York MGP site. The groundwater monitoring program included sampling eight monitoring wells for BTEX (benzene, toluene, ethylbenzene, and xylenes) and PAHs (polycyclic aromatic hydrocarbons). An evaluation of the results of this monitoring program was submitted to the NYSDEC on May 8, 2007. Based on the NYSDEC's comments on this evaluation, NYSEG agreed (in a letter dated January 4, 2008) to revise the scope of the monitoring to sampling just one well (MW98-7D) and continue with the soil cover inspections annually for an additional 5 years (until 2012). Based on the results of the supplemental 5-year groundwater monitoring program completed in 2012 and discussions with the NYSDEC, NYSEG agreed to continue sampling groundwater from MW98-7D and conduct the soil cover inspections on an annual basis for an unspecified duration.

2017 GROUNDWATER SAMPLING EVENT

Arcadis sampled groundwater from monitoring well MW98-7D on June 26, 2018. The location of the well and other pertinent site features can be found on Figure 1. Consistent with the sampling events completed since 2004, the sampling from

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MW98-7D was conducted using low-flow purging techniques. The low-flow method consists of slowly purging water from the well at a rate of approximately 100 to 200 milliliters per minute until readings of the following field parameters stabilized: pH, dissolved oxygen, oxidation-reduction potential (ORP), turbidity and conductivity. The table below presents the values for these field parameters at the time of sampling:

Well ID	pH (S.U.) ¹	Temperature (°C) ²	Conductivity (mS/cm) ³	Dissolved Oxygen (mg/L) ⁴	ORP (mV) ⁵	Turbidity (NTU) ⁶
MW98-7D	7.26	11.52	0.459	0.27	-43.5	0.28

Notes:

- ¹ S.U. = Standard Units.
- ² °C = degrees Celsius.
- ³ mS/cm = milliSiemens per centimeter.
- ⁴ mg/L = milligrams per liter.
- ⁵ mV = millivolts.
- ⁶ NTU = Nephelometric Turbidity Units.

No problems arose during the sampling event. The collected sample was analyzed for BTEX and PAHs by TestAmerica of Amherst, New York. The groundwater sampling log is included as Attachment 1 and the historical analytical results for MW98-7D are summarized in Table 1 in comparison to NYSDEC Class GA Standards and Guidance Values¹.

Consistent with previous sampling events, groundwater sampled from MW98-7D exceeded the NYSDEC Class GA Standards for all of the BTEX compounds. Also consistent with previous events, several PAHs continue to be detected in the sample collected from well MW98-7D. While trace amounts of individual PAHs continue to be detected, only acenaphthene and naphthalene were detected at a concentration above the NYSDEC Class GA Guidance Value for these compounds. The levels for both BTEX and PAHs were generally within the range of concentrations detected during the previous sampling rounds.

2017 RECONNAISSANCE OF SOIL COVER AREA

On June 26, 2018, Arcadis also performed the annual reconnaissance of the soil cover portion of the site, as required by the site's ROD. Findings of the reconnaissance were generally consistent with those found during previous years. Please refer to the attached photographic log for pictures of relevant features of the soil cover. Likely due to the lack of rain leading up to the inspection event, the soft wet soil typically observed in the southwest corner of the property, just north of well pair MW98-7S/7D, was not observed during the 2018 event. Similarly, no obvious tire ruts from mowing were observed in this area as seen in the past. Not observed during previous inspection events, a new raised-bed vegetable garden is now present at 139 Babbott Avenue as seen in Photo #1. The garden is located off the southwest corner of the residence garage/barn and east of monitoring well CW91-6. Based on its proximity to surrounding site features, the garden appears to be located within or straddling the southeast corner of the soil cover footprint, as depicted on Figure 1. As reported in the 2014 inspection report, the above-ground pool

¹ The NYSDEC Class GA Guidance Values are published in the NYSDEC Division of Water Technical and Operational Guidance Series (1.1.1) Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations; reissued June 1998 and revised in April 2000 and June 2004.

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installed at the 139 Babbott Avenue property and small raised-bed vegetable garden at 145 Babbott Avenue are still present (Photo #2). No additional disturbances were observed during the 2018 inspection and the soil cover appeared in good condition (Photos #3 &4).

SUMMARY

The 2018 PAH analytical results for the groundwater sample collected from MW98-7D are lower than the 2017 results but are generally within the range of concentrations historically detected at this well. Only acenaphthene and naphthalene were found to exceed Class GA Guidance Values for these compounds. BTEX concentrations also decreased in 2018 compared to analytical results from 2017, but remained within the range of historical BTEX concentrations observed in groundwater from this well. Analytical data from the 2019 BTEX and PAH results will be evaluated to determine if any concentration trends become apparent.

Aside from the disturbances caused by the installation of the above-ground pool and raised garden in 2014, as well as the new raised-bed vegetable garden installed sometime between June 2017 and June 2018, the soil cover appeared to be in good condition with no obvious damage.

The next groundwater sampling and soil cover inspection event is scheduled for the summer of 2019. If you have any questions, please feel free to contact John Ruspantini of NYSEG at 585.484.6787 or me at 315.671.9379.

Sincerely,

Arcadis of New York, Inc.



David A. Cornell
Senior Geologist

Copies:

John J. Ruspantini, CHMM, NYSEG
Keith A. White, C.P.G., Arcadis

Enclosures:

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- 1 Summary of Groundwater Sampling Results in Comparison to NYSDEC Class GA Standards and Guidance Values

Figure

- 1 Site Map

Attachments

- 1 Groundwater Sampling Log
- 2 Chain of Custody Record
- 3 Soil Cover Inspection Photograph Log

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TABLE



Table 1
Summary of Groundwater Sampling Results in Comparison to NYSDEC Class GA Standards and Guidance Values

2018 Groundwater Sampling and Soil Cover Inspection Report
Waterville Former MGP Site
Waterville, New York

Location ID: Date Collected:	NYSDEC TOGS 1.1.1 Water Guidance Values	Units	MW98-7D 05/10/05	MW98-7D 11/10/05	MW98-7D 05/10/06	MW98-7D 11/07/06	MW98-7D 05/01/08	MW98-7D 05/28/09	MW98-7D 06/03/11
Detected Volatile Organics									
Benzene	1	ug/L	160 [150]	90	140 [140]	110 [94]	140 D [120 D]	110 D08 [120 D08]	57 [170]
Ethylbenzene	5	ug/L	110 [110]	84	97 [93]	85 [66 J]	86 [81]	90 M7 [91]	36 [150]
m&p-Xylene	--	ug/L	NA	NA	NA	NA	38 [36]	39 [40]	20 [62]
o-Xylene	--	ug/L	NA	NA	NA	NA	52 [50]	52 M7 [53]	26 [77]
Toluene	5	ug/L	26 [28]	20 J	27 [26]	18 [16 J]	26 [24]	22 [23]	9 [34]
Xylenes (total)	5	ug/L	110 [110]	81	95 [91]	90 [64 J]	NA	92 M7 [93]	46 [140]
Total BTEX	--	ug/L	406 [398]	275 J	359 [350]	303 [240 J]	342 [311]	314 [327]	148 [494]
Detected Semivolatile Organics									
2-Methylnaphthalene	--	ug/L	110 [120]	140 [140]	130 [52]	100 J [82 J]	110 [97]	110 M7 [140 D08]	NA
Acenaphthene	20	ug/L	110 [110]	140 [140]	96 J [92]	140 [110]	120 [120]	120 D08 [140 D08]	130 [160]
Acenaphthylene	--	ug/L	23 J [22 J]	24 J [23 J]	19 J [14 J]	19 J [15 J]	22 [22]	19 [25]	21 J [24 J]
Anthracene	50	ug/L	7 J [7.2 J]	11 J [11 J]	44 J [5.2 J]	8.7 J [7.6 J]	8 [9]	7.8 [9.6]	8.5 J [9.6 J]
Dibenzofuran	--	ug/L	NA	NA	NA	NA	2 J [2 J]	2.3 [2.9]	NA
Fluoranthene	50	ug/L	2.6 J [2.3 J]	100 U [100 U]	100 U [21 U]	3.5 J [3 J]	3 J [3 J]	2.6 [3.2]	48 U [48 U]
Fluorene	50	ug/L	13 J [13 J]	100 U [17 J]	57 J [28]	14 J [12 J]	16 [15]	19 [24]	20 J [22 J]
Indeno(1,2,3-cd)pyrene	0.002	ug/L	5.3 U [5.3 U]	10 U [10 U]	10 U [2.1 U]	11 U [10 U]	5 U [5 U]	0.48 UM8 [0.48 U]	48 U [48 U]
Naphthalene	10	ug/L	970 [1,000]	1,200 [1,100]	910 [360]	1,300 [930]	1,100 D [980 D]	850 D08 [1,100 D08]	780 [1,000]
Phenanthrene	50	ug/L	44 J [42 J]	54 J [51 J]	75 J [39]	51 J [44 J]	46 [45]	44 [56]	59 [69]
Pyrene	50	ug/L	2.9 J [3.4 J]	100 U [100 U]	100 U [21 U]	4.1 J [3.1 J]	4 J [4 J]	3 [3.7]	3.3 J [3.7 J]
Total PAHs	--	ug/L	1,280 J [1,320 J]	1,570 J [1,480 J]	1,330 J [590 J]	1,640 J [1,210 J]	1,430 J [1,300 J]	1,180 [1,500]	1,020 J [1,290 J]
Detected Inorganics									
Iron	300	ug/L	859	1,200	1,180	1,130	NA	NA	NA
Manganese	300	ug/L	1,130	1,390	1,380	1,220	NA	NA	NA
Nitrate	--	ug/L	100 U	100 U	110	100 U	NA	NA	NA
Sulfate	250,000	ug/L	5,000 U	5,000 U	5,000 U	5,000 U	NA	NA	NA
Total Organic Carbon	--	ug/L	1,700	1,800	2,100	1,700	NA	NA	NA

See Notes on Page 2.

Table 1
Summary of Groundwater Sampling Results in Comparison to NYSDEC Class GA Standards and Guidance Values

2018 Groundwater Sampling and Soil Cover Inspection Report
Waterville Former MGP Site
Waterville, New York

Location ID: Date Collected:	NYSDEC TOGS 1.1.1 Water Guidance Values	Units	MW98-7D 06/14/12	MW98-7D 06/28/13	MW98-7D 06/20/14	MW98-7D 07/09/15	MW98-7D 07/20/16	MW98-7D 06/15/17	MW98-7D 06/26/18
Detected Volatile Organics									
Benzene	1	ug/L	90 J	8.9	17	68	39 J	130 DJ	48 [49]
Ethylbenzene	5	ug/L	97 J	6.3	11	66	48 J	110 DJ	47 [47]
m&p-Xylene	--	ug/L	39	3.3	6.9	31	22	48 J	21 [21]
o-Xylene	--	ug/L	54 J	4.2	10	43	30 J	62 J	29 [28]
Toluene	5	ug/L	18	2.2	3.3	15	9.7	37 J	11 [11]
Xylenes (total)	5	ug/L	93 J	7.5	17	74	52 J	110 J	50 [49]
Total BTEX	--	ug/L	298 J	24.9	48.3	223	149 J	387 J	156 [156]
Detected Semivolatile Organics									
2-Methylnaphthalene	--	ug/L	NA						
Acenaphthene	20	ug/L	86 J	120 D	61	35 J	100 EJ	150 EJ	88 DJ [62]
Acenaphthylene	--	ug/L	12 J	20	5.6	0.66 J	18	27	18 [13]
Anthracene	50	ug/L	6.3 J	7.7	4.2	4.9 J	7.8	9.1	6.9 [4.9 J]
Dibenzofuran	--	ug/L	NA						
Fluoranthene	50	ug/L	49 U	2.7 J	1.7 J	1.7 J	2.6 J	3.1 J	2.4 J [1.7 J]
Fluorene	50	ug/L	15 J	18	8.5	9.7	14	15	9.4 [7.2]
Indeno(1,2,3-cd)pyrene	0.002	ug/L	49 U	4.7 UJ	1.9 U	5.2 UJ	4.8 U	5 U	5 U [5 U]
Naphthalene	10	ug/L	600	990 D	1.9 U	0.86 J	640 D	910 D	440 D [370 D]
Phenanthrene	50	ug/L	37 J	49	23	24	45	58 J	39 J [29]
Pyrene	50	ug/L	49 U	3.4 J	2.2	2 J	2.8 J	4 J	2.7 J [2 J]
Total PAHs	--	ug/L	756 J	1,210 J	106 J	78.8 J	830 J	1,180 J	606 J [490 J]
Detected Inorganics									
Iron	300	ug/L	NA						
Manganese	300	ug/L	NA						
Nitrate	--	ug/L	NA						
Sulfate	250,000	ug/L	NA						
Total Organic Carbon	--	ug/L	NA						

Notes:

D = Compound quantitated using a secondary dilution.

E = Analyte exceeded calibration range.

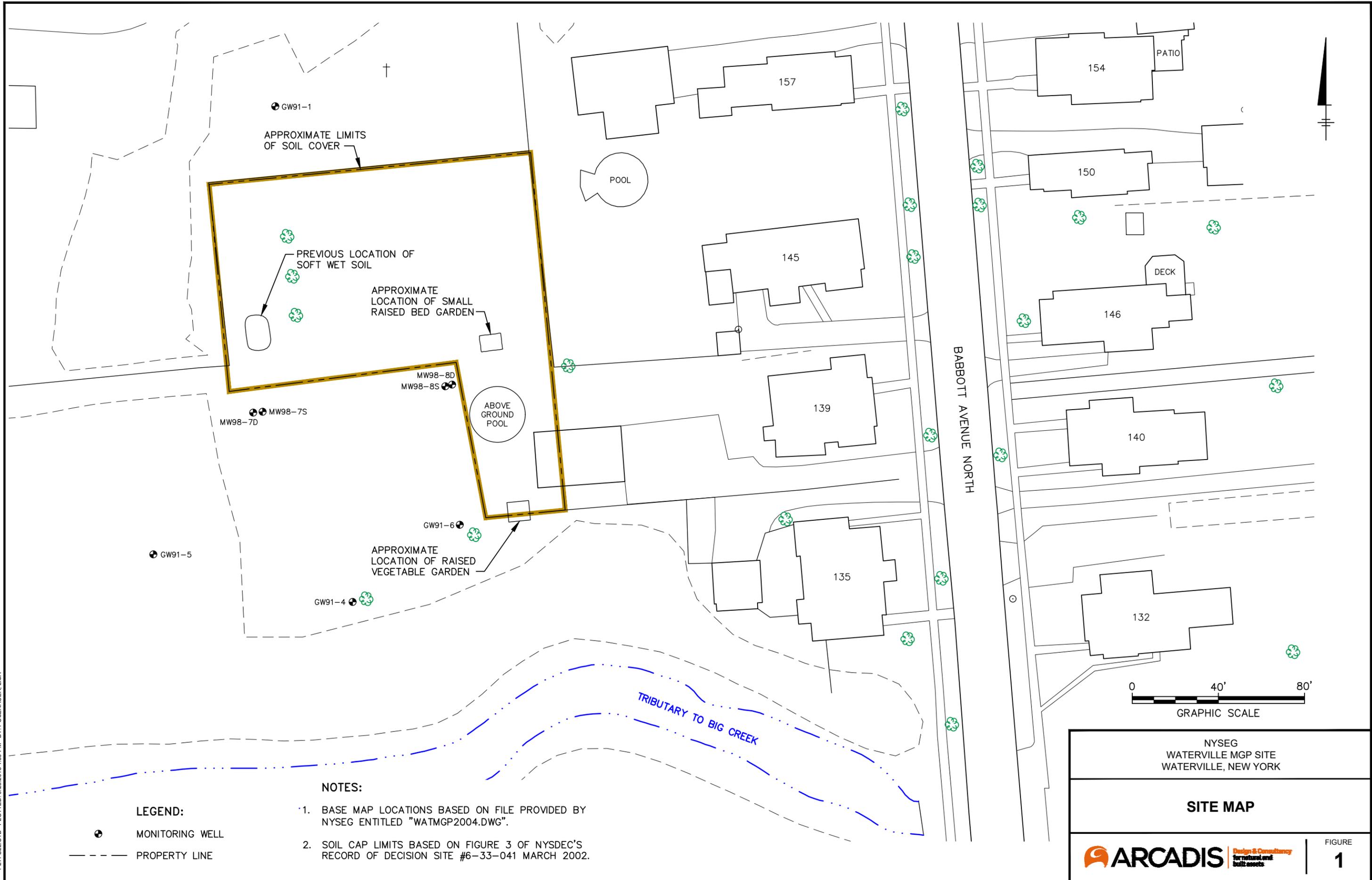
J = Indicates an estimated value.

ND = None detected.

U = The compound was analyzed for but not detected. The associated value is the compound quantitation limit.

FIGURE



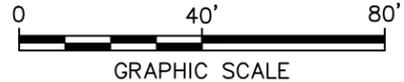


NOTES:

1. BASE MAP LOCATIONS BASED ON FILE PROVIDED BY NYSEG ENTITLED "WATMGP2004.DWG".
2. SOIL CAP LIMITS BASED ON FIGURE 3 OF NYSDEC'S RECORD OF DECISION SITE #6-33-041 MARCH 2002.

LEGEND:

- MONITORING WELL
- - - PROPERTY LINE



NYSEG WATERVILLE MGP SITE WATERVILLE, NEW YORK	
SITE MAP	
ARCADIS Design & Consultancy for natural and built assets 	FIGURE 1

ATTACHMENT 1

Groundwater Sampling Log



GROUNDWATER SAMPLING LOG

Sampling Personnel: Levia G Terrell/Josh Sinay

Well ID: MW98-7D

Client / Job Number: NYSEG Waterville

Date: 6-26-18

Weather: SUNNY

Time In: 9:50

Time Out:

Well Information

Depth to Water:	(feet)	6.85	(from MP)
Total Depth:	(feet)	18.47	(from MP)
Length of Water Column:	(feet)	11.62	
Volume of Water in Well:	(gal)	1.90	

Well Type:	Flushmount	Stick-Up
Well Material:	Stainless Steel	PVC
Well Locked:	Yes	No
Measuring Point Marked:	Yes	No
Well Diameter:	1" 2"	Other:

Purging Information

Purging Method:	Bailer	Peristaltic	Grundfos	Other:
Tubing/Bailer Material:	St. Steel	Polyethylene	Teflon	Other:
Sampling Method:	Bailer	Peristaltic	Grundfos	Other:
Duration of Pumping:	(min)	60		
Average Pumping Rate:	(ml/min)	150	Water-Quality Meter Type:	YSI/Lamotte 2020
Total Volume Removed:	(gal)	~3.0	Did well go dry:	Yes No

gal / ft. of water	1" ID	2" ID	4" ID	6" ID
	0.041	0.163	0.653	1.469
1 gal = 3.785 L = 3785 ml = 0.1337 cubic feet				

pH	DO	Cond.	ORP
± 0.1	± 10%	± 3.0%	± 10 mV

Parameter:	1	2	3	4	5	6	7	8	9	10	11	12	13
Volume Purged (gal)	955	1000	1005	1010	1015	1020	1025	1030	1035	1040	1045	1050	1055
Rate (mL/min)	150	150	150	150	150	150	160	150	150	150	150	150	A
Depth to Water (ft.)	6.97	7.03	7.14	7.25	7.36	7.45	7.56	7.65	7.74	7.82	7.90	7.99	M
pH	7.14	7.14	7.16	7.19	7.19	7.20	7.23	7.23	7.24	7.24	7.25	7.26	P
Temp. (C)	11.68	11.61	11.53	11.53	11.52	11.57	11.55	11.51	11.50	11.49	11.50	11.52	L
Conductivity (mS/cm)	0.326	0.334	0.346	0.358	0.370	0.383	0.398	0.412	0.429	0.447	0.452	0.459	E
Dissolved Oxygen (mg/L)	6.59	3.76	2.91	2.64	2.51	1.71	1.01	0.94	0.68	0.27	0.26	0.27	
ORP (mV)	50.7	37.6	19.8	6.59	0.11	-0.91	-2.68	-26.8	-37.6	-41.6	-38.6	-43.5	
Turbidity (NTU)	7.68	6.14	5.79	4.61	4.75	3.46	1.91	1.68	0.99	0.29	0.37	0.28	
Notes:													

Sampling Information

Analyses	#	Laboratory
BTEX	3	TestAmerica Buffalo
PAHs	2	TestAmerica Buffalo
Sample ID:		Sample Time: 1055
MS/MSD:	Yes	No
Duplicate:	Yes	No
Duplicate ID		Dup. Time:
Chain of Custody Signed By:		

Problems / Observations

950 CLEAR, COLORLESS, MID COAL TAR-LIKE ODPN

FINAL SIMILAR TO INITIAL

ATTACHMENT 2

Chain of Custody Record



ATTACHMENT 3

Soil Cover Inspection Photograph Log



SOIL COVER INSPECTION PHOTOGRAPH LOG

CLIENT: NYSEG	SITE NAME: Waterville Former MGP Site
PROJECT#: B0013053.0006	SITE LOCATION: Waterville, New York
PHOTOGRAPH #: 1	
PHOTOGRAPHER: LGT	
DATE: 06/26/18	
DIRECTION: North	
COMMENT: Location of new raised bed vegetable garden at 139 Babbott Avenue.	

CLIENT: NYSEG	SITE NAME: Waterville Former MGP Site
PROJECT#: B0013053.0006	SITE LOCATION: Waterville, New York
PHOTOGRAPH #: 2	
PHOTOGRAPHER: LGT	
DATE: 06/26/18	
DIRECTION: East	
COMMENT: Small raised bed garden at 145 Babbott Avenue and above ground swimming pool behind 139 Babbott Avenue.	

SOIL COVER INSPECTION PHOTOGRAPH LOG

CLIENT: NYSEG	SITE NAME: Waterville Former MGP Site
PROJECT#: B0013053.0006	SITE LOCATION: Waterville, New York
PHOTOGRAPH #: 3	
PHOTOGRAPHER: LGT	
DATE: 06/26/18	
DIRECTION: West	
COMMENT: View of the soil cover looking west along the cemetery fence line behind 145 Babbott Avenue.	

CLIENT: NYSEG	SITE NAME: Waterville Former MGP Site
PROJECT#: B0013053.0006	SITE LOCATION: Waterville, New York
PHOTOGRAPH #: 4	
PHOTOGRAPHER: LGT	
DATE: 06/26/18	
DIRECTION: Northwest	
COMMENT: View of the soil cover looking northwest from behind 139 Babbott Avenue.	