Perchlorate Evaluation, Northrop Grumman Site

What Was Done

The Northrop Grumman (NGC) operable unit 3 (OU3) RI report analyzed groundwater samples for Perchlorates. H2M also sampled the Bethage Water District wells for Perchlorates.

Discussion of data

Groundwater sample analysis identified Perchlorates in the aquifer in the region of the Northrop Grumman and NWIRP Sites. The analytical results of perchlorate are provided in the **attached Table 8** of the RI Report (2006-7 Sample events).

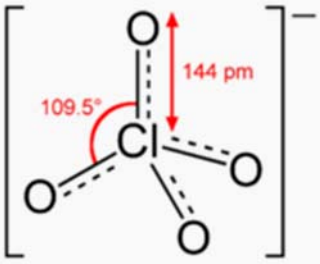
In some VPBs, the samples in the heart of the plume did not contain perchlorates. In other borings, where there was no concentration in the heart of the plume, with samples hundreds of feet below the impacted areas containing perchlorates. In some instances VPBs throughout the impacted groundwater areas were completely impacted throughout most of the VPB.

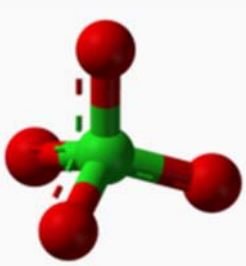
The Bethpage Water District supplied the DEC **with the attached results** of testing all their wellfields 4, 5, 6, 7 and 8 for perchlorates also (2004.) The wellfields that exhibited the highest concentrations, 7 and 8, are located to the north and upgradient of the Grumman-Navy site(s).

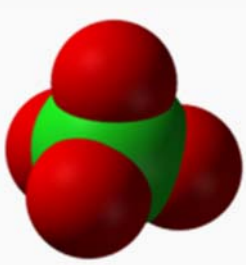
Conclusion

Based on the findings of samples reported in the Area RI Report, no on-Site source of perchlorate to groundwater was identified and, overall, the Study Area data verified that perchlorate is not site related, with no overall trends that could be established. In addition, the upgradient BWD wells 7 and 8 had the highest concentrations from the H2M sampling, indicating the source is most likely upgradient of the NGC and NWIRP site.

Perchlorate







Names
Systematic IUPAC name Perchlorate[1]

Identifiers	
CAS Registry Number	14797-73-0 ✓

Perchlorates (From USEPA Website)

Perchlorate is both a naturally occurring and man-made chemical that is used to produce rocket fuel, fireworks, flares and explosives. Perchlorate can also be present in bleach and in some fertilizers. Perchlorate may have adverse health effects because scientific research indicates that this contaminant can disrupt the thyroid's ability to produce hormones needed for normal growth and development.

EPA is developing a proposed national primary drinking water regulation for perchlorate. EPA is committed to using the best available peer reviewed science and data to develop the perchlorate drinking water regulation. EPA is evaluating the available science on perchlorate health effects and exposure. EPA is also evaluating laboratory methods for measuring and treatment technologies for removing perchlorate in drinking water. The Agency is also evaluating costs and benefits of potential regulatory options for perchlorate. We anticipate publication of the proposed rule for public review and comment in 2013.

Final Regulatory Determination for Perchlorate in Drinking Water

EPA has decided to regulate perchlorate under the Safe Drinking Water Act (SDWA). The science that has lead to this decision has been peer reviewed by independent scientists and public health experts including the National Academy of Sciences. This decision reverses a 2008 preliminary determination, and considers input from almost 39,000 public commenters on multiple public notices (May 2007, October 2008, and August 2009) related to perchlorate. This action notifies interested parties of EPA's decision to regulate perchlorate, but does not in itself impose any requirements on public water systems (PWSs). However, this action initiates a process to develop and establish a national primary drinking water regulation (NPDWR). Once the NPDWR is finalized, certain PWSs will be required to take action to comply with the regulation in accordance with the schedule specified in the regulation.

H2MGROUP

BETHPAGE WATER DISTRICT

SUMMARY OF PERCHLORATE RESULTS

Well No.	2001 Result (A)	2001 Result (B)	2002 Result	2003 Result	December 2003	March 2004	May 2004	July 2004	November 2004
4-1	< 4 ppb	< 4 ppb	NA	< 1 ppb	< 1 ppb	< 1 ppb	< 1 ppb	1.3 ppb	<1 ppb
4-2	< 4 ppb	< 4 ppb	NA	< 1 ppb	< 1 ppb	< 1 ppb	< 1 ppb	1.2 ppb	1.3 ppb
5-1	< 4 ppb	< 4 ppb	NA	< 1 ppb	< 1 ppb	< 1 ppb	< 1 ppb	< 1 ppb	<1 ppb
6-1	< 4 ppb	5.0 ppb	< 4 ppb	2.9 ppb	3.6 ppb	3.1 ppb	4.2 ppb	4.1 ppb	4.1 ppb
6-2	< 4 ppb	< 4 ppb	< 4 ppb	< 1 ppb	< 1 ppb	1.2 ppb	< 1 ppb	< 1 ppb	1.1 ppb
7	4.4 ppb	4.3 ppb	5.0 ppb	4.5 ppb	5.4 ppb	NA	6.4 ppb	8.0 ppb	6.4 ppb
8	4.2 ppb	4.3 ppb	5.0 ppb	3.7 ppb	3.9 ppb	4.3 ppb	5.2 ppb	5.6 ppb	5.4 ppb
BGD-1	< 4 ppb	< 4 ppb	NA	3.1 ppb	3.9 ppb	3.9 ppb	6.1 ppb	7.6 ppb	6.4 ppb

Table 8. Concentrations of Perchlorate in Groundwater Samples Collected from Study Area Vertical Profile Borings, Northrop Grumman Systems Corporation, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.

Sample Location	Sample Depth (ft bls)	Sample Date	Concentration (ug/L)
VP-100	46-51	9/15/2006	< 10
VP-100	55-60	9/15/2006	< 5
VP-100	75-80	9/13/2006	< 4
VP-100	105-110	9/14/2006	< 4
VP-100 (REP)	105-110	9/14/2006	< 4
VP-100	125-130	9/12/2006	< 4
VP-100	145-150	9/13/2006	< 4
VP-100	160-165	9/11/2006	< 4
VP-100	180-185	9/12/2006	< 4
VP-100	190-195	9/12/2006	< 4
VP-100	200-205	9/8/2006	< 4
VP-100	210-215	9/11/2006	< 4
VP-100	220-225	9/11/2006	< 4
VP-100	230-235	9/7/2006	< 4
VP-100 (REP)	230-235	9/8/2006	< 4
VP-100	240-245	9/8/2006	< 4
VP-100	250-255	9/7/2006	< 4
VP-100	270-275	9/7/2006	< 4
VP-100	290-295	9/6/2006	< 4
VP-100	310-315	9/6/2006	< 4
VP-100	330-335	9/5/2006	4.3
VP-100 (REP)	330-335	9/5/2006	4.2
VP-100	350-355	9/5/2006	< 4
VP-100	371-376	9/1/2006	< 4
VP-100	394-399	9/1/2006	4.7
VP-101	60	6/27/2006	< 10 J
VP-101	80	6/27/2006	< 10 J
VP-101	100	6/28/2006	< 10 J
VP-101	120	6/28/2006	< 10 J
VP-101	140	6/28/2006	< 10 J
VP-101	167	6/29/2006	< 10
VP-101	320	7/6/2006	< 10
VP-101	340	7/6/2006	< 10
VP-101	360	7/7/2006	**11**
VP-101	387	7/10/2006	**3 J**
VP-101	400	7/10/2006	< 10
VP-101	420	7/11/2006	**6.2**
VP-101	440	7/11/2006	< 10
VP-101	460	7/11/2006	< 10
VP-101	480	7/12/2006	< 0.32
VP-101	507	7/13/2006	< 1
VP-102	45-50	10/13/2006	< 5
VP-102	65-70	10/13/2006	**0.68 J**
VP-102 (REP)	65-70	10/13/2006	< 5
VP-102	85-90	10/13/2006	**1.2**
VP-102	105-110	10/12/2006	**0.77 J**
VP-102	125-130	10/12/2006	**3.3**
VP-102	135-140	10/11/2006	**1.6**
VP-102	150-155	10/11/2006	**3.4**
VP-102	160-165	10/11/2006	**1.5**
VP-102	170-175	10/10/2006	**1.7**
VP-102	180-185	10/10/2006	< 1
VP-102	190-195	10/6/2006	< 1
VP-102	200-205	10/6/2006	**0.67 J**
VP-102	220-225	10/5/2006	**0.76 J**
VP-102	240-245	10/5/2006	**0.4 J**

Notes and abbreviations on last page.

Table 8. Concentrations of Perchlorate in Groundwater Samples Collected from Study Area Vertical Profile Borings, Northrop Grumman Systems Corporation, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.

Sample Location	Sample Depth (ft bls)	Sample Date	Concentration (ug/L)
VP-102	250-255	10/4/2006	**0.46 J**
VP-102 (REP)	250-255	10/4/2006	**0.41 J**
VP-102	260-265	10/4/2006	**1.3**
VP-102	270-275	10/3/2006	**0.59 J**
VP-102	280-285	10/3/2006	**0.71 J**
VP-102	290-295	10/2/2006	**0.65 J**
VP-102	300-305	9/29/2006	< 1
VP-102	310-315	9/29/2006	< 1
VP-102	325-330	9/28/2006	< 1
VP-102 (REP)	325-330	9/28/2006	< 1
VP-102	345-350	9/28/2006	< 1
VP-102	365-370	9/27/2006	**0.98 J**
VP-102	370-375	10/3/2006	**0.59 J**
VP-102	380-385	10/3/2006	**0.71 J**
VP-103	60	10/10/2006	< 10
VP-103	80	10/10/2006	< 10
VP-103	100	10/10/2006	**2.2 J**
VP-103	120	10/10/2006	< 20
VP-103	140	10/11/2006	< 10
VP-103	165	10/11/2006	< 10
VP-103	185	10/11/2006	**0.93 J**
VP-103	200	10/12/2006	< 20
VP-103	220	10/12/2006	< 20
VP-103	240	10/12/2006	< 20
VP-103	260	10/12/2006	< 2
VP-103	320	10/16/2006	< 2
VP-103	345	10/16/2006	< 10
VP-103 (REP)	345	10/16/2006	< 10
VP-103	360	10/17/2006	< 1
VP-103	380	10/17/2006	< 1
VP-103	420	10/18/2006	< 5
VP-103	440	10/18/2006	< 5
VP-103	460	10/18/2006	< 10
VP-103	480	10/18/2006	< 20
VP-103	500	10/19/2006	< 20
VP-103	525	10/19/2006	< 10
VP-103	545	10/20/2006	**6.9**
VP-103	560	10/20/2006	< 10
VP-103	580	10/23/2006	< 10
VP-103	600	10/23/2006	< 10
VP-103	620	10/23/2006	< 5
VP-103	640	10/24/2006	**3.7 J**
VP-103 (REP)	640	10/24/2006	< 10
VP-103	660	10/24/2006	**6 J**
VP-104	40	8/7/2006	< 4
VP-104	60	7/28/2006	< 4
VP-104	80	7/28/2006	< 4
VP-104	100	7/31/2006	< 4
VP-104	120	7/31/2006	< 4
VP-104	140	7/31/2006	< 4
VP-104 (REP)	140	7/31/2006	< 4
VP-104	160	7/31/2006	< 4
VP-104	180	8/1/2006	< 4
VP-104	200	8/1/2006	< 4
VP-104	220	8/1/2006	< 4
VP-104	240	8/1/2006	< 4

Notes and abbreviations on last page.

Table 8. Concentrations of Perchlorate in Groundwater Samples Collected from Study Area Vertical Profile Borings, Northrop Grumman Systems Corporation, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.

Sample Location	Sample Depth (ft bls)	Sample Date	Concentration (ug/L)
VP-104	260	8/2/2006	< 4
VP-104	280	8/2/2006	< 4
VP-104	300	8/2/2006	< 4
VP-104	320	8/3/2006	< 4
VP-104	340	8/3/2006	< 4
VP-104	360	8/3/2006	< 4
VP-104	380	8/7/2006	< 4
VP-104	400	8/7/2006	< 4
VP-104	420	8/7/2006	< 4
VP-104	460	8/8/2006	< 4
VP-104	480	8/8/2006	< 4
VP-104	500	8/8/2006	< 4
VP-104	520	8/14/2006	< 4
VP-104	540	8/14/2006	< 4
VP-104	560	8/14/2006	< 4
VP-104	740	8/22/2006	< 4
VP-104	820	8/24/2006	< 4
VP-104	840	8/24/2006	< 4
VP-104	860	8/25/2006	< 4
VP-104	880	8/25/2006	< 4
VP-105	45-50	8/2/2006	< 4
VP-105	55-60	8/2/2006	< 4
VP-105	65-70	8/2/2006	< 4
VP-105	75-80	8/2/2006	< 4
VP-105	85-90	8/1/2006	< 4
VP-105	95-100	8/1/2006	< 4
VP-105	102-107	8/1/2006	< 4
VP-105	115-120	7/31/2006	< 4
VP-105	125-130	7/31/2006	< 4
VP-105	135-140	7/31/2006	< 4
VP-105	145-150	7/28/2006	< 4
VP-105	155-160	7/28/2006	< 4
VP-105	165-170	7/28/2006	< 4
VP-107	45-50	7/25/2006	< 4
VP-107	55-60	7/25/2006	< 4
VP-107	65-70	7/25/2006	< 4
VP-107	75-80	7/25/2006	< 4
VP-107	85-90	7/25/2006	< 4
VP-107	95-100	7/21/2006	< 4
VP-107	105-110	7/21/2006	< 4
VP-107	119-124	7/21/2006	< 4
VP-107	135-140	7/20/2006	< 4
VP-107	148-153	7/20/2006	< 4
VP-107	165-170	7/20/2006	< 4
VP-108	45-50	7/13/2006	< 1
VP-108	55-60	7/13/2006	**1.6**
VP-108	65-70	7/13/2006	**1.7**
VP-108	75-80	7/13/2006	**1.2**
VP-108	85-90	7/13/2006	**1.2**
VP-108	95-100	7/13/2006	**1.2**
VP-108	105-110	7/13/2006	**1.3**
VP-108	115-120	7/13/2006	**1.4**
VP-108	125-130	7/13/2006	**1.6**
VP-108	135-140	7/13/2006	**1.4**
VP-108	145-150	7/13/2006	**1.3**
VP-108 (REP)	145-150	7/13/2006	**1.3**

Notes and abbreviations on last page.

Table 8. Concentrations of Perchlorate in Groundwater Samples Collected from Study Area Vertical Profile Borings, Northrop Grumman Systems Corporation, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.

Sample Location	Sample Depth (ft bls)	Sample Date	Concentration (ug/L)
VP-109	44-49	2/5/2007	**9.4**
VP-109	55-60	2/5/2007	**0.79 J**
VP-109	65-70	2/5/2007	**1**
VP-109	75-80	2/5/2007	**1.1**
VP-109	85-90	2/2/2007	**1.1**
VP-109	95-100	2/2/2007	**0.43 J**
VP-109	105-110	2/2/2007	**0.84 J**
VP-109	115-120	2/1/2007	**0.4 J**
VP-109	125-130	2/1/2007	< 1
VP-109	135-140	1/31/2007	**0.68 J**
VP-109	145-150	1/31/2007	**0.36 J**
VP-109	155-160	1/31/2007	**0.5 J**
VP-109	165-170	1/30/2007	**0.77 J**
VP-109	175-180	1/30/2007	**0.51 DJ**
VP-109	185-190	1/30/2007	**0.62 J**
VP-109	195-200	1/29/2007	**0.85 J**
VP-109	205-210	1/29/2007	**0.38 J**
VP-109	215-220	1/26/2007	< 1
VP-109	225-230	1/25/2007	< 1
VP-109	235-240	1/25/2007	< 1
VP-109 (REP)	235-240	1/25/2007	< 1
VP-109	247-252	1/24/2007	**0.57 J**
VP-109	255-260	1/24/2007	**0.73 J**
VP-109	265-270	1/23/2007	< 2
VP-109	275-280	1/23/2007	< 2
VP-109	288-293	1/22/2007	< 1
VP-110	40-45	2/22/2007	< 1
VP-110 (REP)	40-45	2/22/2007	< 1
VP-110	50-55	2/22/2007	< 1
VP-110	60-65	2/21/2007	< 1
VP-110	70-75	2/21/2007	< 1
VP-110	80-80	2/21/2007	< 1
VP-110	90-95	2/21/2007	< 1
VP-110	100-105	2/21/2007	< 1
VP-110	110-115	2/20/2007	**0.69 J**
VP-110	120-125	2/20/2007	**0.95 J**
VP-110	140-145	2/20/2007	**0.59 J**
VP-110	150-155	2/20/2007	**1.3**
VP-110	160-165	2/20/2007	**1.2**
VP-110	170-175	2/16/2007	**1.4**
VP-110	180-185	2/16/2007	**0.78 J**
VP-110 (REP)	180-185	2/16/2007	**0.93 J**
VP-110	190-195	2/16/2007	**0.71 J**
VP-110	200-205	2/13/2007	**0.91 J**
VP-110	210-215	2/13/2007	**1**
VP-110	220-225	2/13/2007	**1**
VP-110	230-235	2/9/2007	**1.6**
VP-110	240-245	2/9/2007	**1.9**
VP-110	250-255	2/7/2007	**2.5**
VP-110	260-265	2/7/2007	**2.2**
VP-110	270-275	2/7/2007	**1.7**
VP-110	283-288	2/6/2007	**1.4**
VP-110	295-300	2/6/2007	**0.97 J**
VP-110	315-320	2/6/2007	**1.6**
VP-110	325-330	2/5/2007	**1.3**
VP-110	333-338	2/5/2007	**3.9**

Notes and abbreviations on last page.

Table 8. Concentrations of Perchlorate in Groundwater Samples Collected from Study Area Vertical Profile Borings, Northrop Grumman Systems Corporation, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.

Sample Location	Sample Depth (ft bls)	Sample Date	Concentration (ug/L)
VP-110	344-349	2/1/2007	**3**
VP-110	352-357	2/1/2007	**1.8**
VP-110	352-367	2/1/2007	**1.6**
VP-110	362-367	1/31/2007	**2.9**
VP-110	372-377	1/31/2007	**1.3**
VP-110	382-387	1/30/2007	**1.4**
VP-111	50-51	4/17/2007	**0.84**
VP-111	70-71	4/17/2007	**1.7**
VP-111	91-91	4/17/2007	**1.1**
VP-111	111-111	4/17/2007	**1.3**
VP-111	131-131	4/18/2007	**2.1**
VP-111	151-151	4/18/2007	**2**
VP-111	171-171	4/18/2007	**1.9**
VP-111 (REP)	171-171	4/18/2007	**2**
VP-111	191-191	4/19/2007	**1.9**
VP-111	211-211	4/19/2007	**1.4**
VP-111	231-231	4/19/2007	**1.5**
VP-111	251-251	4/19/2007	**1.1**
VP-111	271-271	4/20/2007	**1.1**
VP-111	291-291	4/20/2007	**0.9**
VP-111	311-311	4/20/2007	**2**
VP-111	331-331	4/20/2007	**2.4**
VP-111	351-351	4/23/2007	**2.4**
VP-111	371-371	4/23/2007	**2.6**
VP-111	391-391	4/24/2007	**1.8**
VP-111	411-411	4/24/2007	**2.2**
VP-111	431-431	4/24/2007	**3.6**
VP-111	451-451	4/24/2007	**1.8**
VP-111	471-471	4/25/2007	**1.4**
VP-111	491-491	4/25/2007	**4.1**
VP-111	511-511	4/25/2007	**4.8**
VP-111	531-531	4/26/2007	**6.2**
VP-111	551-551	4/26/2007	**1.6**
VP-111 (REP)	551-551	4/26/2007	**1.6**
VP-111	571-571	4/27/2007	**4.1**
VP-111	591-591	4/27/2007	**2.6**
VP-111	616-616	4/30/2007	**2**
VP-111	631-631	5/1/2007	< 0.2
VP-112	60-60	5/23/2007	**0.48**
VP-112	80-80	5/23/2007	**3**
VP-112	100-100	5/23/2007	**0.93**
VP-112	120-120	5/24/2007	**3.7**
VP-112	140-140	5/24/2007	**0.86**
VP-112	165-165	5/24/2007	**1.1**
VP-112	185-185	5/30/2007	**1.2**
VP-112	200-200	5/30/2007	**2.6**
VP-112	220-220	5/31/2007	**3.4**
VP-112	240-240	5/31/2007	**3.5**
VP-112 (REP)	240-240	5/31/2007	**3.5**
VP-112	260-260	5/31/2007	**3.3**
VP-112	280-280	5/31/2007	**0.93**
VP-112	300-300	6/1/2007	**0.75**
VP-112	320-320	6/1/2007	**0.73**
VP-112	340-340	6/1/2007	**0.78**
VP-112	360-360	6/4/2007	**0.98**
VP-112	380-380	6/4/2007	**0.74**

Notes and abbreviations on last page.

Table 8. Concentrations of Perchlorate in Groundwater Samples Collected from Study Area Vertical Profile Borings, Northrop Grumman Systems Corporation, Operable Unit 3 (Former Grumman Settling Ponds), Bethpage, New York.

Sample Location	Sample Depth (ft bls)	Sample Date	Concentration (ug/L)
VP-112	410-410	6/5/2007	**0.76**
VP-112	420-420	6/6/2007	**0.91**
VP-112	440-440	6/6/2007	**0.78**
VP-112	470-470	6/7/2007	**1.7**
VP-112 (REP)	470-470	6/7/2007	**1.5**
VP-112	480-480	6/7/2007	**1.2**
VP-112	500-500	6/7/2007	**1.5**
VP-112	520-520	6/7/2007	**1.9**
VP-112	545-545	6/8/2007	**3.8**
VP-112	560-560	6/8/2007	**3**
VP-112	580-580	6/8/2007	**5.3**
VP-112	600-600	6/11/2007	**5.2**
VP-112	620-620	6/13/2007	**1.9**
VP-112	660-660	6/14/2007	**0.9**
VP-112	680-680	6/14/2007	**0.2**
VP-112	700-700	6/14/2007	< 0.2

Notes and Abbreviations:

1. Results validated following protocols specified in March 2006 RI/FS Work Plan (ARCADIS G&M, Inc. 2006).
2. Samples analyzed for perchlorate using USEPA Method 314.0.
3. Nassau County Department of Health has adopted a guidance value of 18 ug/L for perchlorate.

Bold value indicates detection.

RI/FS	Remedial Investigation/Feasibility Study
USEPA	United States Environmental Protection Agency
ug/L	Micrograms per liter
J	Value is estimated
D	Value from a secondary dilution
ft bls	Feet below land surface
REP	Field replicate

CITY:Melville-NY DIV/GROUP:SER1 DB:A.Sanchez LD: PIC: PM:C.S.Giovanni TM:D.Stern LYR:ON=*;OFF=*REF*
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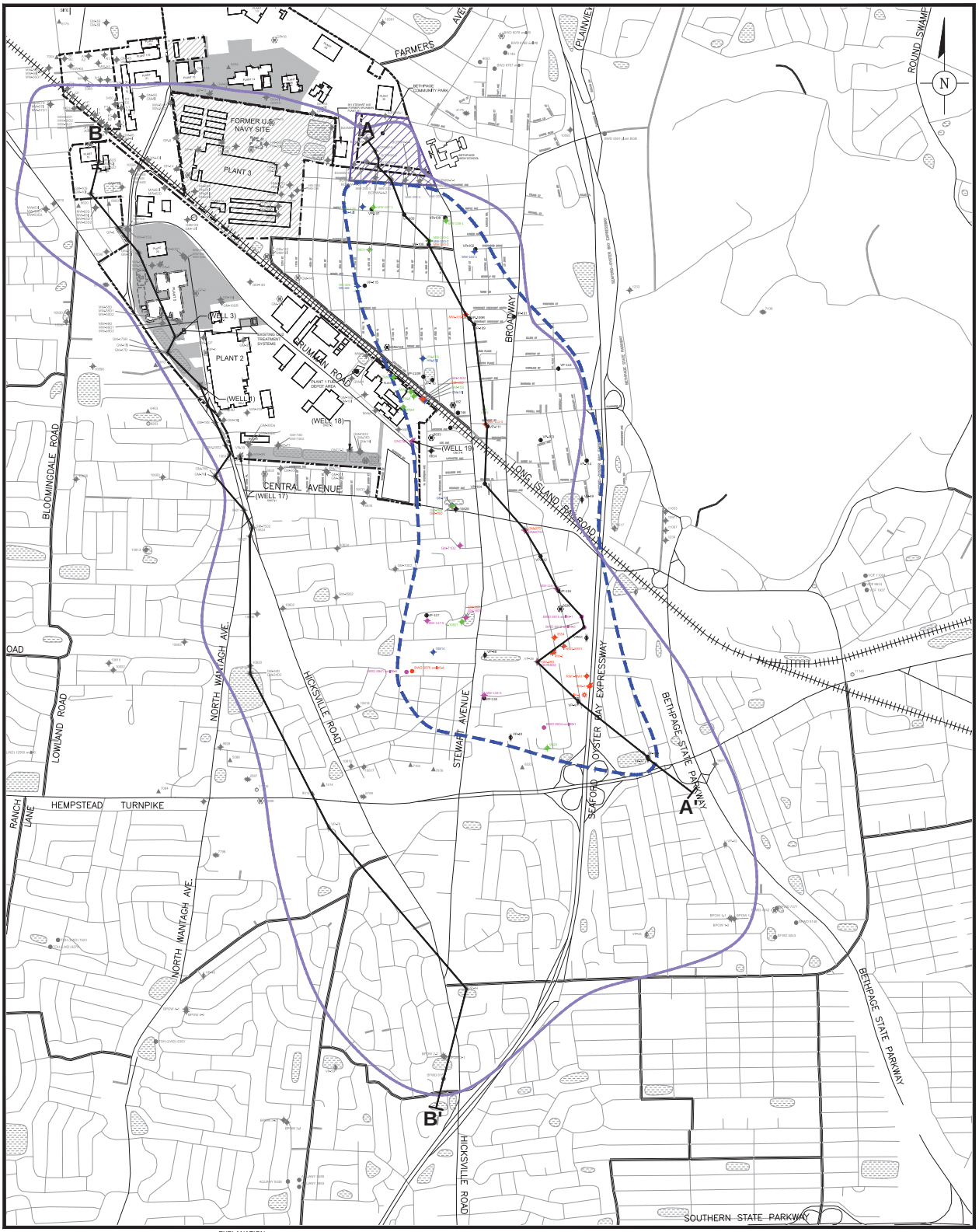

EXPLANATION:

- PROPERTY BOUNDARY OF THE FORMER GRUMMAN AEROSPACE PROPERTY
- PROPERTY BOUNDARY OF THE FORMER U.S. NAVY PROPERTY
- PROPERTY BOUNDARY OF THE FORMER OCC PROPERTY
- LONG ISLAND RAILROAD
- DENOTES NORTHROP GRUMMAN OWNED PROPERTY
- DENOTES FORMER U.S. NAVY OWNED PROPERTY
- RECHARGE BASIN
- A — A' LINE OF SECTION
- SITE AREA
- STUDY AREA LIMIT (APPROXIMATE)
- APPROXIMATE LIMIT OF REGIONAL AREA OF VOC-IMPACTED GROUNDWATER
- MICROGRAMS PER LITER

- OBSERVATION, MONITORING WELL
- INDUSTRIAL WELL
- PUBLIC SUPPLY WELL
- IRRIGATION WELL
- INJECTION WELL
- NORTHROP GRUMMAN OR NAVY PRODUCTION WELL
- OU2 VERTICAL PROFILE BORING
- OU3 VERTICAL PROFILE BORING
- ABANDONED WELL

DESIGNATION OF HYDROGEOLOGIC ZONE FOR MONITORING WELL SCREENED INTERVALS (ARCADIS 2003)

- SHALLOW
- INTERMEDIATE
- DEEP
- DEEP2

NOTES:

1. VERTICAL PROFILE BORING LOCATIONS BASED ON FIELD MEASUREMENTS.
2. HYDROGEOLOGIC ZONE BASED ON MODEL LAYER ELEVATIONS PRESENTED IN COMPREHENSIVE GROUNDWATER MODEL (ARCADIS 2003).

0 800' 1600'
SCALE IN FEET

ALL COORDINATES REFERENCED TO NORTH AMERICAN DATUM 1983

NORTHROP GRUMMAN SYSTEMS CORPORATION
OPERABLE UNIT 3
(FORMER GRUMMAN SETTLING PONDS)
BETHPAGE, NEW YORK

STUDY AREA SHOWING WELL AND VERTICAL PROFILE BORING LOCATIONS AND LINES OF SECTION

ARCADIS

FIGURE 1

CITY:(Reqd) DIV/GROUP:(Reqd) DB:(Reqd) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
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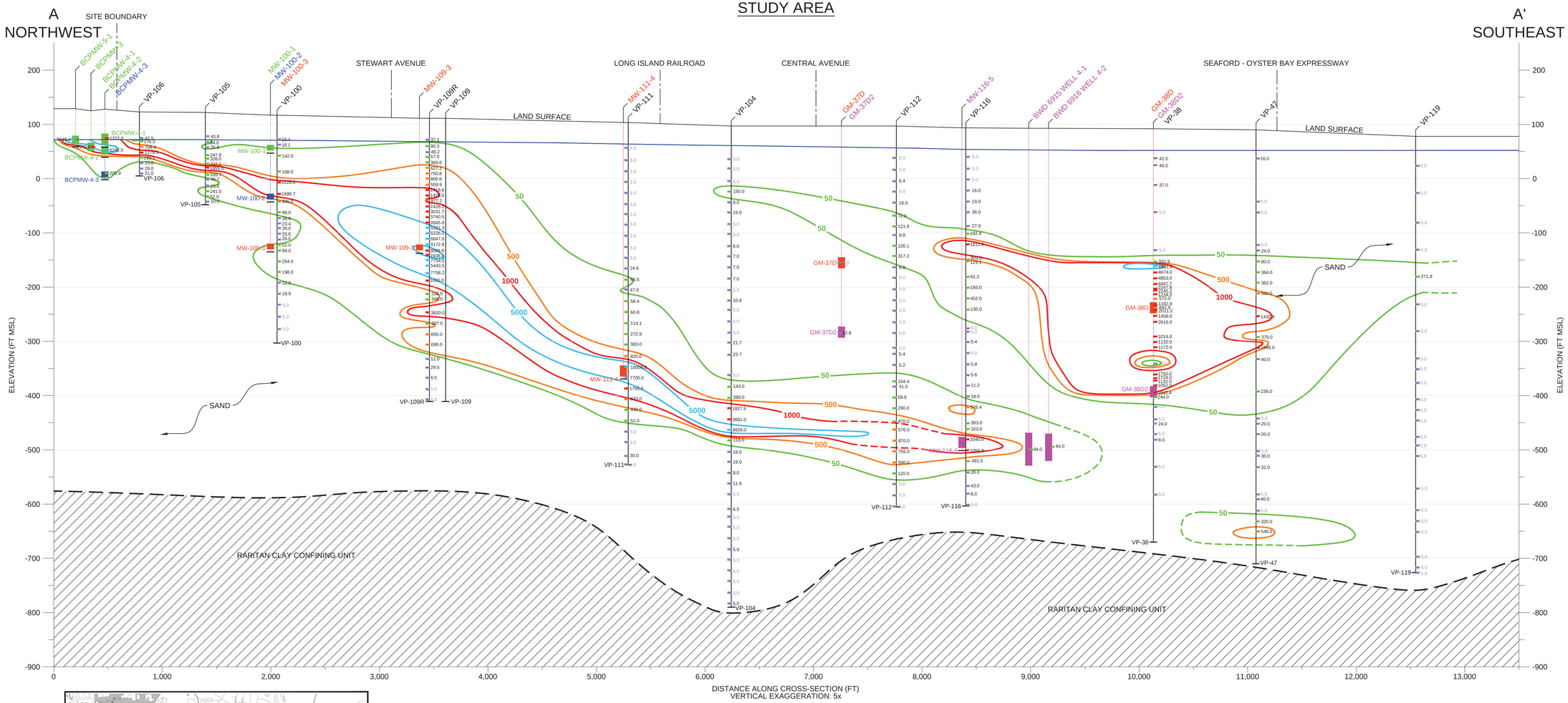
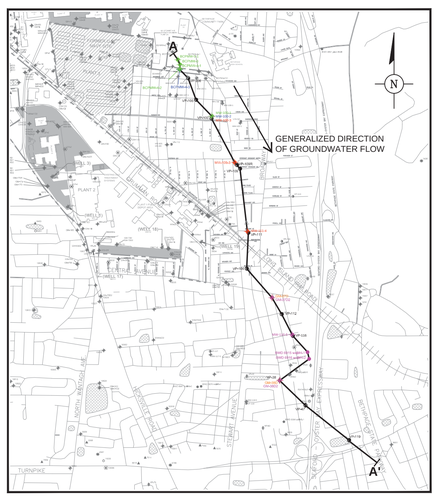
STUDY AREA

A NORTHWEST — A' SOUTHEAST





PLAN VIEW SHOWING LINE OF SECTION A-A'

0 2000' 4000'

SCALE IN FEET

EXPLANATION

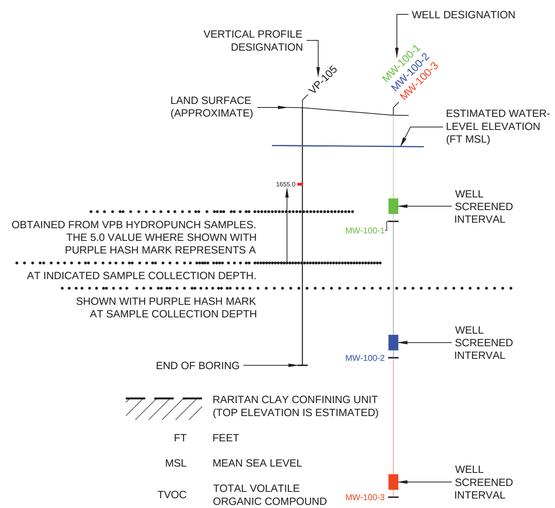
- OBSERVATION, MONITORING WELL
- PUBLIC SUPPLY WELL
- OU2 VERTICAL PROFILE BORING
- OU3 VERTICAL PROFILE BORING
- A — A' LINE OF SECTION

DESIGNATION OF HYDROGEOLOGIC ZONE FOR MONITORING WELL SCREENED INTERVALS (ARCADIS 2003)

- SHALLOW
- INTERMEDIATE
- DEEP
- DEEP2

TVOC CONTOURS

- 50
- 500
- 1000
- 5000



NOTES:

1. HYDROGEOLOGIC ZONE BASED ON MODEL LAYER ELEVATIONS PRESENTED IN COMPREHENSIVE GROUNDWATER MODEL (ARCADIS 2003).
2. VERTICAL PROFILE BORING LOCATIONS ARE BASED ON FIELD MEASUREMENTS.
3. MONITORING WELLS SURVEYED TO NAD 1983.
4. LAND SURFACE ESTIMATED FROM USGS QUADRANGLES (AMITYVILLE, HUNTINGTON, FREEPORT, AND HICKSVILLE)
5. THE GEOLOGICAL TERM "SAND" REFERENCED ABOVE IS DEFINED IN DETAIL IN THE STUDY AREA REMEDIAL INVESTIGATION REPORT. LOCALIZED LENSES OF LOWER PERMEABILITY NOT SHOWN. REFER TO STUDY AREA REMEDIAL INVESTIGATION REPORT FOR THIS INFORMATION (ARCADIS 2009).

ALL COORDINATES REFERENCED TO NORTH AMERICAN DATUM 1983

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CONCENTRATIONS OF TVOCs IN GROUNDWATER (CROSS SECTION A-A')

ARCADIS

FIGURE 2