

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.
3. Results validated following protocols specified in Sampling and Analysis Plan in the Bethpage Park Groundwater Containment System OM&M Manual (Arcadis 2016). See previous annual reports for historical analytical results.
4. As of August 4, 2022 the RW-1 concentration is representative of the addition of BCPMW-4-1 and BCPMW-4-2 that were added as additional recovery wells.

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

1.7	Bold value indicates a detection.
< 0.69	Compound not detected above the laboratory quantification limit.
J	Result is estimated.
µg/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 ^{1,3} (All Constituent Concentrations in ppbv)	08/22/23	11/08/23	02/22/24	05/15/24
<u>Tentatively Identified Compounds</u>				
1-Butanol	ND	ND	3	ND
Octane, 3-methyl	ND	ND	6	ND
Nonane	ND	ND	2.5	ND
alkane	ND	ND	3.4	0.83 J
Camphene	ND	ND	2.7	ND
Silanol, trimethyl-	ND	3	ND	ND
n-Propyl acetate	1.1	ND	ND	ND
Cyclohexane, methyl-	ND	2.6	ND	ND
Total VOC TICs^{2,4}	1.94	5.6	78	0.83

Notes, Abbreviations, Qualifiers, and Units:

- 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.
- Compounds found in associated method blank are not included in Total VOC TICs.
- Results validated following protocols specified in Sampling and Analysis Plan in the Bethpage Park Groundwater Containment System OM&M Manual (Arcadis 2016). See previous annual reports for historical analytical results.
- As of August 4, 2022 the RW-1 concentration is representative of the addition of BCPMW-4-1 and BCPMW-4-2 that were added as additional recovery wells.

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

- 1** 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 ^{1,8}	Water Flow Rates (All Flows in gpm)						Water Pressures (All Pressures in psi)					Air Flow Rate (scfm) ²	Air Pressures (All Pressures in iwc) ^{5,6}				Air Temp. (°R) ⁵	
	Remedial Well ²				Combined Influent ³	Effluent ²	Remedial Well Effluent ^{2,4}				Effluent ⁵	Effluent	ECU Influent				Effluent	Effluent
	RW 1 ⁷	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)	(°R)
08/22/23	30.3	73.9	78.1	31.0	213	219	57	27	35	54	16	1,128	2.5	< 1.0	< 1.0	< 1.0	< 1.0	546
09/07/23	30.9	73.6	76.0	31.0	212	221	57	26	40	54	22	1,103	2.5	< 1.0	< 1.0	< 1.0	< 1.0	553
10/04/23	28.9	73.4	75.7	30.7	209	220	59	26	38	54	12	1,107	2.5	< 1.0	< 1.0	< 1.0	4.0	540
11/08/23	24.6	75.4	76.3	29.7	206	212	8	23	41	56	12	1,099	1.5	< 1.0	< 1.0	< 1.0	3.5	528
12/07/23	24.0	81.2	75.7	29.5	210	285	8	22	41	56	12	1,171	2.0	< 1.0	< 1.0	< 1.0	4.5	522
01/11/24	25.2	75.2	77.5	30.4	208	286	8	67	65	70	17	1,068	2.0	< 1.0	< 1.0	< 1.0	< 1.0	526
02/22/24	25.5	69.5	78.1	29.9	203	254	7	46	33	57	12	1,026	2.0	< 1.0	< 1.0	< 1.0	1.0	520
03/18/24	25.8	73.6	78.0	29.6	207	260	8	38	33	58	25	1,064	1.5	< 1.0	< 1.0	< 1.0	< 1.0	526
04/16/24	29.0	71.7	76.6	28.8	206	260	8	43	39	59	17	1,012	1.5	< 1.0	< 1.0	< 1.0	< 1.0	538
05/15/24	20.1	71.7	76.9	28.0	197	249	8	42	38	60	11	948	1.0	< 1.0	< 1.0	< 1.0	< 1.0	534
06/12/24	30.2	75.8	77.7	29.9	214	261	8	30	35	58	18	1,044	2.0	< 1.0	< 1.0	< 1.0	< 1.0	546

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.
6. Pressure readings recorded as < 1.0 iwc due to pressure being too low for gauge sensitivity.
7. As of August 4, 2022 the RW-1 flow rate presented includes the combined flow rates from wells BCPMW-4-1 and BCPMW-4-2 as additional recovery wells.

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
°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 ³	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 Totals⁸	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	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			
2018 Totals	15,145	37,712	32,473	14,917	100,247	< 0.01	13.71	0.90	0.56	15.2	< 0.01	13.5	0.70	< 0.01	14.2	< 0.01	0.27	0.19	0.52	0.97	< 0.01	0.038	< 0.01	< 0.01	0.042	< 0.01	0.037	< 0.01	< 0.01	0.039	< 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			
2020 Totals	14,475	35,814	37,537	15,113	102,939	< 0.01	19.3	1.3	< 0.01	20.6	< 0.01	19.3	0.91	< 0.01	20.2	< 0.01	< 0.01	0.36	< 0.01	0.36	< 0.01	0.053	< 0.01	< 0.01	0.056	< 0.01	0.053	< 0.01	< 0.01	0.055	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01			
2021 Totals	14,490	36,403	38,153	15,324	104,370	< 0.01	171.4	1.9	0.05	173.3	< 0.01	167.7	1.14	< 0.01	168.9	< 0.01	3.6	0.75	0.11	4.49	< 0.01	1.865	< 0.01	< 0.01	1.886	< 0.01	1.825	< 0.01	< 0.01	1.839	< 0.01	0.04	< 0.01	< 0.01	0.0470			
2022 Totals	12,224	36,802	38,231	15,238	102,495	45	53	15	< 0.01	112.3	43.3	51.2	13.1	< 0.01	107.6	1.7	1.3	1.6	0.1	4.8	0.5	0.6	0.2	< 0.01	1.2	0.5	0.6	0.1	< 0.01	1.2	0.02	0.01	< 0.01	< 0.01	0.04			
2023 Totals	13,740	33,732	37,815	15,084	100,372	4.75	12.97	8.90	< 0.01	46.88	24.89	12.97	8.47	< 0.01	46.3	0.1	< 0.01	0.3	< 0.01	0.4	0.1	0.14	0.10	< 0.01	0.51	0.27	0.14	0.09	< 0.01	0.51	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01			
January through March 2024																																						
01/01/24 - 02/01/24	1,058	3,039	3,214	1,259	8,570	0.9	0.45	0.48	< 0.01	1.86	0.9	0.5	0.33	< 0.01	1.7	< 0.01	< 0.01	< 0.01	< 0.01	0.000	0.030	0.015	0.015	< 0.01	0.060	0.030	0.015	0.011	< 0.01	0.055	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01			
02/01/24 - 03/01/24	1,017	2,968	3,249	1,254	8,487	0.9	0.44	0.48	< 0.01	1.82	0.9	0.4	0.34	< 0.01	1.7	< 0.01	< 0.01	< 0.01	< 0.01	0.000	0.031	0.015	0.017	< 0.01	0.063	0.031	0.015	0.012	< 0.01	0.058	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01			
03/01/24 - 04/01/24	1,145	3,251	3,474	1,319	9,189	1.0	0.48	0.52	< 0.01	2.01	1.0	0.5	0.36	< 0.01	1.9	< 0.01	< 0.01	< 0.01	< 0.01	0.000	0.033	0.016	0.017	< 0.01	0.065	0.033	0.016	0.012	< 0.01	0.060	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01			
Subtotal Jan - Mar 2024	3,220	9,258	9,937	3,832	26,247	2.8	1.37	1.47	< 0.01	5.68	2.8	1.4	1.04	< 0.01	5.2	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.031	0.015	0.016	< 0.01	0.062	0.031	0.015	0.011	< 0.01	0.058	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01			
April through June 2024																																						
04/01/24 - 05/01/24	1,201	3,105	3,323	1,231	8,861	0.6	1.4	1.5	0.6	4.06	0.6	0.6	0.6	0.6	2.2	< 0.01	< 0.01	< 0.01	< 0.01	0.000	0.018	0.047	0.051	0.019	0.135	0.018	0.018	0.018	0.018	0.073	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01			
05/01/24 - 06/01/24	815	2,401	2,659	967	6,842	0.4	1.1	1.2	0.4	3.14	0.4	0.4	0.4	0.4	1.5	< 0.01	< 0.01	< 0.01	< 0.01	0.000	0.012	0.036	0.039	0.014	0.101	0.012	0.012	0.012	0.012	0.048	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01			
06/01/24 - 07/01/24	1,056	2,971	3,098	1,186	8,311	0.5	1.4	1.4	0.5	3.81	0.5	0.5	0.5	0.5	1.9	< 0.01	< 0.01	< 0.01	< 0.01	0.000	0.016	0.045	0.047	0.018	0.127	0.016	0.016	0.016	0.016	0.065	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01			
Subtotal Apr - Jun 2024	3,072	8,477	9,080	3,384	24,014	1.4	3.89	4.16	1.55	11.01	1.4	1.4	1.41	1.4	5.6	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.015	0.043	0.046	0.017	0.121	0.015	0.015	0.015	0.015	0.062	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01			
2024 Totals	6,292	17,735	19,018	7,215	50,260	4.244	5.259	5.637	1.551	16.691	4.250	2.782	2.444	1.410	10.879	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.046	0.058	0.062	0.017	0.183	0.046	0.030	0.026	0.015	0.120	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01			
Total Since System Start Up	224,104	526,608	550,037	229,453	1,530,202	56	1,291	948	257	2,570	74	1,272	132	3	1,482	2	15	812	254	1,077	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--			

Notes, Abbreviations, and Units on last page.

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; trichloroethylene; 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. As of August 4, 2022 the RW-1 concentration is representative of the addition of BCPMW-4-1 and BCPMW-4-2 that were added as additional recovery wells.

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

Table 9
2024 Rule 212 Evaluation
Bethpage Park Soil Gas Containment System and Groundwater Containment System
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman,
Bethpage, New York

Project VOCs	CAS#	HTAC? ¹	2024 BPGWCS Maximum Effluent Conc. (ug/m3) ^{2,8}	2024 BPSGCS Maximum Effluent Conc. (ug/m3) ^{2,8}	2024 BPGWCS Emissions (lb/yr) ⁴	Facility Wide Emissions (lb/yr) ⁵	Rule 212 Emission Limit (lb/yr) ⁶	Further evaluation Required? ⁷
1,1,1-Trichloroethane	71-55-6	No		1.9	0.000	0.095	100	N
1,1 - Dichloroethane	75-34-3	No	2.2	4.0	0.068	0.269	100	N
1,1 - Dichloroethene	75-35-4	No	1.3	0.6	0.040	0.070	100	N
Benzene	71-43-2	Yes	0.51	1.4	0.016	0.086	100	N
cis- 1,2-Dichloroethene	156-59-2	No	115	149	3.570	11.058	100	N
Tetrachloroethene	127-18-4	Yes	5.9	6.4	0.183	0.505	1000	N
Toluene	108-88-3	No	2.1	3.2	0.065	0.226	100	N
trans- 1,2-Dichloroethene	156-60-5	No	1.1	2.5	0.034	0.160	100	N
Trichloroethene	79-01-6	Yes	29	189	0.900	10.399	500	N
Vinyl Chloride	75-01-4	Yes	6.1	0.68	0.189	0.224	100	N
Xylenes ³	1330-20-7	No	4.4	1.52	0.135	0.212	100	N
Non Project VOCs								
1-Chloro-1,1-difluoroethane (Freon 142B)	75-68-3	No	0.35	106	0.011	5.338	100	N
2-Butanone	78-93-3	No	2.3	4.1	0.071	0.277	100	N
4-Methyl-2-Pentanone	108-10-1	No	0.41		0.013	0.013	100	N
Acetone	67-64-1	No	22	19.0	0.683	1.638	100	N
Carbon Tetrachloride	56-23-5	Yes	0.82	0.69	0.025	0.060	100	N
Chlorodifluoromethane (Freon 22)	75-45-6	No	3.5	0.98	0.109	0.158	100	N
Chloromethane	74-87-3	No	9.5	0.54	0.295	0.322	100	N
Chloroform	67-66-3	Yes	8.3	13	0.258	0.911	100	N
Dichlorodifluoromethane (Freon 12)	75-71-8	No	2.6	2.3	0.081	0.196	100	N
Ethylbenzene	100-41-4	No	2.1		0.065	0.065	100	N
Methylene Chloride	75-09-2	No	1.5	79.2	0.047	4.027	100	N
Styrene (Monomer)	100-42-5	No		1.4	0.000	0.066	100	N

Footnotes on last page

Table 9
2024 Rule 212 Evaluation
Bethpage Park Soil Gas Containment System and Groundwater Containment System
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman,
Bethpage, New York

Project VOCs	CAS#	HTAC? ¹	2024 BPGWCS Maximum Effluent Conc. (ug/m3) ^{2,8}	2024 BPSGCS Maximum Effluent Conc. (ug/m3) ^{2,8}	2024 BPGWCS Emissions (lb/yr) ⁴	Facility Wide Emissions (lb/yr) ⁵	Rule 212 Emission Limit (lb/yr) ⁶	Further evaluation Required? ⁷
Non Project VOCs (cont d)								
Trichlorofluoromethane (Freon 11)	75-69-4	No	1.7	2	0.053	0.153	100	N
Trichlorotrifluoroethane (Freon 113)	76-13-1	No		0.68	0.000	0.032	100	N

Flowrates

Description	Flow (cfm)
BPGWCS	948
BPSGCS combined with ISTR	578

Notes:

- High toxicity air contaminant (HTAC) based on 6 CRR-NY Rule 212-2.2, Table 2 – high toxicity air contaminant list.
- Maximum effluent concentrations for soil gas effluent from VSP-601 and GW vapor from VSP-05 based on sampling performed in 2023. Compounds not detected above the laboratory reporting limit are excluded from the air quality impact analysis summary.
- Total for xylenes m, o, and P.
- Emission rate calculated based on maximum effluent concentration and maximum air flow rates measured during the sampling events. Emission rate standardized at 70 °F and 1 atm.
 e.g., TCE (lb/yr) = TCE [$\mu\text{g}/\text{m}^3$] x Air Flow Rate [ft^3/min] x ($1 \text{ m}^3/35.3147 \text{ ft}^3$) x (60 min/hr) x (0.000001 g/1 μg) x (0.0022 lb/g) x 8,760 hrs/yr
- Combined 2022 emissions from groundwater, ISTR, and soil gas containment systems.
- 100 lb/yr for non-HTACs, and mass emission limits based on Rule 212-2.2, Table 2 for HTACs.
- For HTACs, no further demonstration (i.e., comparison to SGCs, AGCs, or air modeling) is required if the actual facility-wide emissions are less than mass emission limit. For non-HTACs, no further demonstration is required if the actual facility-wide emissions are less than 100 lbs/yr.
- Blank cell indicates that the compound was not detected above its laboratory quantification limit.

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 (All Constituent Concentrations in µg/L)	Sample Location: Sample Date: NYSDEC SCGs	RW 1 8/22/2023	RW 1 11/7/2023	RW 1 2/22/2024	RW 1 5/15/2024	RW 2 8/22/2023	RW 2 8/22/2023	RW 2 2/22/2024	RW 2 5/15/2024
Project VOCs									
1,1,1-Trichloroethane	5	< 1.17	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	5	< 1.0	3.6	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	0.6	< 1.0	0.62 J	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	5	< 1.0	2.9	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	5	< 1.17	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethylene	5	< 1.0	213	52.5	30.0	23.7	32.4	8.4	6.8
Vinyl Chloride	2	< 1.0	34.9	3.6	0.61 J	2.1	2.2	1.1	0.61 J
cis-1,2-dichloroethene	5	< 1.0	574	48.9	24.4	28.3	27.4	8.3	10.5
trans-1,2-dichloroethene	5	< 1.0	5.8	0.67 J	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzene	1	< 0.50	2.1	< 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
Xylene-o	5	< 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
Subtotal Project VOCs		ND	831.12	105.7	55.0	54.1	62.0	17.8	18
Non-Project VOCs									
1,1,1,2-Tetrachloroethane	5	< 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
1,2-Dichloropropane	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Butadiene	0.5	< 5.17	< 5.18	< 5.0	< 5.0	< 5.0	< 5.1	< 5.0	< 5.0
2-Butanone	NE	< 27	< 28	< 10	< 10	< 10	< 11	< 10	< 10
4-methyl-2-pentanone	50	< 5.17	< 5.18	< 5.0	< 5.0	< 5.0	< 5.1	< 5.0	< 5.0
Acetone	NE	< 27	< 28	< 10	< 10	< 10	< 11	< 10	< 10
Bromodichloromethane	50	< 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
Bromomethane	5	< 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
Carbon tetrachloride	5	< 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
Chlorodibromomethane	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorodifluoromethane (Freon 22)	NE	< 5.17	< 5.18	< 5.0	< 5.0	< 5.0	< 5.1	< 5.0	< 5.0
Chloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

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



Compound ¹ (All Constituent Concentrations in µg/L)	Sample Location: Sample Date: NYSDEC SCGs	RW 3 8/22/2023	RW 3 11/7/2023	RW 3 2/22/2024	RW 3 5/15/2024	RW 4 8/22/2023	RW 4 11/7/2023	RW 4 2/22/2024	RW 4 5/15/2024
Project VOCs									
1,1,1-Trichloroethane	5	< 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	< 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
1,1-Dichloroethene	5	< 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
Trichloroethylene	5	9.1	8.1	6.5	5.6	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl Chloride	2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-dichloroethene	5	9.4	12.0	6.0	6.0	< 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
Benzene	1	< 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
Xylene-o	5	< 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
Subtotal Project VOCs		19	20	12.5	11.60	ND	ND	ND	ND
Non-Project VOCs									
1,1,1,2-Tetrachloroethane	5	< 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
1,2-Dichloropropane	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Butadiene	0.5	< 5.0	< 5.1	< 1.0	< 1.0	< 5.0	< 5.1	< 5.0	< 1.0
2-Butanone	NE	< 10	< 11	< 1.0	< 1.0	< 10	< 11	< 10	< 1.0
4-methyl-2-pentanone	50	< 5.0	< 5.1	< 1.0	< 1.0	< 5.0	< 5.1	< 5.0	< 1.0
Acetone	NE	< 10	< 11	< 1.0	< 1.0	< 10	< 11	< 10	< 1.0
Bromodichloromethane	50	< 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
Bromomethane	5	< 2.0	< 2.0	< 1.0	< 1.0	< 2.0	< 2.0	< 2.0	< 1.0
Carbon Disulfide	60	< 2.0	< 2.0	< 1.0	< 1.0	< 2.0	< 2.0	< 2.0	< 1.0
Carbon tetrachloride	5	< 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
Chlorodibromomethane	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorodifluoromethane (Freon 22)	NE	< 5.0	< 5.1	< 1.0	< 1.0	0.52 J	0.62 J	0.55 J	< 1.0
Chloroethane	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

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



Compound ¹ (All Constituent Concentrations in µg/L)	Sample Location: Sample Date: NYSDEC SCGs	RW 1 8/22/2023	RW 1 11/7/2023	RW 1 2/22/2024	RW 1 5/15/2024	RW 2 8/22/2023	RW 2 8/22/2023	RW 2 2/22/2024	RW 2 5/15/2024
Chloroform	7	< 1.0	< 1.0	< 1.0	< 1.0	< 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
cis-1,3-dichloropropene	0.4	< 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
Dichloromethane	5	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Ethylbenzene	5	3.22	0.80 J	< 1.0	< 1.0	< 1.0	< 1.1	< 1.0	< 1.0
Methyl N-Butyl Ketone	50	< 5.17	< 5.18	< 5.0	< 5.0	< 5.0	< 5.1	< 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
Styrene	5	< 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
Trichlorofluoromethane (Freon 11)	5	< 2.17	< 2.18	< 2.0	< 2.0	< 2.0	< 2.1	< 2.0	< 2.0
Trichlorotrifluoroethane (Freon 113)	5	< 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
Subtotal Non-Project VOCs		3.22	0.80	ND	ND	ND	ND	ND	ND
Total VOCs^{2,3,4}		3.22	832	105.7	55.0	54.1	62.0	17.80	17.9
1,4-Dioxane		0.5	4.0 B	2.3	1.40	1.3	0.86 B	2.20	0.34

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

Table 10
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Bethpage Park Groundwater Containment System
Operable Unit 3 (Former Grumman Settling Ponds)
Northrop Grumman,
Bethpage, New York



Compound ¹ (All Constituent Concentrations in µg/L)	Sample Location: Sample Date: NYSDEC SCGs	RW 3 8/22/2023	RW 3 11/7/2023	RW 3 2/22/2024	RW 3 5/15/2024	RW 4 8/22/2023	RW 4 11/7/2023	RW 4 2/22/2024	RW 4 5/15/2024
Chloroform	7	< 1.0	0.96 J	< 1.0	< 1.0	< 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
cis-1,3-dichloropropene	0.4	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dichlorodifluoromethane (Freon 12)	5	< 2.0	< 2.0	< 1.0	< 1.0	< 2.0	< 2.0	< 2.0	< 1.0
Dichloromethane	5	< 2.0	< 2.0	< 1.0	< 1.0	< 2.0	< 2.0	< 2.0	< 1.0
Ethylbenzene	5	< 1.0	< 1.1	< 1.0	< 1.0	< 1.0	< 1.1	< 1.0	< 1.0
Methyl N-Butyl Ketone	50	< 5.0	< 5.1	< 1.0	< 1.0	< 5.0	< 5.1	< 5.0	< 1.0
Methyl tert-Butyl Ether	5	< 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
trans-1,3-dichloropropene	0.4	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichlorofluoromethane (Freon 11)	5	< 2.0	< 2.1	< 1.0	< 1.0	< 2.0	< 2.1	< 2.0	< 1.0
Trichlorotrifluoroethane (Freon 113)	5	< 5.0	< 5.0	< 1.0	< 1.0	< 5.0	< 5.0	< 5.0	< 1.0
1-Chloro-1,1-difluoroethane (Freon 142b)	NE	< 5.0	< 5.0	< 1.0	< 1.0	< 5.0	< 5.0	< 5.0	< 1.0
Subtotal Non-Project VOCs		ND	0.96	ND	ND	0.52	0.62	0.55	ND
Total VOCs^{2,3,4}		18.5	21.1	12.5	11.60	0.52	0.62	0.6	ND
1,4-Dioxane		1.3	0.70 B	< 0.24	0.34	0.13 J	< 0.24	< 0.24	0.3

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



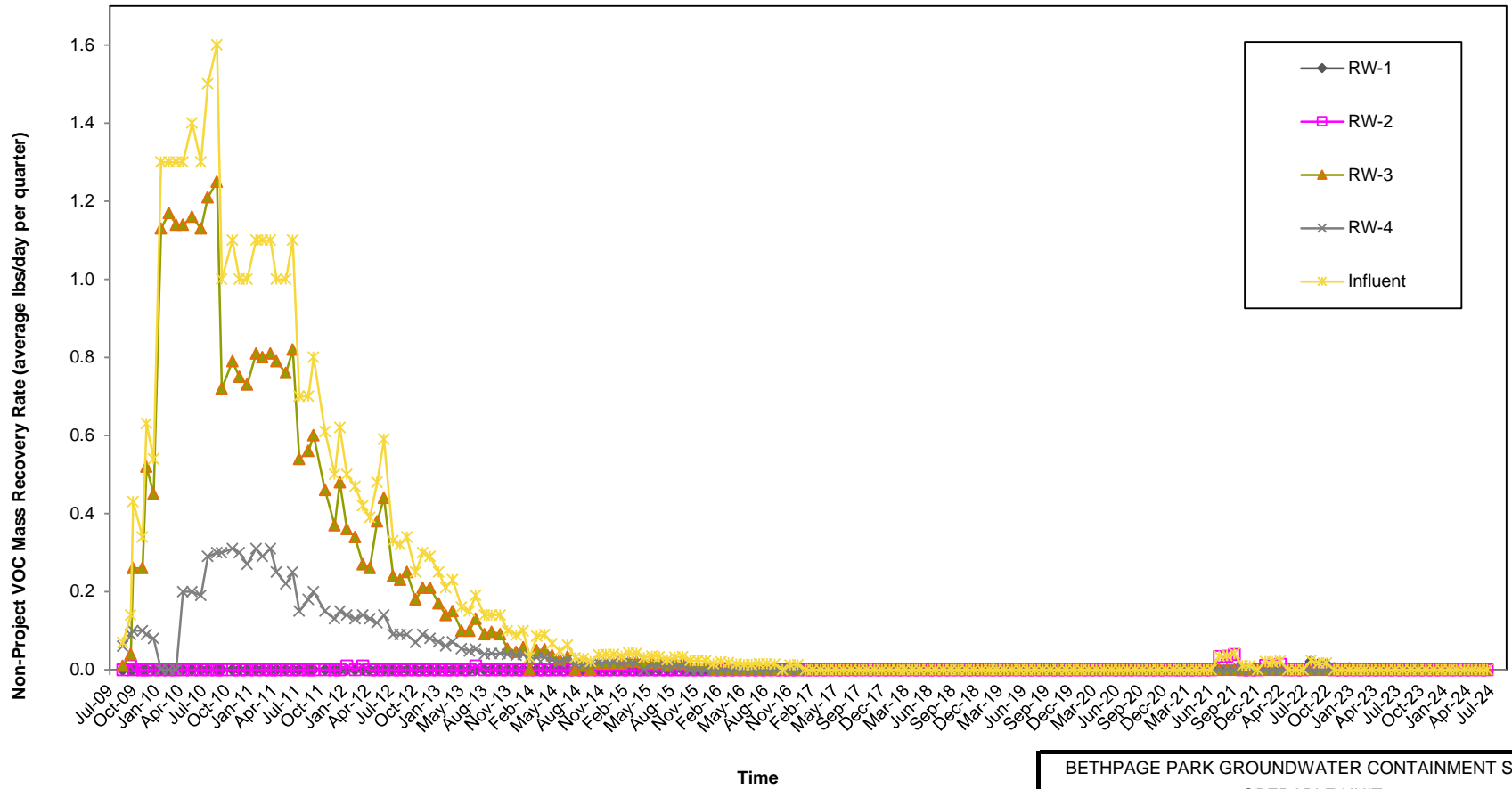
Notes, Abbreviations, Qualifiers, and Units:

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 USEPA 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.
3. As of August 4, 2022 the RW-1 concentration is representative of the addition of BCPMW-4-1 and BCPMW-4-2 that were added as additional recovery wells.
4. The analytical results for project VOCs collected from RW-1 on November 7, 2023 were unusually high. At the time the sample was collected, the replacement of pumps and cleaning of the lines of recovery wells 4-1 and 4-2 (completed on November 6, 2023) likely contributed to the high project VOCs concentration reported.

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
2.1	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
U	Indicates the compound was analyzed for but not detected above the specified level
ND	Analyte not detected at, or above its laboratory quantification limit.
µg/L	micrograms per liter

Figures




Abbreviations, Notes, and Units:

VOC = Volatile Organic Compound

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

1. As of August 4, 2022 the RW-1 concentration is representative of the addition of BCPMW-4-1 and BCPMW-4-2 that were added as additional recovery wells.

lbs/day = pounds per day

BETHPAGE PARK GROUNDWATER CONTAINMENT SYSTEM OPERABLE UNIT 3 (FORMER GRUMMAN SETTLING PONDS) BETHPAGE, NEW YORK	
NON-PROJECT VOC MASS RECOVERY RATES	
	FIGURE 8C