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ENVIRONMENT

Subject:
Results of Third Quarter 2020 System Operation and Monitoring, Bethpage Park Groundwater Containment System (BPGWCS), Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York, NYSDEC Site #1-30-003A.

Date:
November 24, 2020

Contact:
Christopher Engler

Phone:
315.409.6579

Email:
christopher.engler@arcadis.com

Our ref:
30059266

Dear Jason:

Enclosed is one electronic PDF copy of the Third Quarter 2020 Report for the BPGWCS operation and monitoring, performed in accordance with the NYSDEC-approved OU3 Groundwater IRM OM&M Manual (Arcadis 2009) and the NYSDEC-approved Sampling and Analysis Plan (SAP; Arcadis 2009). As we have transitioned to electronic submittals (via PDF) in line with NYSDEC's paper reduction program, hard copies of the report can be provided on request.

If you have any questions, please do not hesitate to contact me.

Sincerely,

Arcadis of New York, Inc.

Christopher Engler, PE
New York PE-069748

Vice President

Enclosure

Copies:
Edward Hannon, Northrop Grumman Corporation
Donald Hesler, NYSDEC
Jim Sullivan, NYS Dept. of Health
Donald Irwin, Nassau County Dept. of Health
Robin Putnam, Nassau County Dept. of Health
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Carlo San Giovanni, Arcadis
Nidal Azzam, USEPA
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Table 1
Operational Summary
Bethpage Park Groundwater Containment System
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman,
Bethpage, New York

ARCADIS Design & Consultancy for natural and built assets

MONTH	DAY																													Days Operational [1]
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
2009 Total																																160
2010 Total																																352
2011 Total																																351
2012 Total																																353
2013 Total																																354
2014 Total																																349
2015 Total																																348
2016 Total																																351
2017 Total																																354
2018 Total																																348
2019 Total																																355
Jul 2020					(2)	(2)																					(3)					28
Aug 2020	(4)	(4)			(5)	(5)			(6)	(6)	(7)	(8)	(7)																			24
Sept 2020																																30
3Q 2020																																82
2020 Total																																255
TOTAL																																**3930**

Legend:

Indicates system online the majority or all of the day.
Indicates system operated with reduced flow rates.
Indicates system off-line the majority or all of the day.

Notes, Abbreviations, and Units on last page.

Table 1
Operational Summary
Bethpage Park Groundwater Containment System
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman,
Bethpage, New York

Notes:

1. Days the system was operational for the majority of the day are counted as one day.

Third Quarter 2020

2. System shutdown due to transformer failure.
3. System shutdown for Air Stripper Chemical cleaning.
4. Planned system shutdown required during the setup of the discharge connection line from the ISTR system into the combined influent to the Air Stripper.
5. Shutdown due to power outage from Tropical Storm Isaias.
6. System shutdown periodically due to system troubleshooting.
7. System operated at reduced flow due to RW-2 troubleshooting.
8. System down due to transformer replacement.

Abbreviations/Units:

3Q	Third Quarter

Table 2
Summary of Influent Water Sample Analytical Results
Bethpage Park Groundwater Containment System
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman,
Bethpage, New York

Compound	11/05/19 (µg/L)	02/06/20 (µg/L)	05/14/20 (µg/L)	07/08/20 (µg/L)
Project VOCs				
1,1,1 - Trichloroethane	< 1.0	< 1.0	< 1.0	< 1.0
1,1 - Dichloroethane	< 1.0	< 1.0	< 1.0	< 1.0
1,2 - Dichloroethane	< 1.0	< 1.0	< 1.0	< 1.0
1,1 - Dichloroethene	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene	**3.6**	**3.9**	**4.5**	**3.7**
Vinyl Chloride	**1.3**	**3.1**	**4.1**	**4.5**
cis 1,2-Dichloroethene	**6.0**	**10.0**	**9.8**	**9.2**
trans 1,2-Dichloroethene	< 1.0	< 1.0	< 1.0	< 1.0
Benzene	< 0.50	< 0.50	< 0.50	< 0.50
Toluene	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	< 1.0	< 1.0	< 1.0	< 1.0
m,p-Xylene	< 1.0	< 1.0	< 1.0	< 1.0
Subtotal Project VOCs	**10.9**	**17.0**	**18.4**	**17.4**
Non-Project VOCs				
1,1,2,2-Tetrachloroethane	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	< 1.0	< 1.0	< 1.0	< 1.0
2-Butanone	< 10	< 10	< 10	< 10
4-Methyl-2-Pentanone	< 5.0	< 5.0	< 5.0	< 5.0
Acetone	< 10	< 10	< 10	< 10
Bromodichloromethane	< 1.0	< 1.0	< 1.0	< 1.0
Bromoform	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Disulfide	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Tetrachloride	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	< 1.0	< 1.0	< 1.0	< 1.0
Chlorodibromomethane	< 1.0	< 1.0	< 1.0	< 1.0
Chlorodifluoromethane (Freon 22)	< 5.0	< 5.0	< 5.0	< 5.0
Chloroethane	< 1.0	< 1.0	< 1.0	< 1.0
Chloroform	< 1.0	**0.56**	**0.57**	< 1.0
Chloromethane	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,3-Dichloropropene	< 1.0	< 1.0	< 1.0	< 1.0

Notes, Abbreviations, Qualifiers, and Units on last page.

Table 2
Summary of Influent Water Sample Analytical Results
Bethpage Park Groundwater Containment System
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman,
Bethpage, New York

Compound	11/05/19 (µg/L)	02/06/20 (µg/L)	05/14/20 (µg/L)	07/08/20 (µg/L)
Non-Project VOCs				
Dichlorodifluoromethane (Freon 12)	< 2.0	< 2.0	< 2.0	< 2.0
Dichloromethane	< 2.0	< 2.0	< 2.0	< 2.0
Ethylbenzene	< 1.0	< 1.0	< 1.0	< 1.0
Methyl N-Butyl Ketone	< 5.0	< 5.0	< 5.0	< 5.0
Methyl Tert-Butyl Ether	< 1.0	< 1.0	< 1.0	< 1.0
Styrene (Monomer)	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,3-Dichloropropene	< 1.0	< 1.0	< 1.0	< 1.0
Trichlorofluoromethane (Freon 11)	< 2.0	< 2.0	< 2.0	< 2.0
Trichlorotrifluoroethane (Freon 113)	< 5.0	< 5.0	< 5.0	< 5.0
1-Chloro-1,1-difluoroethane (Freon 142b)	< 5.0	< 5.0	< 5.0	< 5.0
Subtotal Non-Project VOCs	0.0	**0.6**	**0.6**	0.0
Total VOCs[1]	**11**	**18**	**19**	**17**
1,4-Dioxane	**0.71**	**1.0**	**1.3**	**1.0**
pH[2]	5.5	5.1	5.6	5.6

Notes, Abbreviations, Qualifiers, and Units:

1. "Total VOCs" represents the sum of individual concentrations of the compounds detected. The values used in calculations referenced in this report have been rounded to the nearest whole number.

2. Influent pH samples collected and measured in the field by Arcadis personnel on the dates listed using a field calibrated pH/conductivity meter. pH units are standard units.

USEPA United States Environmental Protection Agency
VOC Volatile Organic Compound

3.0 Bold value indicates a detection.
< 1.0 Compound not detected at or above the laboratory quantification limit.
µg/L micrograms per liter

Table 3
Summary of Effluent Water Sample Analytical Results
Bethpage Park Groundwater Containment System
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman,
Bethpage, New York

ARCADIS Design & Consultancy for natural and built assets

Compound	Discharge Limit[1] (µg/L)	10/15/19 (µg/L)	11/05/19 (µg/L)	12/04/19 (µg/L)	01/14/20 (µg/L)	02/06/20 (µg/L)	03/03/20 (µg/L)	04/15/20 (µg/L)	05/14/20 (µg/L)	06/04/20 (µg/L)	07/08/20 (µg/L)	08/18/20 (µg/L)	09/02/20 (µg/L)
Project VOCs													
1,1,1-Trichloroethane	5[2]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	5[2]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	5[2]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene	5[2]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl Chloride	5[2]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis 1,2-Dichloroethene	5[2]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans 1,2-Dichloroethene	5[2]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Subtotal Project VOCs		0	0	0	0	0	0	0	0	0	0	0	0
Compound	**Discharge Limit[1] (µg/L)**	**10/15/19 (µg/L)**	**11/05/19 (µg/L)**	**12/04/19 (µg/L)**	**01/14/20 (µg/L)**	**02/06/20 (µg/L)**	**03/03/20 (µg/L)**	**04/15/20 (µg/L)**	**05/14/20 (µg/L)**	**06/04/20 (µg/L)**	**07/08/20 (µg/L)**	**08/18/20 (µg/L)**	**09/02/20 (µg/L)**
Non-Project VOCs													
Chloroform	5[2]	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dichloromethane	5[2]	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Trichlorotrifluoroethane (Freon 113)	5[2]	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Subtotal Non-Project VOCs		0	0	0	0	0	0	0	0	0	0	0	0
Total VOCs[3]		0	0	0	0	0	0	0	0	0	0	0	0
Treatment Efficiency[4]		> 99.9%	> 99.9%	> 99.9%	> 99.9%	> 99.9%	> 99.9%	> 99.9%	> 99.9%	> 99.9%	> 99.9%	> 99.9%	> 99.9%
Compound	**Discharge Limit[1] (µg/L)**	**10/15/19 (µg/L)**	**11/05/19 (µg/L)**	**12/04/19 (µg/L)**	**01/14/20 (µg/L)**	**02/06/20 (µg/L)**	**03/03/20 (µg/L)**	**04/15/20 (µg/L)**	**05/14/20 (µg/L)**	**06/04/20 (µg/L)**	**07/08/20 (µg/L)**	**08/18/20 (µg/L)**	**09/02/20 (µg/L)**
Inorganics													
Total Iron	600	**201**	**110**	< 100	< 100	< 100	**144**	< 100	**144**	**113**	< 100	< 100	< 100
Total Manganese	600	**46.1**	**47.6**	**43.1**	**50.1**	**49.7**	**51.9**	**45.3**	**44.2**	**46.5**	**45.0**	**47.8**	**46.0**
Nitrate and Nitrite	10,000	**2,700**	**2,700**	**2,900**	**2,400**	**2,900**	**2,800**	**2,600**	**2,800**	**2,900**	**2,700**	**2,700**	**2,600**
Toal Kjeldahl Nitrogen	10,000	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200	< 200
Total Nitrogen	10,000	**2,700**	**2,900**	**3,100**	**2,400**	**2,900**	**2,800**	**2,600**	**2,800**	**2,900**	**2,700**	**2,700**	**2,600**
1,4-Dioxane	NE	**0.70**	**0.68**	**0.87**	**0.76**	**1.0**	**0.79**	**1.2**	**1.4**	**1.3**	**1.3**	**1.1**	**1.2**
pH[5]	5.5-8.5	6.2	6.3	6.8	6.3	6.1	6.1	5.9	6.9	6.5	6.5	6.7	6.6

Notes, Abbreviations, Qualifers, and Units on last page.

Table 3
Summary of Effluent Water Sample Analytical Results
Bethpage Park Groundwater Containment System
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman,
Bethpage, New York

Notes, Abbreviations, Qualifiers, and Units:

1. Discharge limits per the interim SPDES equivalency program or Division of Water Technical and Operational Guidance Series (TOGS 1.1.1) Quality Standards and Guidance Values and Groundwater Effluent Limitations, if the compound is not part of the SPDES Permit Equivalency.

2. As of September 2017, the 10 SPDES VOCs discharge limits are per Site Number 1-30-003A Operable Unit 3 SPDES Permit Equivalency.

3. "Total VOCs" represents the sum of individual concentrations of compounds detected. The values used in calculations referenced in this report have been rounded to the nearest whole number.

4. Treatment efficiency was calculated by dividing the difference between the influent and effluent total VOC concentrations by the influent total VOC concentration.

5. Effluent pH measured on site using a handheld pH meter. pH units are standard units.

NYSDEC	New York State Department of Environmental Conservation
SPDES	State Pollutant Discharge Elimination System
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound
NE	Not Established
102	Bold value indicates a detection.
< 0.50	Compound not detected above the laboratory quantification limit.
µg/L	micrograms per liter

Table 4
Influent Vapor Sample Analytical Results
Bethpage Park Groundwater Containment System
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman,
Bethpage, New York

Compound[1]	11/26/19 (µg/m^3)	03/30/20 (µg/m^3)	05/14/20 (µg/m^3)	07/08/20 (µg/m^3)
Project VOCs				
1,1,1 - Trichloroethane	**0.82**	**1.2**	**1.0**	**1.3**
1,1 - Dichloroethane	**3.8**	**7.3**	**5.7**	**6.5**
1,2 - Dichloroethane	< 0.81	**0.45 J**	< 0.81	< 0.81
1,1 - Dichloroethene	**0.99**	**1.3**	**0.91**	**1.3**
Tetrachloroethene	**2.2**	**2.6**	**1.9**	**4.6**
Trichloroethene	**49**	**58.6**	**69.9**	**94.6**
Vinyl Chloride	**23.0**	**50.1**	**56.2**	**94.3**
cis 1,2-Dichloroethene	**108**	**182**	**170**	**206**
trans 1,2-Dichloroethene	< 0.79	**0.52 J**	**0.48 J**	**0.48 J**
Benzene	**1.90**	**0.58 J**	**0.35 J**	**0.58 J**
Toluene	**2.30**	**0.83**	**0.57 J**	**1.1**
o-Xylene	**0.78 J**	**1.0**	**0.83 J**	**1.5**
m,p-Xylene	**1.7**	**0.65 J**	< 0.87	**0.56 J**
Subtotal Project VOCs	**194**	**307**	**308**	**413**
Non-Project VOCs				
1,1,2,2-Tetrachloroethane	< 0.69	< 0.69	< 0.69	< 0.69
1,1,2-Trichloroethane	< 0.55	< 0.55	< 0.55	< 0.55
1,2-Dichloropropane	< 0.92	**0.60 J**	**0.51 J**	**0.65 J**
1,3-Butadiene	**0.42 J**	< 0.44	< 0.44	< 0.44
2-Butanone	< 0.59	< 0.59	< 0.59	< 0.59
4-Methyl-2-Pentanone	< 0.82	< 0.82	< 0.82	< 0.82
Acetone	**4.5**	< 0.48	**6.9**	**5.2**
Bromodichloromethane	< 0.67	< 0.67	< 0.67	< 0.67
Bromoform	< 0.41	< 0.41	< 0.41	< 0.41
Bromomethane	< 0.78	< 0.78	< 0.78	< 0.78
Carbon Disulfide	< 0.62	< 0.62	< 0.62	< 0.62
Carbon Tetrachloride	< 0.25	**0.48**	< 0.25	< 0.25
Chlorobenzene	< 0.92	< 0.92	< 0.92	< 0.92
Chlorodibromomethane	< 0.85	< 0.85	< 0.85	< 0.85
Chlorodifluoromethane (Freon 22)	**6.3**	< 0.70	**5.6**	< 0.70
Chloroethane	< 0.53	< 0.53	< 0.53	< 0.53
Chloroform	**7.3**	**11**	**9.3**	**11**
Chloromethane	**1.3**	**2.1**	**1.3**	**1.5**
cis-1,3-Dichloropropene	< 0.91	< 0.91	< 0.91	< 0.91
Dichlorodifluoromethane (Freon 12)	< 0.99	< 0.99	**1.8**	**2.2**
Dichloromethane	**4.2**	**0.83**	**0.73**	< 0.69
Ethylbenzene	**0.65 J**	**0.56 J**	< 0.87	< 0.87
Methyl N-Butyl Ketone	< 0.82	< 0.82	< 0.82	< 0.82
Methyl Tert-Butyl Ether	< 0.72	**0.69 J**	< 0.72	< 0.72
Styrene (Monomer)	< 0.85	< 0.85	< 0.85	< 0.85
trans-1,3-Dichloropropene	< 0.91	< 0.91	< 0.91	< 0.91
Trichlorofluoromethane (Freon 11)	**1.6**	< 0.56	**1.2**	**1.3**
Trichlorotrifluoroethane (Freon 113)	**1.5**	**1.7**	**1.5**	**1.8**
1-Chloro-1,1-difluoroethane (Freon 142b)	< 0.82	< 0.82	< 0.82	< 0.82
Subtotal Non-Project VOCs	**28**	**18**	**29**	**24**
Total VOCs[2]	**222**	**325**	**337**	**436**

Notes, Abbreviations, Qualifiers, and Units on last page.

Table 4
Influent Vapor Sample Analytical Results
Bethpage Park Groundwater Containment System
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman,
Bethpage, New York

Notes, Abbreviations, Qualifiers, and Units:

1. Vapor samples collected by Arcadis on the dates shown and submitted to a NYSDOH ELAP certified laboratory for VOC analyses per Modified USEPA Method TO-15. A VOC analyte list is provided in the DRAFT Bethpage Park Groundwater Containment System OM&M Manual (Arcadis 2016). Influent samples were collected at Vapor Sampling Port-1 (VSP-1); refer to Figure 3 of this OM&M Report for the location of VSP-1.

2. "Total VOCs" represents the sum of individual concentrations of compounds detected. The values used in calculations referenced in this report have been rounded to the nearest whole number.

ELAP	Environmental Laboratory Approval Program
NYSDOH	New York State Department of Health
OM&M	Operation, Maintenance, and Monitoring
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound
0.93	Bold value indicates a detection.
< 0.81	Compound not detected above the laboratory quantification limit.
J	Result is estimated.
µg/m^3	micrograms per cubic meter

Table 5
Summary of Effluent Vapor Sample Analytical Results
Bethpage Park Groundwater Containment System
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman,
Bethpage, New York

Compound[1]	11/26/19 (µg/m^3)	03/30/20 (µg/m^3)	05/14/20 (µg/m^3)	07/08/20 (µg/m^3)
Project VOCs				
1,1,1 - Trichloroethane	**0.82**	**0.93**	**0.76**	**1.0**
1,1 - Dichloroethane	**4.5**	**6.1**	**4.9**	**6.1**
1,2 - Dichloroethane	< 0.81	**0.45 J**	< 0.81	< 0.81
1,1 - Dichloroethene	**0.99**	**1.0**	**0.71**	**1.1**
Tetrachloroethene	**1.8**	**1.7**	**1.2**	**3.3**
Trichloroethene	**31**	**29**	**30**	**50**
Vinyl Chloride	**16**	**26.3**	**26.1**	**44.2**
cis 1,2-Dichloroethene	**85.6**	**109**	**99.5**	**111**
trans 1,2-Dichloroethene	< 0.79	< 0.79	< 0.79	< 0.79
Benzene	**1.5**	**0.38 J**	< 0.64	< 0.64
Toluene	**2.8**	**1.4**	**1.4**	**1.3**
o-Xylene	**0.61 J**	**0.74 J**	**0.48 J**	**0.74 J**
m,p-Xylene	**1.4**	**0.61 J**	**0.56 J**	**0.48 J**
Subtotal Project VOCs	**147**	**178**	**166**	**219**
Non-Project VOCs				
1,1,2,2-Tetrachloroethane	< 0.69	< 0.69	< 0.69	< 0.69
1,1,2-Trichloroethane	< 0.55	< 0.55	< 0.55	< 0.55
1,2-Dichloropropane	< 0.92	**0.46 J**	< 0.92	< 0.92
1,3-Butadiene	< 0.44	< 0.44	< 0.44	< 0.44
2-Butanone	**4.7**	< 0.59	< 0.59	< 0.59
4-Methyl-2-Pentanone	< 0.82	< 0.82	< 0.82	< 0.82
Acetone	**38.5**	< 0.48	**24.9**	**43.9**
Bromodichloromethane	< 0.67	< 0.67	< 0.67	< 0.67
Bromoform	< 0.41	< 0.41	< 0.41	< 0.41
Bromomethane	< 0.78	< 0.78	< 0.78	< 0.78
Carbon Disulfide	< 0.62	< 0.62	< 0.62	< 0.62
Carbon Tetrachloride	< 0.25	**0.45**	< 0.25	< 0.25
Chlorobenzene	< 0.92	< 0.92	< 0.92	< 0.92
Chlorodibromomethane	< 0.85	< 0.85	< 0.85	< 0.85
Chlorodifluoromethane (Freon 22)	**7.7**	< 0.70	**5.6**	< 0.70
Chloroethane	< 0.53	< 0.53	< 0.53	< 0.53
Chloroform	**11**	**11**	**9.3**	**12.0**
Chloromethane	**1.3**	**1.4**	**1.1**	**1.4**
cis-1,3-Dichloropropene	< 0.91	< 0.91	< 0.91	< 0.91
Dichlorodifluoromethane (Freon 12)	< 0.99	< 0.99	**1.8**	**2.3**
Dichloromethane	< 0.69	**4.5**	**0.76**	< 0.69
Ethylbenzene	**0.48 J**	**0.48 J**	< 0.87	< 0.87
Methyl N-Butyl Ketone	< 0.82	< 0.82	< 0.82	< 0.82
Methyl Tert-Butyl Ether	< 0.72	< 0.72	< 0.72	< 0.72
Styrene (Monomer)	< 0.85	< 0.85	< 0.85	< 0.85
trans-1,3-Dichloropropene	< 0.91	< 0.91	< 0.91	< 0.91
Trichlorofluoromethane (Freon 11)	**1.7**	< 0.56	**1.2**	**1.5**
Trichlorotrifluoroethane (Freon 113)	**2.0**	**1.9**	**1.6**	**2.2**
1-Chloro-1,1-difluoroethane (Freon 142b)	< 0.82	< 0.82	< 0.82	< 0.82
Subtotal Non-Project VOCs	**67**	**20**	**46**	**63**
Total VOCs[2]	**214**	**198**	**212**	**283**

Notes, Abbreviations, Qualifiers, and Units on last page.

Table 5
Summary of Effluent Vapor Sample Analytical Results
Bethpage Park Groundwater Containment System
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman,
Bethpage, New York

Notes, Abbreviations, Qualifiers, and Units:

1. Vapor samples collected by Arcadis on the dates shown and submitted to a NYSDOH ELAP certified laboratory for VOC analyses per Modified USEPA Method TO-15. A VOC analyte list is provided in the DRAFT Bethpage Park Groundwater Containment System OM&M Manual (Arcadis 2016). Effluent samples were collected at Vapor Sampling Port-5 (VSP-5); refer to Figure 3 of this OM&M Report for the location of VSP-5.

2. "Total VOCs" represents the sum of individual concentrations of all compounds detected. The values used in calculations referenced in this report have been rounded to the nearest whole number.

ELAP	Environmental Laboratory Approval Program
NYSDOH	New York State Department of Health
OM&M	Operation, Maintenance, and Monitoring
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound
0.76	Bold value indicates a detection.
< 0.81	Compound not detected above the laboratory quantification limit.
J	Result is estimated.
$\mu g/m^3$	micrograms per cubic meter

Table 6
Summary of Effluent Vapor Tentatively Identified Compounds
Bethpage Park Groundwater Containment System
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman,
Bethpage, New York

Compound[1]	11/26/19 (ppbv)	03/30/20 (ppbv)	05/14/20 (ppbv)	07/08/20 (ppbv)
Tentatively Identified Compounds				
Acetone	ND	**8.9 JN**	ND	ND
Alkane	**3.3 J**	ND	ND	ND
C3 alkyl benzene	**3.9 J**	ND	ND	ND
Carbon Dioxide	**29 JNB**	**15 JNB**	**170 JB**	**170 JNB**
Difluorochloromethane	ND	**1.5 JN**	ND	ND
Ethanol	ND	**1.3 JN**	ND	ND
Cumene	ND	ND	ND	**1.8 JN**
2-Phenyl-2-Propanol	ND	ND	ND	**1.2 JN**
Unknown (A)	ND	**1.1 J**	ND	ND
Unknown (B)	ND	ND	ND	**5.7 J**
Total VOC TICs[2]	**7.2 J**	**12.8 J**	ND	**8.7 J**

Notes, Abbreviations, Qualifiers, and Units:

1. Vapor samples collected by Arcadis on the dates shown and submitted to a NYSDOH ELAP certified laboratory for VOC analyses per Modified USEPA Method TO-15. A VOC analyte list is provided in the DRAFT Bethpage Park Groundwater Containment System OM&M Manual (Arcadis 2016). Effluent samples were collected at Vapor Sampling Port-5 (VSP-5); refer to Figure 3 of this OM&M Report for the location of VSP-5.

2. Compounds found in associated method blank are not included in Total VOC TICs.

ECU	Emission Control Unit
ELAP	Environmental Laboratory Approval Program
NYSDOH	New York State Department of Health
OM&M	Operation, Maintenance, and Monitoring
TIC	Tentatively Identified Compound
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound
3.3	Bold value indicates a detection.
ND	TIC were not detected.
B	TIC was detected in the associated method blank.
J	Result is estimated.
N	Indicates presumptive evidence of a compound.
ppbv	parts per billion by volume

Table 7
Summary of System Parameters
Bethpage Park Groundwater Containment System
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman,
Bethpage, New York

Date [1]	Water Flow Rates						Water Pressures					Air Flow Rate [2]	Air Pressures [5,6]					Air Temp. [5]
	Remedial Well [2]				Combined Influent [3]	Effluent [2]	Remedial Well Effluent [2,4]				Effluent [5]	Effluent	ECU Influents				Effluent	Effluent
	RW-1	RW-2	RW-3	RW-4			RW-1	RW-2	RW-3	RW-4			GAC-501	GAC-502	PPZ-601	PPZ-602		
	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(gpm)	(psi)	(psi)	(psi)	(psi)	(psi)	(scfm)	(iwc)	(iwc)	(iwc)	(iwc)	(iwc)	(^{o}R)
10/15/19	29.9	74.5	75.1	30.3	210	219	57	69	35	56	17	1,510	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	538
11/05/19	30.1	73.3	75.4	29.8	209	218	57	66	33	56	14	1,496	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	535
12/04/19	30.1	72.1	75.5	30.0	208	218	57	6	40	56	13	1,542	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	532
01/16/20	30.3	75.8	75.6	30.6	212	231	57	44	42	56	14	1,526	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	531
02/06/20	31.5	75.5	76.3	30.1	213	225	56	42	38	56	14	1,575	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	530
03/03/20	30.7	75.8	75.5	30.6	213	227	56	33	40	56	15	1,600	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	538
04/15/20	31.2	70.1	75.4	30.8	208	213	56	6	36	56	16	1,570	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	538
05/14/20	30.2	75.8	75.2	30.2	211	226	57	50	36	57	25	1,572	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	548
06/04/20	30.8	75.0	75.0	31.3	212	219	56	46	33	55	14	1,500	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	544
07/08/20	30.6	75.3	75.4	30.2	211	225	57	42	36	56	17	1,500	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	550
08/18/20	30.4	75.0	75.0	30.0	210	227	57	46	35	55	13	1,500	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	544
09/02/20	30.8	74.5	74.9	30.3	211	220	56	41	36	56	16	1,500	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	544

Notes, Abbreviations, and Units on last page.

Table 7
Summary of System Parameters
Bethpage Park Groundwater Containment System
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman,
Bethpage, New York

Notes, Abbreviations, and Units:

1. Operational data collected by Arcadis on days noted. Parameters listed were typically recorded during compliance monitoring events. Data in this table correspond to approximately the past year of system operation.
2. Instantaneous parameters obtained from the SCADA HMI: Water Flow Rate, Water Pressure, Air Flow Rate.
3. Combined influent water-flow rate is the sum of individual well flow rates via the SCADA System.
4. Remedial Well effluent pressure readings measured at the influent manifold within the treatment system building.
5. Instantaneous values recorded from field-mounted instruments during weekly site visits. On 5/14/2020 effluent air temperature was recorded using SCADA daily average temperature due to gauge calibration.
6. Pressure readings recorded as < 1.0 iwc due to pressure being too low for gauge sensitivity.

ECU	Emission Control Unit
GAC	Granular Activated Carbon
HMI	Human-Machine Interface
RW	Remedial Well
SCADA	Supervisory Control and Data Acquisition
Temp	Temperature
gpm	gallons per minute
iwc	inches of water column
psi	pounds per square inch
^{o}R	degrees Rankine
scfm	standard cubic feet per minute

Table 8
Summary of Groundwater Recovered, VOC Mass Recovered, and VOC Mass Recovery Rates
Bethpage Park Groundwater Containment System
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman,
Bethpage, New York

Operating Period [1]	Volume of Groundwater Recovered (x1,000 gal) [2]					VOC Mass Recovered (lbs) [3]															VOC Mass Recovery Rate (lbs/day) [4]													
						Total VOCs [5]					Project VOCs [6]					Non-Project VOCs [7]					Total VOCs [5]					Project VOCs [6]					Non-Project VOCs [7]				
	RW-1	RW-2	RW-3	RW-4	Total	RW-1	RW-2	RW-3	RW-4	Total	RW-1	RW-2	RW-3	RW-4	Total	RW-1	RW-2	RW-3	RW-4	Total	RW-1	RW-2	RW-3	RW-4	Total	RW-1	RW-2	RW-3	RW-4	Total	RW-1	RW-2	RW-3	RW-4	Total
System Pilot Test, Shakedown and Startup Totals [8]	137	270	251	150	808	NA	NA	NA	NA	1.1	NA	NA	NA	NA	1.0	NA	NA	NA	NA	0.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2010 Totals	15,726	35,127	38,160	15,689	104,702	0.56	172	412	89	672	0.56	171	28	0.10	200	< 0.01	0.17	383	89	469	< 0.01	0.46	1.1	0.24	1.8	< 0.01	0.46	0.075	< 0.01	0.54	< 0.01	< 0.01	1.0	0.24	1.3
2011 Totals	15,218	36,570	37,682	15,196	104,666	0.36	167	271	78	516	0.36	167	35	0.090	203	< 0.01	1.1	236	78	314	< 0.01	0.45	0.73	0.21	1.4	< 0.01	0.45	0.095	< 0.01	0.55	< 0.01	< 0.01	0.64	0.21	0.85
2012 Totals	15,260	35,178	36,111	15,336	101,885	0.28	114	113	40	267	0.25	113	12	0.39	126	< 0.01	1.5	101	40	141	< 0.01	0.31	0.31	0.11	0.73	< 0.01	0.31	0.032	< 0.01	0.35	< 0.01	< 0.01	0.28	0.11	0.39
2013 Totals	15,968	37,514	36,622	16,036	106,140	0.14	111	41	18	171	0.14	110	4.3	0.36	113	< 0.01	1.6	37	18	57	< 0.01	0.30	0.11	0.050	0.47	< 0.01	0.30	0.012	< 0.01	0.31	< 0.01	< 0.01	0.10	0.049	0.16
2014 Totals	15,690	33,222	31,199	15,691	95,802	0.063	67	9.9	8.1	85	0.063	65	2.0	0.20	67	< 0.01	1.5	8.1	7.9	17	< 0.01	0.19	0.028	0.023	0.24	< 0.01	0.18	< 0.01	< 0.01	0.19	< 0.01	< 0.01	0.023	0.022	0.047
2015 Totals	15,859	38,082	34,961	14,755	103,657	0.028	47	7.1	4.5	57	0.021	45	1.5	0.20	45	<0.01	1.7	5.6	4.2	12	<0.01	0.13	0.019	0.012	0.16	<0.01	0.12	<0.01	<0.01	0.12	<0.01	<0.01	0.015	0.012	0.032
2016 Totals	15,826	34,539	39,349	15,826	105,540	<0.01	38	3.2	2.2	44	<0.01	37	1.4	0.20	39	<0.01	1.5	1.7	2.0	5.2	<0.01	0.10	<0.01	<0.01	0.12	<0.01	0.10	<0.01	<0.01	0.11	<0.01	<0.01	<0.01	<0.01	0.014
2017 Totals	16,005	31,600	37,614	15,965	101,184	< 0.01	13	2.2	1.2	17	< 0.01	13	1.1	0.16	14	< 0.01	0.56	1.1	1.1	2.7	< 0.01	0.037	< 0.01	< 0.01	0.046	< 0.01	0.035	< 0.01	< 0.01	0.038	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2019 Totals	15,456	32,470	38,416	15,343	101,685	< 0.01	11.51	1.36	0.22	13.10	< 0.01	11.51	1.07	< 0.01	12.59	< 0.01	< 0.01	0.29	0.18	0.63	< 0.01	0.032	< 0.01	< 0.01	0.036	< 0.01	0.032	< 0.01	< 0.01	0.034	< 0.01	< 0.01	< 0.01	0.001	< 0.01
January 2020 through March 2020																																			
01/01/20 - 02/01/20	934	2,343	2,331	938	6,545	< 0.01	1.04	0.08	< 0.01	1.13	< 0.01	1.0	0.07	< 0.01	1.1	< 0.01	< 0.01	0.01	< 0.01	0.011	< 0.01	0.034	< 0.01	< 0.01	0.036	< 0.01	0.034	< 0.01	< 0.01	0.036	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
02/01/20 - 03/01/20	1,265	3,122	3,141	1,252	8,780	< 0.01	1.39	0.11	< 0.01	1.50	< 0.01	1.4	0.10	< 0.01	1.5	< 0.01	< 0.01	0.02	< 0.01	0.015	< 0.01	0.048	< 0.01	< 0.01	0.052	< 0.01	0.048	< 0.01	< 0.01	0.051	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
03/01/20 - 04/01/20	1,315	3,333	3,347	1,342	9,337	< 0.01	1.48	0.12	< 0.01	1.60	< 0.01	1.5	0.11	< 0.01	1.6	< 0.01	< 0.01	0.02	< 0.01	0.016	< 0.01	0.048	< 0.01	< 0.01	0.052	< 0.01	0.048	< 0.01	< 0.01	0.051	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Subtotal Jan - Mar 2020	3,514	8,798	8,818	3,532	24,662	< 0.01	3.91	0.32	< 0.01	4.23	< 0.01	3.9	0.28	< 0.01	4.2	< 0.01	< 0.01	0.04	< 0.01	0.04	< 0.01	0.043	< 0.01	< 0.01	0.046	< 0.01	0.043	< 0.01	< 0.01	0.046	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
April 2020 through June 2020																																			
04/01/20 - 05/01/20	1,325	3,018	3,247	1,321	8,911	< 0.01	1.51	0.10	< 0.01	1.60	< 0.01	1.5	0.06	< 0.01	1.6	< 0.01	< 0.01	0.04	< 0.01	0.038	< 0.01	0.050	< 0.01	< 0.01	0.053	< 0.01	0.050	< 0.01	< 0.01	0.052	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
05/01/20 - 06/01/20	1,350	3,069	3,334	1,338	9,090	< 0.01	1.53	0.10	< 0.01	1.63	< 0.01	1.5	0.06	< 0.01	1.6	< 0.01	< 0.01	0.04	< 0.01	0.039	< 0.01	0.049	< 0.01	< 0.01	0.053	< 0.01	0.049	< 0.01	< 0.01	0.051	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
06/01/20 - 07/01/20	1,304	3,203	3,219	1,309	9,036	< 0.01	1.60	0.09	< 0.01	1.70	< 0.01	1.6	0.06	< 0.01	1.7	< 0.01	< 0.01	0.04	< 0.01	0.038	< 0.01	0.053	< 0.01	< 0.01	0.057	< 0.01	0.053	< 0.01	< 0.01	0.055	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Subtotal Apr - June 2020	3,979	9,289	9,801	3,968	27,037	< 0.01	4.64	0.29	< 0.01	4.93	< 0.01	4.6	0.17	< 0.01	4.8	< 0.01	< 0.01	0.12	< 0.01	0.12	< 0.01	0.051	< 0.01	< 0.01	0.054	< 0.01	0.051	< 0.01	< 0.01	0.053	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
July 2020 through September 2020																																			
07/01/20 - 08/01/20	1,214	2,995	3,010	1,216	8,435	< 0.01	1.59	0.10	< 0.01	1.70	< 0.01	1.6	0.07	< 0.01	1.7	< 0.01	< 0.01	0.03	< 0.01	0.033	< 0.01	0.051	< 0.01	< 0.01	0.055	< 0.01	0.051	< 0.01	< 0.01	0.054	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
08/01/20 - 09/01/20	1,148	2,512	2,834	1,157	7,651	< 0.01	1.34	0.10	< 0.01	1.43	< 0.01	1.3	0.07	< 0.01	1.4	< 0.01	< 0.01	0.03	< 0.01	0.031	< 0.01	0.043	< 0.01	< 0.01	0.046	< 0.01	0.043	< 0.01	< 0.01	0.045	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
09/01/20 - 10/01/20	1,302	3,106	3,246	1,301	8,956	< 0.01	1.65	0.11	< 0.01	1.76	< 0.01	1.7	0.08	< 0.01	1.7	< 0.01	< 0.01	0.04	< 0.01	0.035	< 0.01	0.055	< 0.01	< 0.01	0.059	< 0.01	0.055	< 0.01	< 0.01	0.058	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Subtotal July - September 2020 [9]	3,664	8,613	9,090	3,674	25,042	< 0.01	4.58	0.31	< 0.01	4.89	< 0.01	4.6	0.21	< 0.01	4.8	< 0.01	< 0.01	0.10	< 0.01	0.10	< 0.01	0.050	< 0.01	< 0.01	0.053	< 0.01	0.050	< 0.01	< 0.01	0.052	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2020 Totals	11,157	26,700	27,709	11,174	76,741	< 0.01	13.1	0.9	< 0.01	197.1	< 0.01	13.1	0.67	< 0.01	13.8	< 0.01	< 0.01	0.26	< 0.01	0.26	< 0.01	0.048	< 0.01	< 0.01	0.719	< 0.01	0.048	< 0.01	< 0.01	0.050	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Total Since System Start Up	174,039	392,821	406,992	172,653	1,146,505	2	1,043	916	256	2,397	2	1,032	106	2	1,142	< 0.01	10	809	254	1,067	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Notes, Abbreviations, Qualifiers, and Units:

1. Represents operating period between consecutive monitoring events.

2. Volume of groundwater recovered is based on individual local well totalized flow readings. Listed value is the difference between totalized flow values recorded between consecutive monitoring events. The total groundwater recovered during a given operating period is the sum of the individual well flow totals. Values shown are rounded to the nearest gallon, but should only be considered accurate to two significant figures to account for error associated with field measurements.

3. Mass recovered per well was calculated by multiplying the Total VOC concentration from the most recent sampling event by the number of gallons extracted during the reporting period. The total amount recovered during a given operating period is the sum of masses recovered from each of the individual wells. Values less than ten pounds are presented using two significant figures and values greater than ten pounds have been rounded to the nearest whole number; however, these values should only be considered accurate to two significant figures to account for error associated with field measurements and analytical data.

4. Mass recovery rates were calculated by dividing the total mass recovered for each well and for the system by the number of days in the respective operating period. Values are presented using two significant figures.

5. "Total VOCs" represents the sum of individual concentrations of the VOCs detected.

6. "Project VOCs" represents the sum of individual compound concentrations of 1,1,1-trichloroethane; 1,1-dichloroethane; 1,2-dichloroethane; 1,1-dichloroethene; tetrachloroethene; trichloroethelyene; vinyl chloride; cis-1,2-dichloroethene; trans-1,2-dichloroethene; benzene; toluene; and xylenes-o,m, p.

7. "Non-Project VOCs" represents the difference between Total VOCs and Project VOCs.

8. Values based on operational data recorded prior to system startup on July 21, 2009.

9. The volume of groundwater recovered and mass recovered calculations represent the operational period between July 1st, 2020 and October 1st, 2020.

NA	Not Applicable
VOC	Volatile Organic Compound.
<	Less than
gal	Gallons
lbs	Pounds
lbs/day	Pounds per day

Table 9
Summary of Air Quality Impact Analysis
Bethpage Park Groundwater Containment System
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman,
Bethpage, New York

ARCADIS Design & Consultancy for natural and built assets

Toxic Air Contaminant[4]	CAS#	VSP-05 Vapor Effluent (µg/m^3)	Emission Rate[1]			Scaled Impact - Hourly[2] (µg/m^3)	Scaled Impact - Annual [2] (µg/m^3)	SGC[3] (µg/m^3)	AGC[3] (µg/m^3)	% of SGC	% of AGC
		7/8/2020	lb/yr	lb/hr	g/s						
Project VOCs											
1,1,1-Trichloroethane	71-55-6	1.0	0.05	5.43E-06	6.8E-07	6.7E-03	1.3E-04	9,000	5,000	0.0%	0.0%
1,1-Dichloroethane	75-34-3	6.1	0.29	3.31E-05	4.2E-06	4.1E-02	7.9E-04	--	0.63	--	0.1%
1,1-Dichloroethene	75-35-4	1.1	0.05	5.97E-06	7.5E-07	7.4E-03	1.4E-04	--	200	--	0.0%
cis-1,2-Dichloroethene	156-59-2	111	5.28	6.02E-04	7.6E-05	7.4E-01	1.4E-02	--	63	--	0.0%
Tetrachloroethene	127-18-4	3.3	0.16	1.79E-05	2.3E-06	2.2E-02	4.3E-04	300	4	0.0%	0.0%
Toluene	108-88-3	1.3	0.06	7.06E-06	8.9E-07	8.7E-03	1.7E-04	37,000	5,000	0.0%	0.0%
Trichloroethene	79-01-6	50	2.38	2.71E-04	3.4E-05	3.3E-01	6.5E-03	20	0.2	1.7%	3.2%
Vinyl Chloride	75-01-4	44.2	2.10	2.40E-04	3.0E-05	3.0E-01	5.7E-03	180,000	0.11	0.0%	5.2%
Xylene-O	1330-20-7	0.74 J	0.02	1.85E-06	2.3E-07	2.3E-03	4.4E-05	22,000	100	0.0%	0.0%
Xylenes - M,P	1330-20-7	0.48 J	0.03	3.04E-06	3.8E-07	3.7E-03	7.3E-05	22,000	100	0.0%	0.0%
Non-Project VOCs											
2-Butanone	78-93-3	3.2	0.15	1.74E-05	2.2E-06	2.1E-02	4.1E-04	13,000	5000	0.0%	0.0%
Acetone	67-64-1	43.9	2.09	2.38E-04	3.0E-05	2.9E-01	5.7E-03	180,000	30,000	0.0%	0.0%
Chloroform	67-66-3	12	0.57	6.51E-05	8.2E-06	8.0E-02	1.6E-03	150	14.7	0.1%	0.0%
Chloromethane	74-87-3	1.4	0.07	7.60E-06	9.6E-07	9.4E-03	1.8E-04	22,000	90	0.0%	0.0%
Dichlorodifluoromethane (Freon 12)	75-71-8	2.3	0.11	1.25E-05	1.6E-06	1.5E-02	3.0E-04	--	12000	--	0.0%
Trichlorofluoromethane (Freon 11)	75-69-4	1.5	0.07	8.14E-06	1.0E-06	1.0E-02	1.9E-04	9,000	5,000	0.0%	0.0%
Trichlorotrifluoroethane (Freon 113)	76-13-1	2.2	0.10	1.19E-05	1.5E-06	1.5E-02	2.8E-04	960,000	180,000	0.0%	0.0%

Notes, Abbreviations, and Units on last page.

Table 9
Summary of Air Quality Impact Analysis
Bethpage Park Groundwater Containment System
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman,
Bethpage, New York

ARCADIS Design & Consultancy for natural and built assets

Notes, Abbreviations, and Units:

1. Emission rate calculated based on VSP-05 effluent concentration and a daily average exit air flow rate of 1,452 ft^3/min for 7/08/2020. Emission rate standardized at 70 ^oF and 1 atm.
   1,1,1-Trichloroethane (lb/hr) = TCE [µg/m^3] x Air Flow Rate [ft^3/min] x (1 m^3/35.3147 ft^3) x (60 min/hr) x (0.000001 g/1 µg) x (0.0022 lb/g)
   lb/yr = lb/hr x 8,760 hrs/yr
   g/s = lb/hr x hr/3,600 sec x 453.59 g/lb
2. Ambient impact based on AERMOD modeling using normalized rate of 1 g/s is scaled to the actual emission rate of the pollutant. Modeling was performed using the representative meteorological data from the nearest station (Brookhaven/Farmingdale) for the years 2015 through 2019. The maximum impact from all the years was used for the calculations.
   Scaled hourly impact (µg/m^3) = AERMOD predicted hourly ambient impact at 1 g/s ([µg/m^3]/[g/s]) x Actual emission rate (g/s)
   Scaled annual impact (µg/m^3) = AERMOD predicted annual ambient impact at 1 g/s ([µg/m^3]/[g/s]) x Actual emission rate (g/s)

AERMOD Normalized Ambient Impact at 1 g/s	
Hourly ([µg/m^3]/[g/s])	Annual ([µg/m^3]/[g/s])
9,778.35	189.33

3. Short-term and annual guideline concentrations specified in the NYSDEC DAR-1 AGC/SGC tables revised August 10, 2016.
4. Compounds not detected above the laboratory reporting limit are excluded from the air quality impact analysis summary.

AGC	Annual Guideline Concentration
DAR-1	Division of Air Resources-1
--	None Specified
NYSDEC	New York State Department of Environmental Conservation
SGC	Short-term Guideline Concentration
VSP	Vapor Sampling Point
cfm	cubic feet per minute
g/s	grams per second
lb/hr	pounds per hour
lb/yr	pounds per year
µg/m^3	micrograms per cubic meter

Table 10
Summary of Remedial Well Groundwater Sample Analytical Results - VOCs
Bethpage Park Groundwater Containment System
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman,
Bethpage, New York

Compound[1] (µg/L)	Sample Location: Sample Date: NYSDEC SCGs	RW-1 11/5/2019	RW-1 2/6/2020	RW-1 5/14/2020	RW-1 7/8/2020	RW-2 11/5/2019	RW-2 2/6/2020	RW-2 5/14/2020	RW-2 7/8/2020	RW-3 11/5/2019	RW-3 2/6/2020	RW-3 5/14/2020	RW-3 7/8/2020	RW-4 11/5/2019	RW-4 2/6/2020	RW-4 5/14/2020	RW-4 7/8/2020
Project VOCs																	
1,1,1-Trichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	**0.65**	**0.84 J**	**0.98 J**	**0.91 J**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	0.6	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethylene	5	< 1.0	< 1.0	< 1.0	< 1.0	**10.8**	**10.5**	**13.0**	**12.0**	**2.0**	**2.2**	**0.63 J**	**1.7**	**0.64**	< 1.0	**0.63 J**	< 1.0
Vinyl Chloride	2	< 1.0	< 1.0	< 1.0	< 1.0	**4.9**	**10.3**	**13.6**	**17**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-dichloroethene	5	< 1.0	< 1.0	< 1.0	< 1.0	**21.9**	**31.7**	**32.4**	**33.9**	**1.2**	**1.6**	**1.5**	**1.1**	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-dichloroethene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzene	1	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Toluene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Xylene-o	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Xylenes-m,p	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Subtotal Project VOCs		0	0	0	0	**38.3**	**53.3**	**60.0**	**63.8**	**3.2**	**3.8**	**2.1**	**2.8**	**0.6**	0	**0.6**	0
Non-Project VOCs																	
1,1,2,2-Tetrachloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Butadiene	0.5	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
2-Butanone	NE	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
4-methyl-2-pentanone	50	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Acetone	NE	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Bromodichloromethane	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromoform	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	5	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon Disulfide	60	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbon tetrachloride	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorodibromomethane	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorodifluoromethane (Freon 22)	NE	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	**3.1**	< 5.0	< 5.0	< 5.0
Chloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroform	7	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	**1.1**	**0.56 J**	**1.4**	**1.3**	< 1.0	< 1.0	< 1.0	< 1.0
Chloromethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,3-dichloropropene	0.4	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dichlorodifluoromethane (Freon 12)	5	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Dichloromethane	5	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Ethylbenzene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methyl N-Butyl Ketone	50	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Methyl tert-Butyl Ether	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Styrene	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,3-dichloropropene	0.4	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichlorofluoromethane (Freon 11)	5	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Trichlorotrifluoroethane (Freon 113)	5	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
1-Chloro-1,1-difluoroethane (Freon 142b)	NE	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Subtotal Non-Project VOCs		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**1.1**	**0.6**	**1.4**	**1.3**	**3.1**	0.0	0.0	0.0
Total VOCs[2]		0.0	0.0	0.0	0.0	**38.3**	**53.3**	**60.0**	**63.8**	**4.3**	**4.4**	**3.5**	**4.1**	**3.7**	0.0	**0.6**	0.0
1,4-Dioxane		**0.47**	**0.38**	**0.32**	**0.32**	**1.5**	**2.3**	**3.0**	**3.0**	**0.39**	**0.56**	**0.59**	**0.45**	**0.23 J**	**0.20 J**	**0.18 J**	**0.13 J**

Notes, Abbreviations, Qualifiers, and Units on last page.

Table 10
Summary of Remedial Well Groundwater Sample Analytical Results - VOCs
Bethpage Park Groundwater Containment System
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman,
Bethpage, New York

Notes, Abbreviations, Qualifiers, and Units:

1. Water samples collected by Arcadis on the dates shown and submitted to a NYSDOH ELAP certified laboratory for VOC analyses per NYSDEC ASP 2005, Method OLM 4.3 (prior to September 1, 2014) and per EPA Method 8260C (after September 1, 2014). Results validated following protocols specified in Sampling and Analysis Plan in the DRAFT Bethpage Park Groundwater Containment System OM&M Manual (Arcadis 2016). See previous quarterly reports for historical analytical results.

2. "Total VOCs" represents the sum of individual concentrations of the VOCs detected.

ASP	Analytical Services Protocol
ELAP	Environmental Laboratory Approval Program
NE	Not Established
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
OLM	Ozone Limited Method
OM&M	Operation, Maintenance, and Monitoring
SCGs	Standards, Criteria, and Guidance values
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound
	Bold cell outline indicates an exceedance of an SCG
1.4	Bold data indicates a detection
< 1.0	Compound not detected above its laboratory quantification limit
J	Compound detected below its reporting limit; value is estimated
µg/L	micrograms per liter

SOURCE:
USGS 7.5 MIN. AMITYVILLE QUADRANGLE, AMITYVILLE, N.Y., 1994, FREEPORT QUADRANGLE, FREEPORT, N.Y., 1994, HICKSVILLE QUADRANGLE, HICKSVILLE, N.Y., 1967, PHOTOREVISED 1979, HUNTINGTON, N.Y., 1967, PHOTOREVISED 1979

0 2000' 4000'

SCALE IN FEET

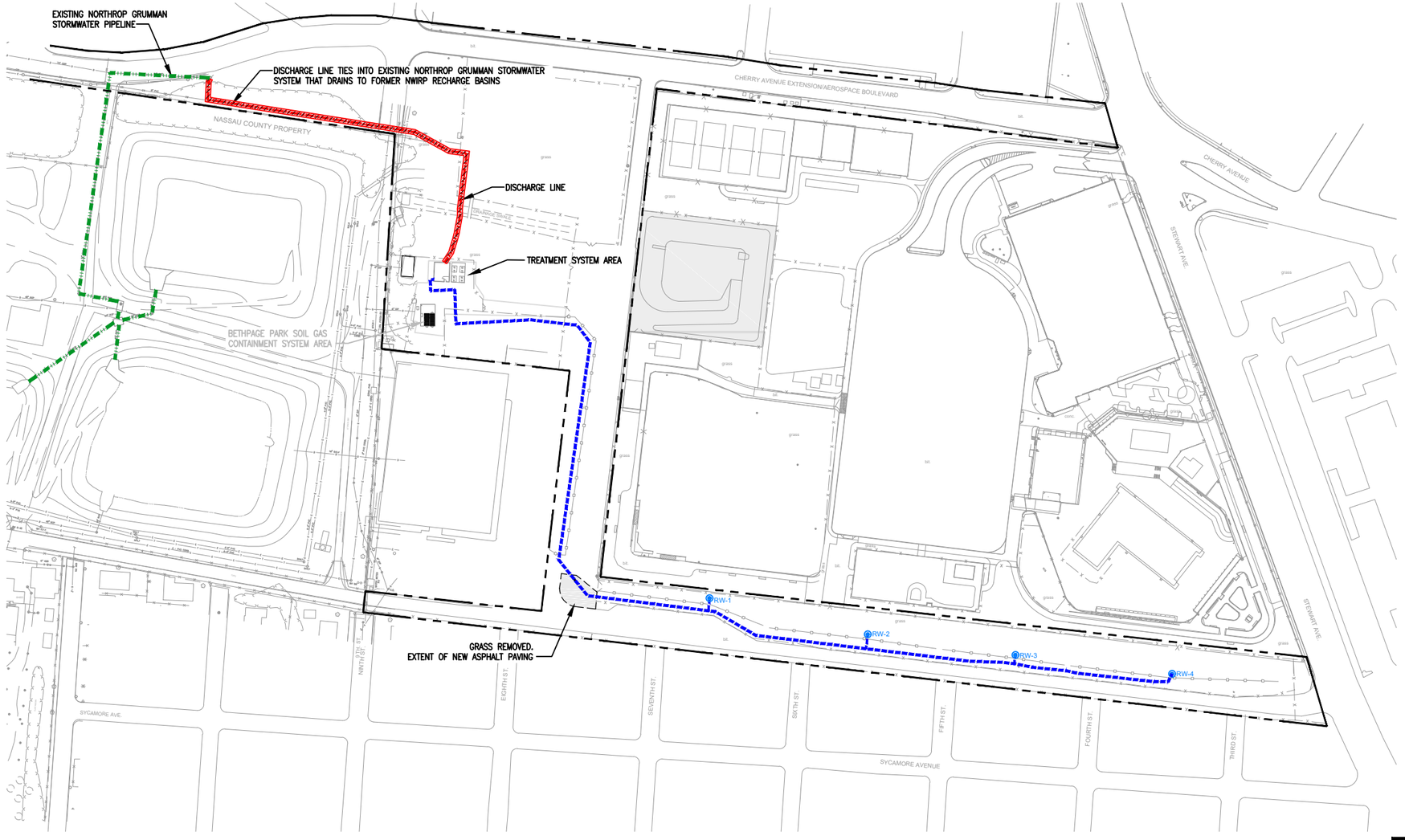
BETHPAGE PARK GROUNDWATER CONTAINMENT SYSTEM
OPERABLE UNIT 3
(FORMER GRUMMAN SETTLING PONDS)
BETHPAGE, NEW YORK

SITE LOCATION

ARCADIS Design & Consultancy for natural and built assets

FIGURE
1

CITY:SYRACUSE-NY DIV/GROUP:ENV DB:A.SANCHEZ LD: PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
G:\ENVCAD\SYRACUSE\ACTIVITY\00149611\4\OMM4INY1496~B01.dwg LAYOUT: BETHPAGE PARK SAVED: 11/11/2015 4:51 PM ACADVER: 19.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 11/11/2015 4:54 PM BY: STOWELL, GARY
XREFS: IMAGES: PROJECTNAME: ----
AMITYVILLE.TIF
FREEPORT.TIF
HICKSVILLE.TIF
HUNTINGTON.TIF



LEGEND:

- NORTHROP GRUMMAN PROPERTY LINE
- FENCE
- bit. BITUMINOUS PAVEMENT
- INFLUENT PIPELINE AND ELECTRICAL CONDUITS
- EFFLUENT PIPELINE
- EXISTING NORTHROP GRUMMAN STORMWATER PIPELINE
- RW-4 REMEDIAL WELL
- NWIRP NAVAL WEAPONS INDUSTRIAL RESERVE PLANT (NOW OWNED BY NASSAU COUNTY)

0 200' 400'

SCALE IN FEET

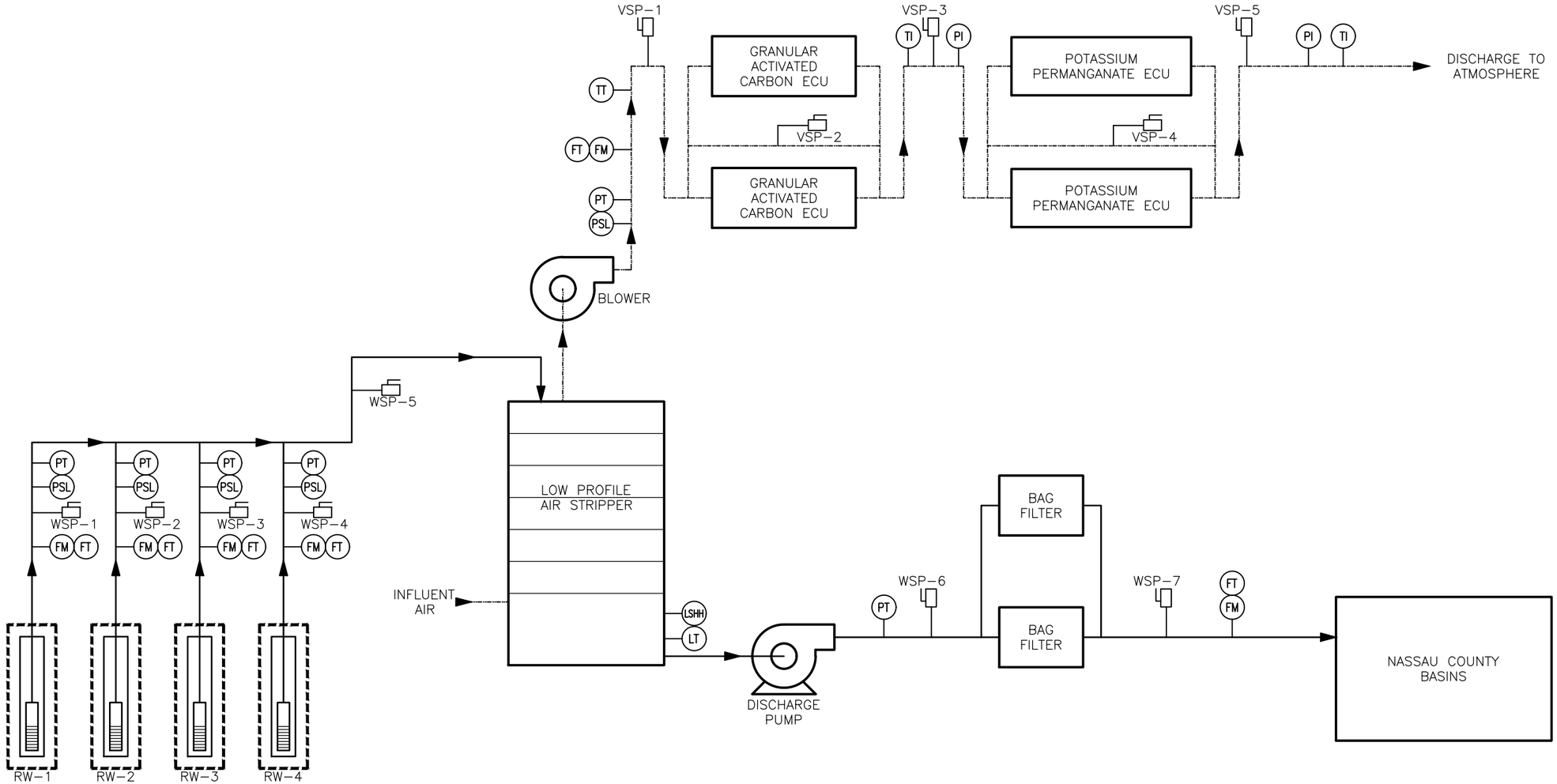
BETHPAGE PARK GROUNDWATER CONTAINMENT SYSTEM
OPERABLE UNIT 3
(FORMER GRUMMAN SETTLING PONDS)
BETHPAGE, NEW YORK

SITE AND GROUNDWATER CONTAINMENT SYSTEM

ARCADIS Design & Consultancy for natural and built assets

FIGURE 2

CITY:SYRACUSE-NY DIV/GROUP:ENV DB:A.SANCHEZ LD:AS PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
C:\Users\alsanchez\OneDrive - ARCADIS\BIM 360 Docs\NORTHROP GRUMMAN\OMM\4NY1496B01.DWG LAYOUT: 2 SAVED: 8/16/2018 1:24 PM ACADVER: 21.0S (LMS TECH) PAGESETUP:---- PLOTSTYLETABLE: ---- PLOTTED: 8/16/2018 1:24 PM BY: SANCHEZ, ADRIAN
XREFS: IMAGES: PROJECTNAME: ----
X-r1496X00
X-ONSITE-BASE SITE



LEGEND:

- PROCESS WATER
- PROCESS AIR
- FM — INSTRUMENT
- SAMPLE PORT
- FLOW DIRECTION
- FM FLOW METER
- FT FLOW RATE TRANSMITTER
- PSL PRESSURE VACUUM LOW
- PT PRESSURE TRANSMITTER
- PI PRESSURE INDICATOR
- LSHH LEVEL SWITCH HIGH HIGH
- LT LEVEL TRANSMITTER
- TT TEMPERATURE TRANSMITTER
- TI TEMPERATURE INDICATOR
- WSP WATER SAMPLE PORT
- VSP VAPOR SAMPLE PORT
- ECU EMISSION CONTROL UNIT

BETHPAGE PARK GROUNDWATER CONTAINMENT SYSTEM
OPERABLE UNIT 3
(FORMER GRUMMAN SETTLING PONDS)
BETHPAGE, NEW YORK

GROUNDWATER TREATMENT SYSTEM PROCESS SCHEMATIC AND MONITORING LOCATIONS

ARCADIS Design & Consultancy for natural and built assets

FIGURE 3

N

EXPLANATION:

Symbol	Description
— · —	NORTHROP GRUMMAN PROPERTY LINE
— x — x —	FENCE
(shaded)	BASIN
bit.	BITUMINOUS PAVEMENT
MW-200-1	MONITORING WELL
RW-2	REMEDIAL WELL
PZ-2C	PIEZOMETER

NOTES:

1. MONITORING WELLS, REMEDIAL WELLS, AND PIEZOMETERS SURVEYED TO NORTH AMERICAN DATUM (NAD) 83.
2. PARK FEATURES SHOWN WERE PRESENT PRIOR TO TOWN OF OYSTER BAY REDEVELOPMENT IN 2005.

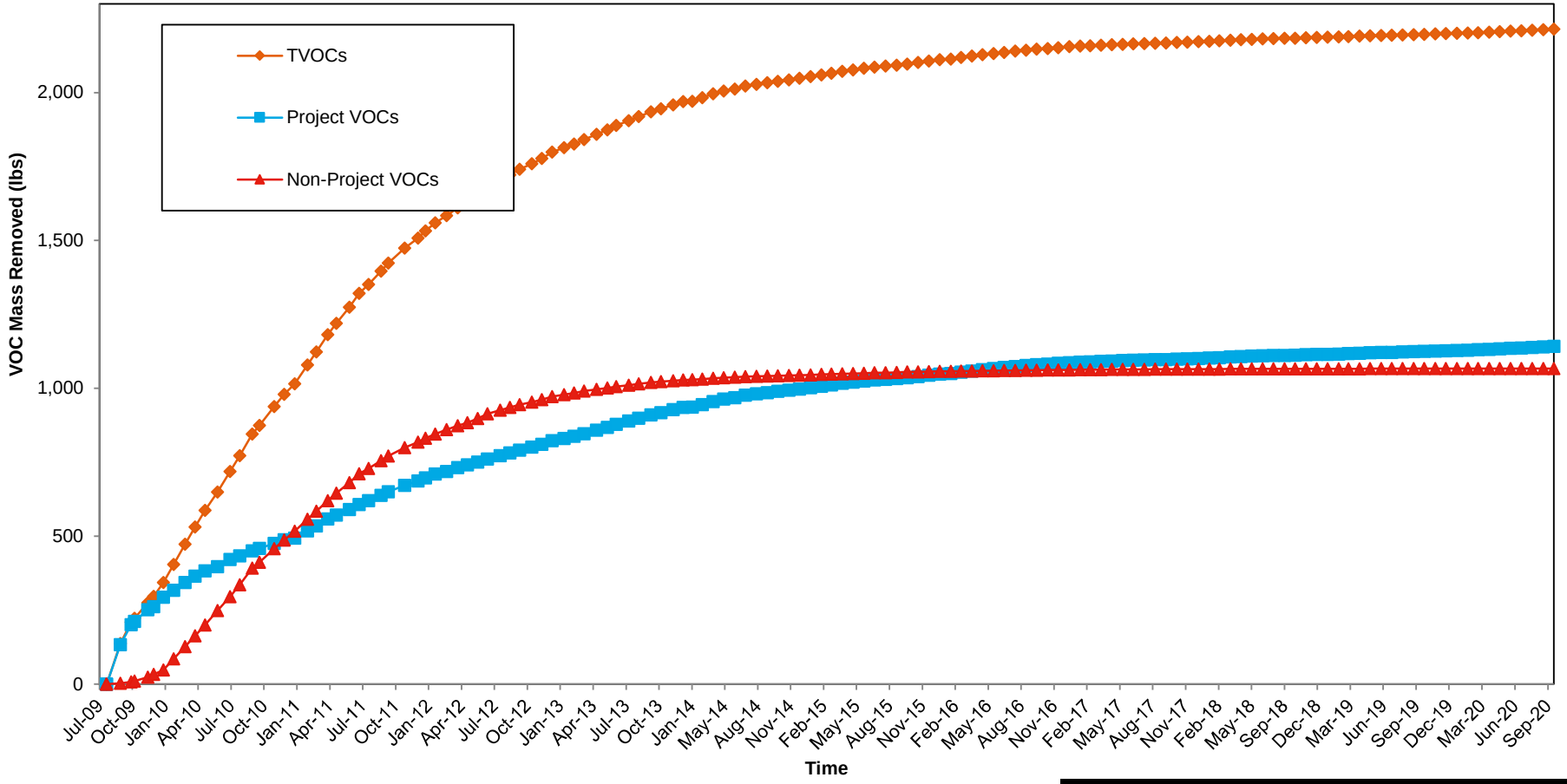
0 100' 200'
APPROXIMATE SCALE IN FEET

BETHPAGE PARK GROUNDWATER CONTAINMENT SYSTEM
OPERABLE UNIT 3
(FORMER GRUMMAN SETTLING PONDS)
BETHPAGE, NEW YORK

GROUNDWATER MONITORING NETWORK SITE PLAN

ARCADIS Design & Consultancy for natural and built assets

FIGURE 4



Abbreviations, Notes, and Units:

VOC = Volatile Organic Compound
TVOCs = Total VOCs detected

Project VOCs = sum of 1,1,1-trichloroethane; 1,1-dichloroethane; 1,2-dichloroethane; 1,1-dichloroethene; tetrachloroethene; trichloroethene; vinyl chloride; cis-1,2-dichloroethene; trans-1,2-dichloroethene; benzene; toluene; and total xylenes.
Non-Project VOCs = sum of VOCs that are not Project VOCs.

lbs = pounds

BETHPAGE PARK GROUNDWATER CONTAINMENT SYSTEM
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CUMULATIVE TOTAL, PROJECT, AND NON-PROJECT VOC MASS REMOVED

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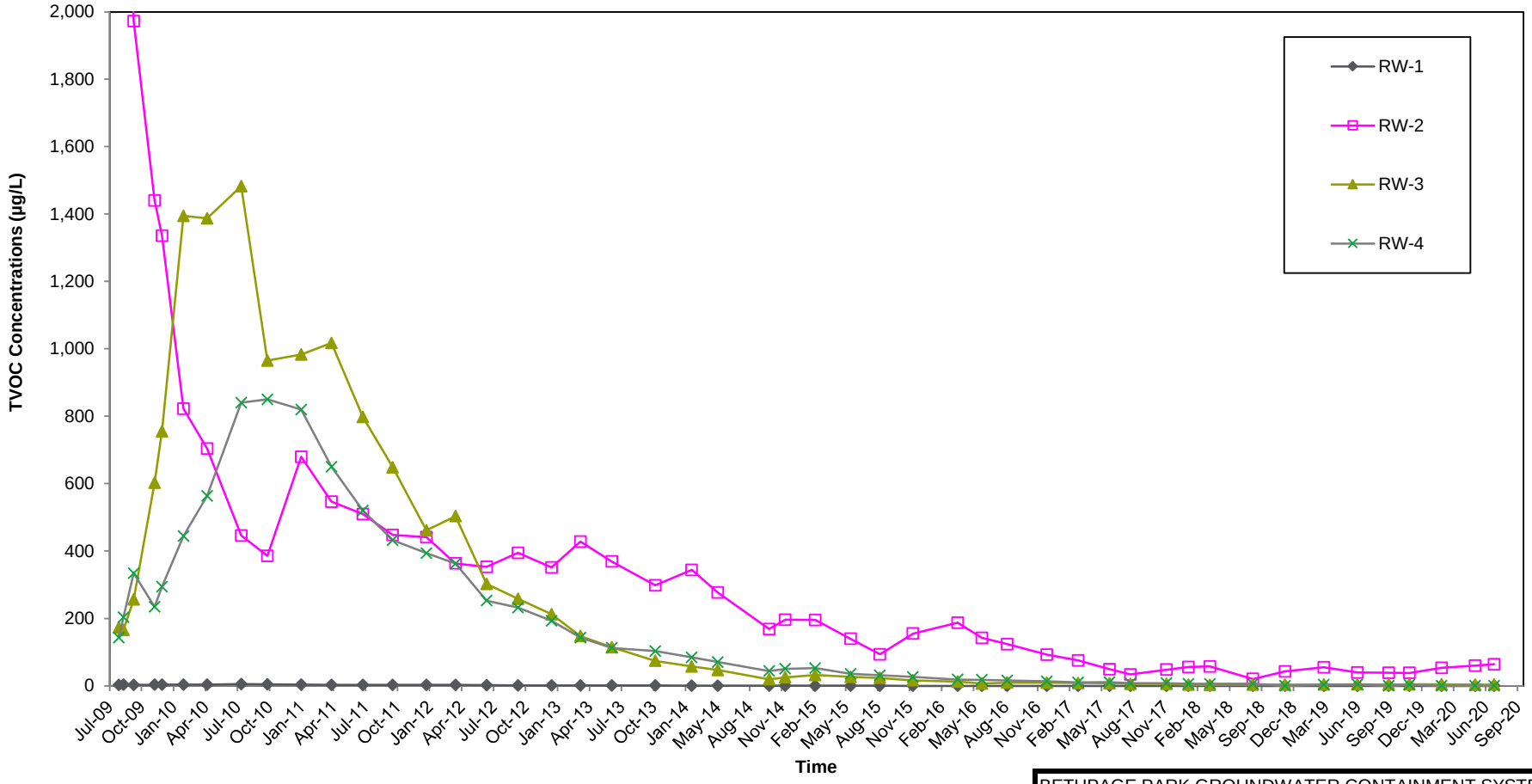
FIGURE
5

G:\APROJECT\Northrop Grumman Bethpage\OU3.2 Groundwater Containment System\10 Final Reports-Presentations\OM&M Reports\2020 Q3\Raw Files\Q3_Table 2-8Figure 5 TVOC Mass Graph



Abbreviations, Notes, and Units:

VOC = Volatile Organic Compound
TVOCs = Total VOCs detected

1. Results prior to September 10, 2009 are not shown to improve figure clarity. The TVOC concentrations are greater than 2,000 µg/L. See previous reports for full data set.

µg/L = micrograms per liter

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REMEDIAL WELL TOTAL VOC CONCENTRATIONS

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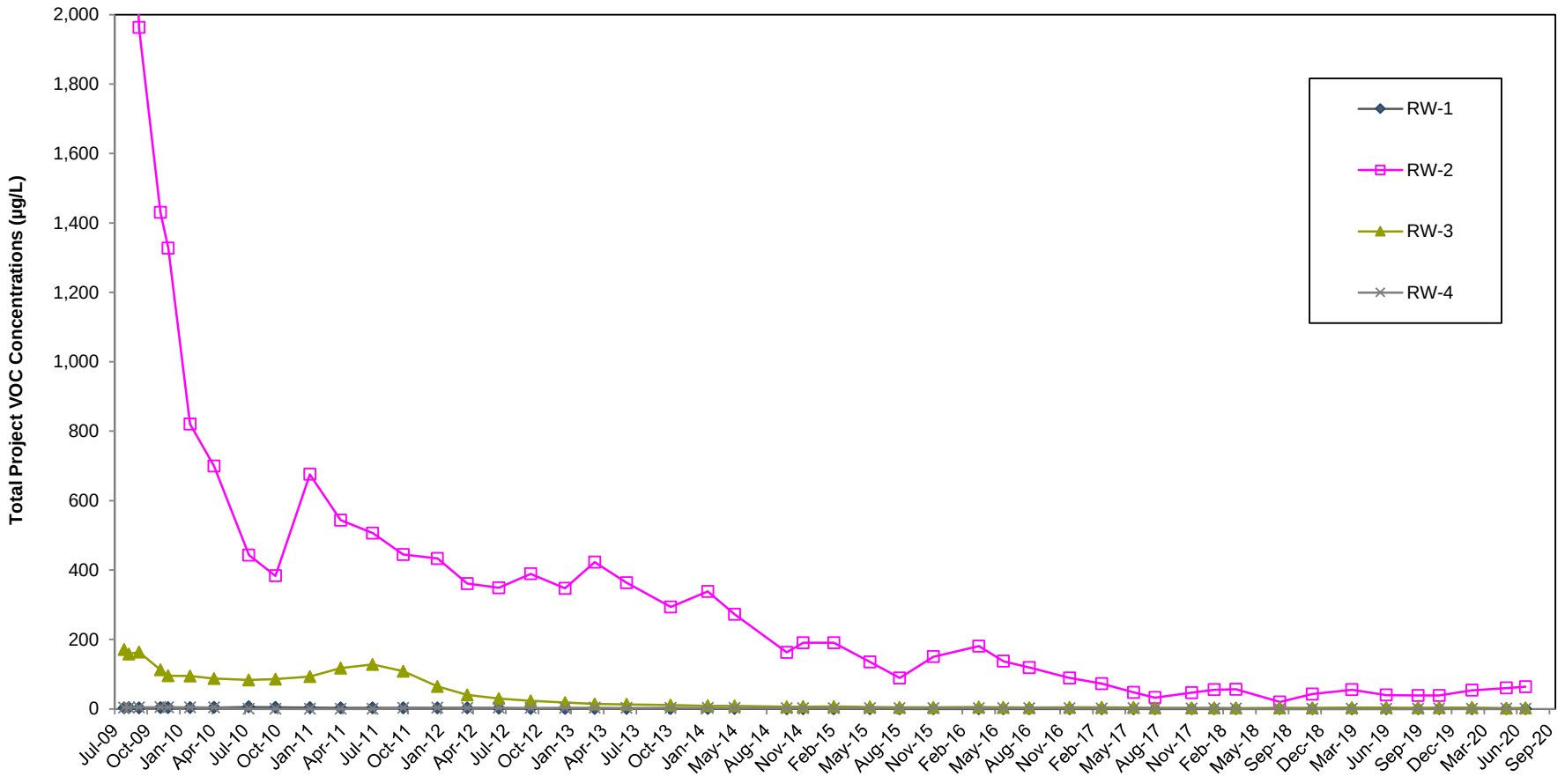
FIGURE 6A



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1. Results prior to September 10, 2009 are not shown to improve figure clarity. Total Project VOC concentrations are greater than 2,000 µg/L. See previous reports for full data set.

µg/L = micrograms per liter

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REMEDIAL WELL PROJECT VOC CONCENTRATIONS

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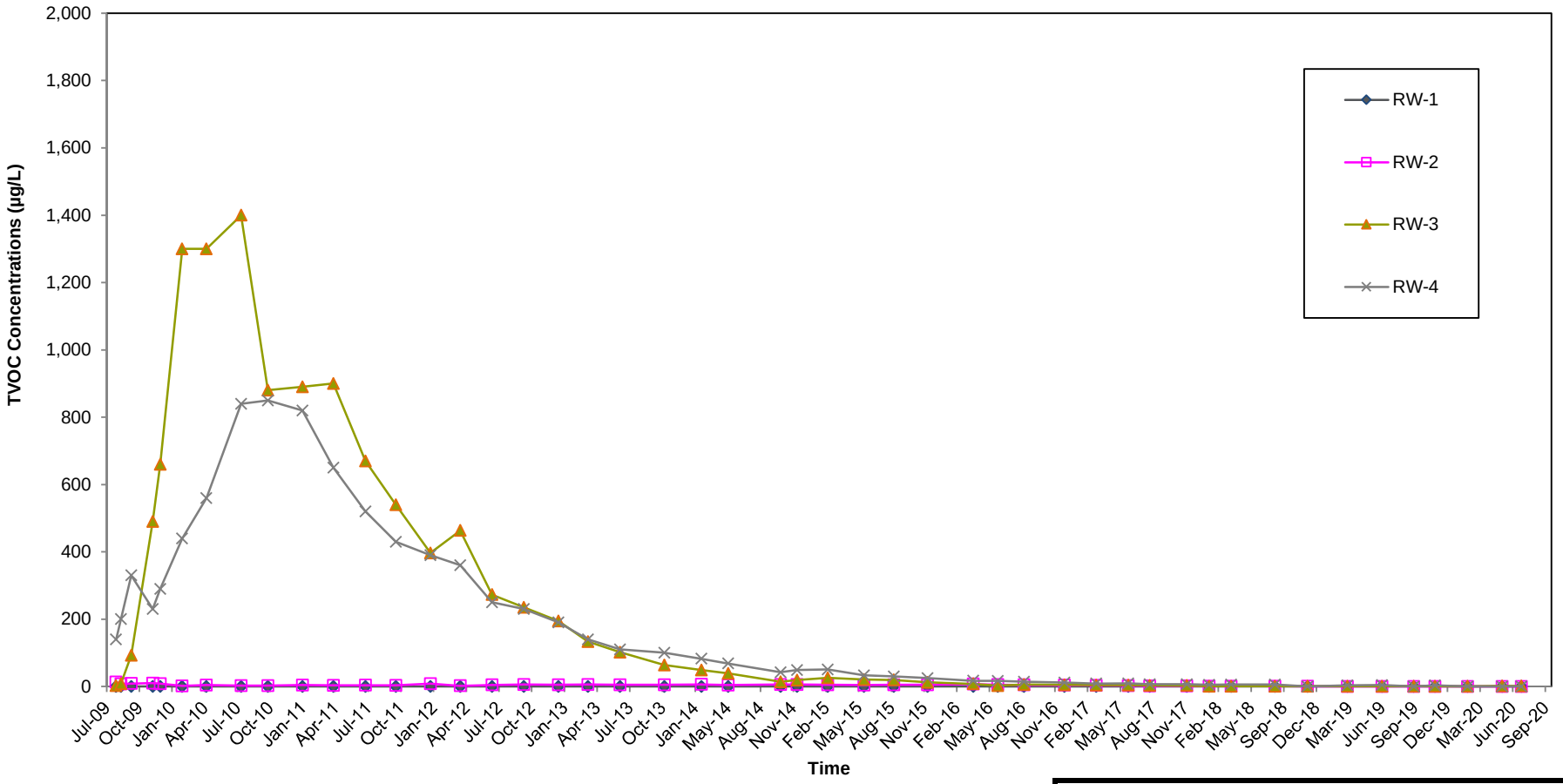
FIGURE 6B



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TVOCs = Total VOCs detected.

Non-Project VOCs = sum of TVOCs that are not Project VOCs.

µg/L = micrograms per liter

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REMEDIAL WELL NON-PROJECT VOC CONCENTRATIONS

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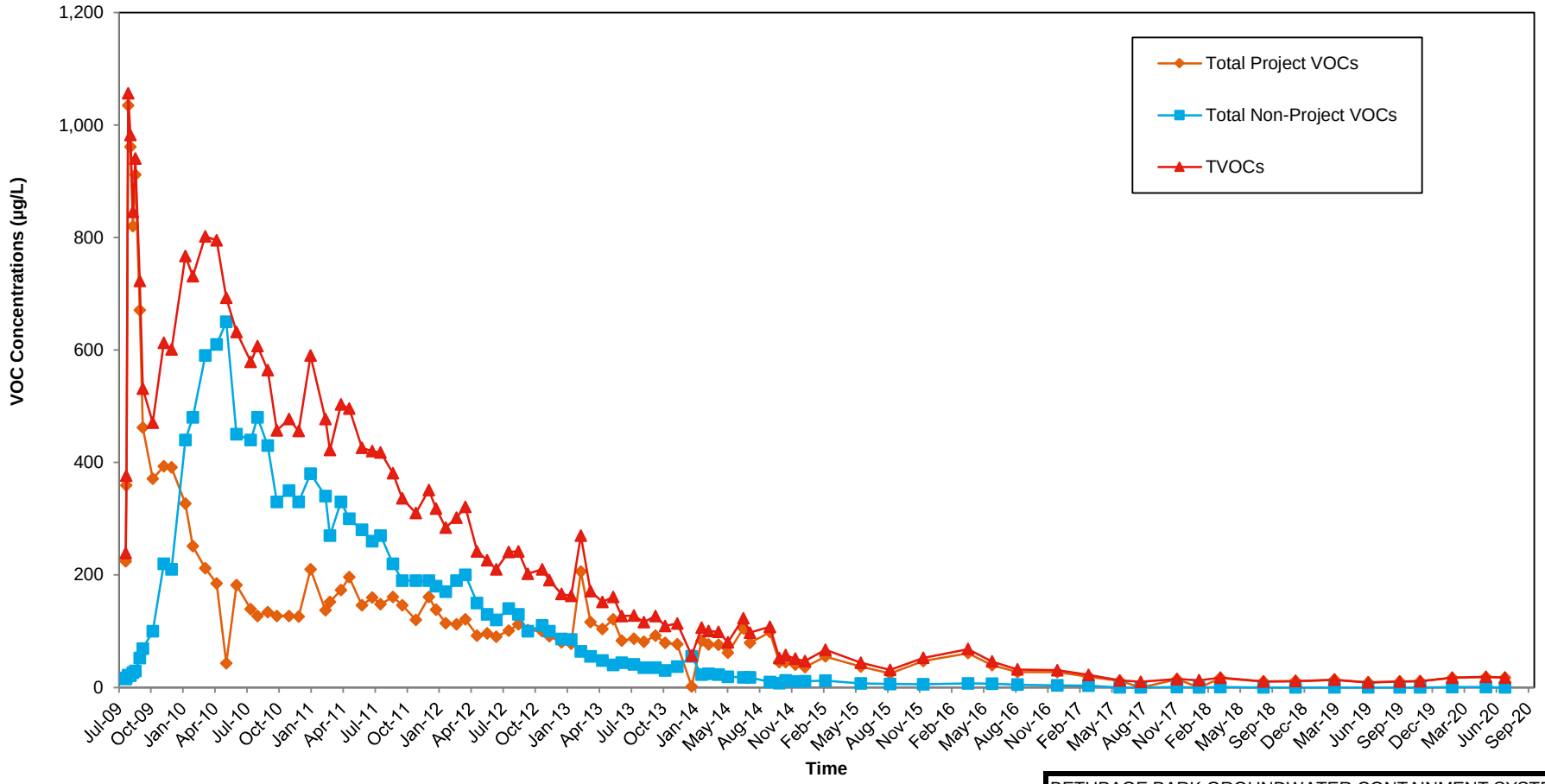
FIGURE
6C

G:\APROJECT\Northrop Grumman Bethpage\OU3.2 Groundwater Containment System\10 Final Reports-Presentations\OM&M Reports\2020 Q3\Raw Files\Q3_Table 2-8Figure 6C RW Non-Proj VOC



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Non-Project VOCs = sum of VOCs that are not Project VOCs.

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INFLUENT TOTAL, PROJECT AND NON-PROJECT VOC CONCENTRATIONS

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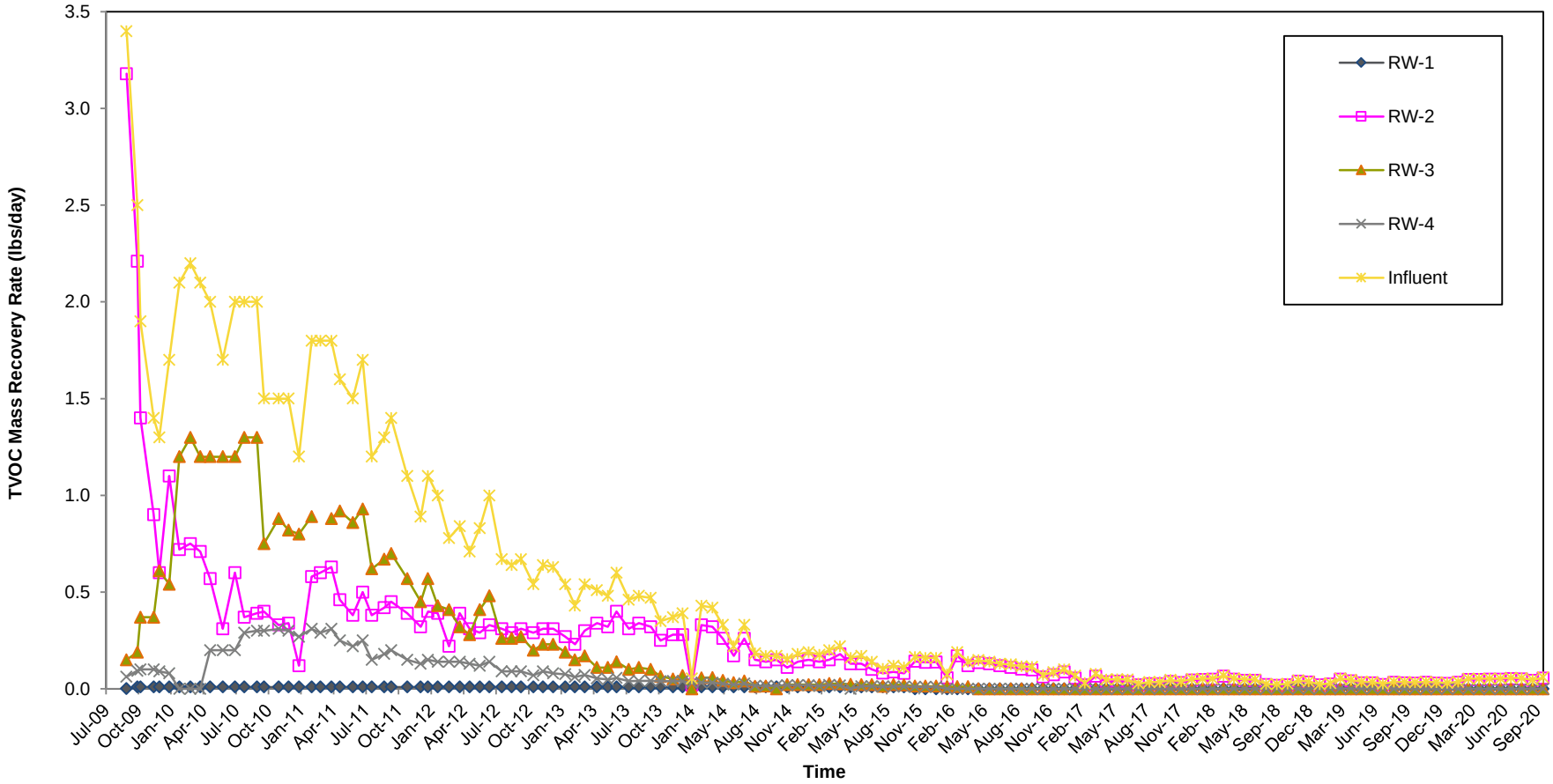
FIGURE
7

G:\APROJECT\Northrop Grumman Bethpage\OU3.2 Groundwater Containment System\10 Final Reports-Presentations\OM&M Reports\2020 Q3\Raw Files\Q3_Table 2-8Figure 7 Comb. Inf. VOC Conc.



Abbreviation, Notes, and Units:

VOC = Volatile Organic Compound
TVOCs = Total VOCs detected

lbs/day = pounds per day

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TOTAL VOC MASS RECOVERY RATES

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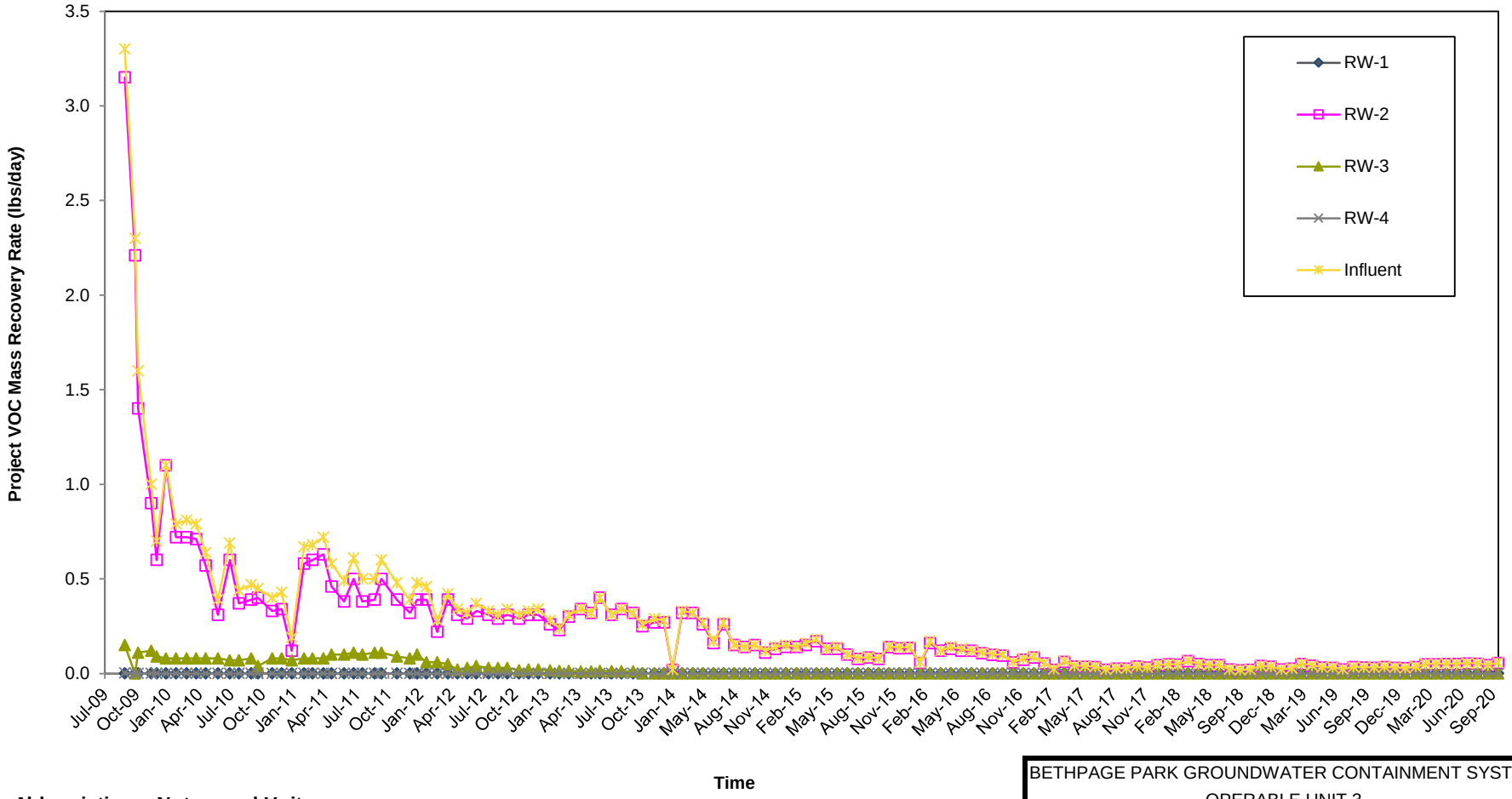
FIGURE
8A

G:\APROJECT\Northrop Grumman Bethpage\OU3.2 Groundwater Containment System\10 Final Reports-Presentations\OM&M Reports\2020 Q3\Raw Files\Q3_Table 2-8Figure 8A VOC Recovery Rates



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lbs/day = pounds per day

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PROJECT VOC MASS RECOVERY RATES

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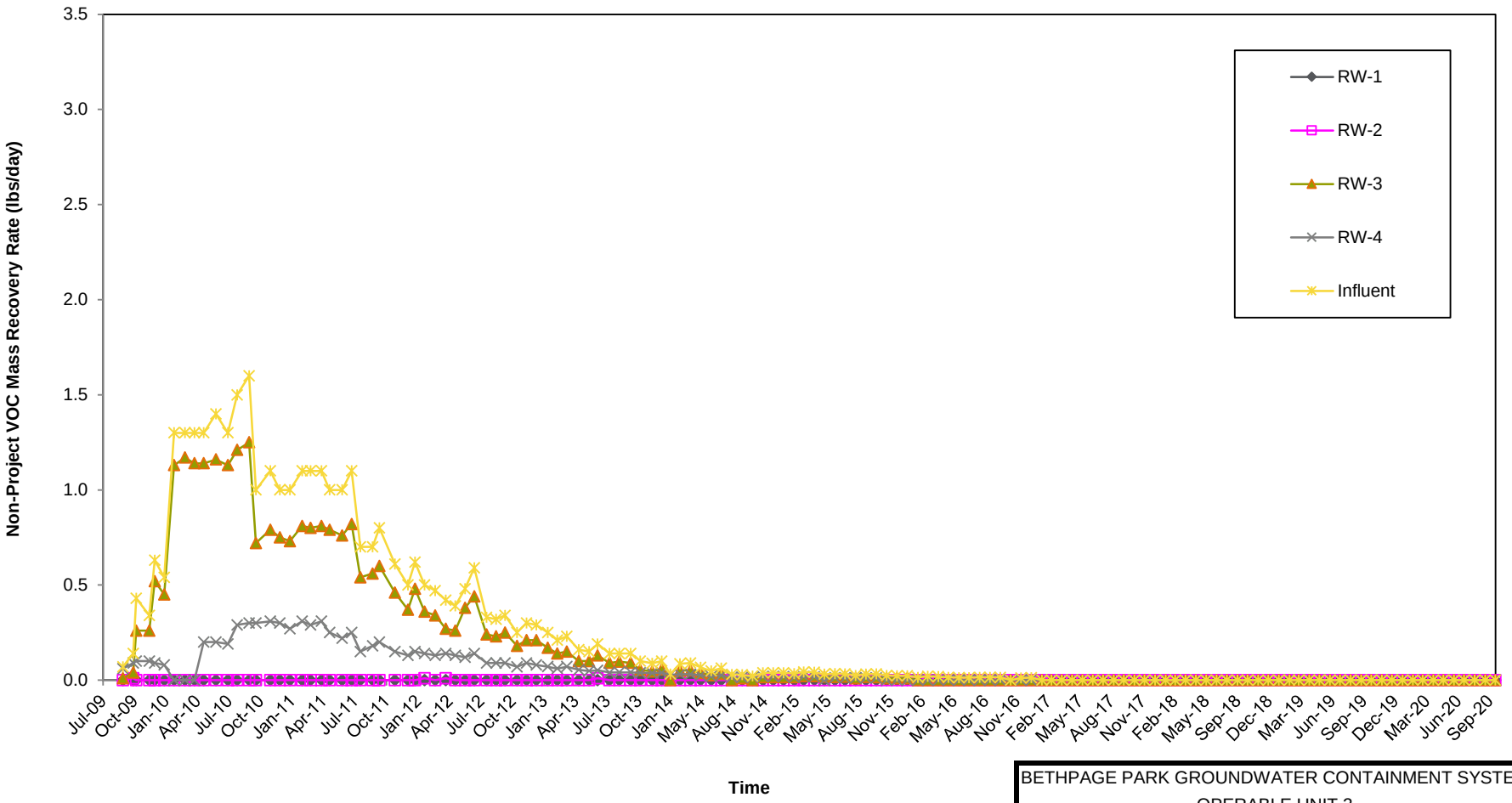
FIGURE
8B

G:\APROJECT\Northrop Grumman Bethpage\OU3.2 Groundwater Containment System\10 Final Reports-Presentations\OM&M Reports\2020 Q3\Raw Files\Q3_Table 2-8Figure 8B VOC Recovery Rates



Abbreviations, Notes, and Units:

VOC = Volatile Organic Compound

Non-Project VOCs = sum of VOCs that are not Project VOCs.

lbs/day = pounds per day

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NON-PROJECT VOC MASS RECOVERY RATES

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FIGURE
8C

G:\APROJECT\Northrop Grumman Bethpage\OU3.2 Groundwater Containment System\10 Final Reports-Presentations\OM&M Reports\2020 Q3\Raw Files\Q3_Table 2-8Figure 8C VOC Recovery Rates