ARCADIS
Infrastructure, environment, facilities

ARCADIS G&M, Inc.
Two Huntington Quadrangle
Suite 1S10
Melville, NY 11747
Tel 631 249 7600
Fax 631 249 7610
www.arcadis-us.com

ENVIRONMENT

Mr. Steven Scharf, P.E.
New York State Department of Environmental Conservation
Division of Environmental Remediation
625 Broadway
Albany, New York 12233-7015

Subject:
Discussion of Preliminary Results from the Off-Site Vertical Profile Boring Program, Phase 2 Groundwater Remedial Investigation, Former Grumman Settling Ponds (Operable Unit 3 – Bethpage Community Park), Bethpage, New York.

Date:
9 November 2006

Contact:
David Stern

Phone:
631-391-5284

Email:
dstern@arcadis-us.com

Our ref:
NY001348.1006.00001

Dear Steve:

On behalf of Northrop Grumman Systems Corporation (NGC), ARCADIS is providing the New York State Department of Environmental Conservation (NYSDEC) with the enclosed validated groundwater analytical data and this preliminary discussion of findings pertaining to the Vertical Profile Boring (VPB) Program conducted as part of the Phase 2 Remedial Investigation/Feasibility Study (RI/FS) for the Bethpage Community Park in Bethpage, New York (hereinafter referred to as the Park). This letter report was prepared, in part, to satisfy the data reporting requirements pursuant to Section III of Administrative Order on Consent (AOC) Index # W1-0018-04-01. Additionally, this letter report was prepared on an expedited basis to present the NYSDEC with initial information regarding select results of the OU3 RI. The following sections of this letter report provide the background, discussion of findings, and a summary.

Background

Figure 1 (enclosed) provides the locations of key wells, VPBs, and portions of the project area referred to in this letter report. As NYSDEC is aware, ARCADIS is employing the VPB groundwater screening methodology (as specified in the approved OU3 RI/FS Work Plan) to investigate VOCs and other analytes in groundwater at various off-site locations south and southeast of the Park. This letter report presents the VOC groundwater analytical results from samples obtained from deep VPBs VP-100 and VP-104, the latter of which was completed approximately 5,400 ft downgradient of the Park and approximately 2,700 ft north-northwest of

Bethpage Water District (BWD) Plant 4. Drilling of these VPBs has been completed and the validated results of the groundwater samples collected and analyzed for volatile organic compounds (VOCs) are attached to this letter report (see Tables 1 and 2).

Concurrent with the NGC OU3 RI, the U.S. Navy is proposing to begin construction of the off-site groundwater remedy at the GM-38 Area. The GM-38 Area refers to an area of VOC-impacted groundwater that exists at depths of 300 to 500 feet below land surface (ft bls) located off-site, southeast of the main NGC/Navy sites. Remedial activities are being conducted by the Navy to satisfy provisions of the Record of Decision (ROD) for Operable Unit 2 (OU2) for the main NGC (NYSDEC Site #1-30-003A) and the Naval Weapons Industrial Reserve Plant (NWIRP) (NYSDEC Site #1-30-003B) sites. As ARCADIS understands the current status of construction of the GM-38 Area remedy, two remedial wells (RW-1 and RW-2) have been installed and the Town of Oyster Bay recently granted access to the Navy to drill a third remedial well (RW-3) and begin construction of the GM-38 Area groundwater pump-and-treat system main plant.

Discussion of Findings

In general, the currently available results of the OU3 RI performed to investigate VOCs in groundwater south of the Park appear to indicate the presence of two distinct VOC plumes south of the Park, which appear to be vertically separated by approximately 80 to 100 ft of aquifer in the VP-100 Area. Based on the depth encountered and, to a lesser extent, comparison to the chemical profile detected in groundwater samples collected beneath the Park to date, the shallower segment of off-site VOC-impacted groundwater appears to be associated with the Park. In contrast, the deeper segment of VOC-impacted groundwater exhibits a distinctly different chemical profile and, more importantly, was identified at a depth that indicates it may be more likely attributable to another source(s). A more detailed analysis of the data is as follows:

1. A relatively shallow zone (as defined below) of VOC-impacted groundwater exists beneath the Park and extends off-site a currently unknown distance. The main constituent of concern (COC) in this impacted zone is cis-1,2-dichloroethene (cis-1,2-DCE), although other VOCs are present at much lower concentrations. On average, cis-1,2-DCE accounts for approximately 80 percent of the total VOCs (TVOCs)

detected. This segment of VOC-impacted groundwater occurs at the water table (approximately 55 ft bls at the Park) at the Park and drops vertically in the aquifer as it moves away from the Park to the southeast (i.e., in the downgradient direction).

2. In VP-100, the highest concentration of cis-1,2-DCE was detected at a depth of 150 ft bls at a concentration of 1,500 micrograms per liter (µg/L). At this same interval, trichloroethene (TCE) was detected at 190 µg/L. The depth of this shallower segment of VOC-impacted groundwater is consistent with ARCADIS' expectations based on the rate of drop of the VOC plume between other VPBs downgradient of the Park. Additionally, at intervals of 270 to 275 and 290 to 295 ft bls, TCE was detected at 240 and 190 µg/L while cis-1,2-DCE was detected at 8 and 7 µg/L; these depth intervals where these VOC concentrations were encountered are significantly deeper than expected based on other data collected and suggests that the deeper impacts arrived at VP-100 via a longer groundwater flow path than the shallower impacts. This suggests that the source of the deeper impacts did not originate in the Park.

3. In VP-104, TCE was detected at 150 µg/L at a depth of 120 ft bls; cis-1,2-DCE was not detected. TCE was again detected in the interval from 480 to 580 ft bls at concentrations ranging from 72 µg/L to 6,300 µg/L. Additionally, cis-1,2-DCE was also detected in this interval but at significantly lower concentrations, ranging from 6 to 470 µg/L. The depth interval where these latter concentrations were encountered is significantly deeper than expected and suggests that the source of VOC impacts to groundwater is not related to the Park.

4. The source(s) of the deep segment of VOC-impacted groundwater identified at VP-100 and VP-104 has not been identified. More importantly, the downgradient extent of the VOC impacted groundwater identified at VP-104 is not presently known. Delineation of the deeper plume is needed so groundwater modeling can be performed to determine the potential impacts to the GM-38 Area Remedial System.

Summary

The data analysis associated with the overall OU3 RI is ongoing and as ARCADIS learns more, ARCADIS' preliminary findings and conclusions described herein may change. However at this time, ARCADIS concludes that due to the depth and

relative concentrations of COCs detected at VPBs VP-100 and VP-104, there is a shallower segment of VOC-impacted groundwater related to OU3 and a distinct, deeper segment of VOC-impacted groundwater that is related to a separate source(s).

Since the leading edge of the deeper segment of VOC-impacted groundwater is not presently known, the effect of the GM-38 Area Remedial System needs to be re-evaluated and the system modified, if necessary.

Feel free to contact us to discuss any of the above information if you have questions or need additional information.

Sincerely,

ARCADIS G&M, Inc.

David E. Stern
Senior Scientist

Carlo San Giovanni
Project Manager

Michael Wolfert
Project Director

Enclosures

Copies:
John Cofman, Northrop Grumman Corporation
Larry Leskovjan, Northrop Grumman Corporation
Susan Clarke, NAVFAC Midlant Environmental
Dave Bryack, TetraTech NUS, Inc.

bcc:
Michael Tone, Nixon Peabody

ARCADIS

Table 1. Concentrations of VOCs Detected in Vertical Profile Boring VP-104, Former Grumman Settling Ponds (Operable Unit 3 - Bethpage Community Park), Bethpage, New York.

Constituent in ug/L	Sample ID: / Sample Depth: / Sample Date:	VP-104 60 ft bls 7/28/2006	VP-104 80 ft bls 7/28/2006	VP-104 100 ft bls 7/31/2006	VP-104 120 ft bls 7/31/2006	VP-104 140 ft bls 7/31/2006	VP-104 REP 140 ft bls 7/31/2006	VP-104 160 ft bls 7/31/2006
1,1,1-Trichloroethane		<5	<5	<5	<5	<5	<5	<5
1,1,2,2-Tetrachloroethane		<5	<5	<5	<5	<5	<5	<5
1,1,2-Trichloroethane		<5	<5	<5	<5	<5	<5	<5
1,1-Dichloroethane		<5	<5	<5	<5	<5	<5	<5
1,1-Dichloroethylene		<5	<5	<5	<5	<5	<5	<5
1,2-Dichloroethane		<5	<5	<5	<5	<5	<5	<5
1,2-Dichloropropane		<5	<5	<5	<5	<5	<5	<5
2-Hexanone		<10	<10	<10	<10	<10	<10	<10
Acetone		<16	<10	<10	<10	<10	<10	<10
Benzene		<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7
Bromodichloromethane		<5	<5	<5	<5	<5	<5	<5
Bromoform		<5	<5	<5	<5	<5	<5	<5
Carbon disulfide		<5	<5	<5	<5	<5	<5	<5
Carbon tetrachloride		<5	<5	<5	<5	<5	<5	<5
Chlorobenzene		<5	<5	<5	<5	<5	<5	<5
Chlorodifluoromethane		<5	<5	<5	<5	<5	<5	<5
Chloroethane		<5	<5	<5	<5	<5	<5	<5
Chloroform		<5	<5	<5	<5	<5	<5	<5
cis-1,2-Dichloroethylene		<5	<5	<5	<5	<5	<5	<5
cis-1,3-Dichloropropene		<5	<5	<5	<5	<5	<5	<5
Dibromochloromethane		<5	<5	<5	<5	<5	<5	<5
Dichlorodifluoromethane		<5	<5	<5	<5	<5	<5	<5
trans-1,2-Dichloroethylene		<5	<5	<5	<5	<5	<5	<5
Ethylbenzene		<5	<5	<5	<5	<5	<5	<5
Bromomethane		<5	<5	<5	<5	<5	<5	<5
Chloromethane		<5	<5	<5	<5	<5	<5	<5
2-Butanone(MEK)		<10	<10	<10	<10	<10	<10	<10
4-Methyl-2-pentanone		<10	<10	<10	<10	<10	<10	<10
Methylene chloride		<5	<5	<5	<5	<5	<5	<5
Styrene		<5	<5	<5	<5	<5	<5	<5
Tetrachloroethylene		<5	<5	<5	<5	<5	<5	<5
Toluene		<5	<5	<5	<5	<5	<5	<5
trans-1,3-Dichloropropene		<5	<5	<5	<5	<5	<5	<5
Trichloroethylene		<5	**1J**	**2J**	**150**	**8**	**10**	**19**
trichlorotrifluoroethane		<5	<5	<5	<5	<5	<5	<5
Vinyl Acetate		<5	<5	<5	<5	<5	<5	<5
Vinyl chloride		<2	<2	<2	<2	<2	<2	<2
Xylene (total)		<5	<5	<5	<5	<5	<5	<5

Table 1. Concentrations of VOCs Detected in Vertical Profile Boring VP-104, Former Grumman Settling Ponds (Operable Unit 3 - Bethpage Community Park), Bethpage, New York.

Constituent in ug/L	Sample ID: / Sample Depth: / Sample Date:	VP-104 180 ft bls 8/1/2006	VP-104 200 ft bls 8/1/2006	VP-104 220 ft bls 8/1/2006	VP-104 240 ft bls 8/1/2006	VP-104 260 ft bls 8/2/2006	VP-104 280 ft bls 8/2/2006	VP-104 300 ft bls 8/2/2006
1,1,1-Trichloroethane		<5	<5	<5	<5	<5	<5	<5
1,1,2,2-Tetrachloroethane		<5	<5	<5	<5	<5	<5	<5
1,1,2-Trichloroethane		<5	<5	<5	<5	<5	<5	<5
1,1-Dichloroethane		<5	<5	<5	<5	<5	<5	<5
1,1-Dichloroethylene		<5	<5	<5	<5	<5	<5	<5
1,2-Dichloroethane		<5	<5	<5	<5	<5	<5	<5
1,2-Dichloropropane		<5	<5	<5	<5	<5	<5	<5
2-Hexanone		<10	<10	<10	<10	<10	<10	<10
Acetone		<10	<10	<10	<10	<10	<10	<10
Benzene		<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7
Bromodichloromethane		<5	<5	<5	<5	<5	<5	<5
Bromoform		<5	<5	<5	<5	<5	<5	<5
Carbon disulfide		<5	<5	<5	<5	<5	<5	<5
Carbon tetrachloride		<5	<5	<5	<5	<5	<5	<5
Chlorobenzene		<5	<5	<5	<5	<5	<5	<5
Chlorodifluoromethane		<5	<5	<5	<5	<5	<5	<5
Chloroethane		<5	<5	<5	<5	<5	<5	<5
Chloroform		<5	<5	<5	<5	<5	<5	<5
cis-1,2-Dichloroethylene		<5	<5	**1J**	<5	<5	<5	<5
cis-1,3-Dichloropropene		<5	<5	<5	<5	<5	<5	<5
Dibromochloromethane		<5	<5	<5	<5	<5	<5	<5
Dichlorodifluoromethane		<5	<5	<5	<5	<5	<5	<5
trans-1,2-Dichloroethylene		<5	<5	<5	<5	<5	<5	<5
Ethylbenzene		<5	<5	<5	<5	<5	<5	<5
Bromomethane		<5	<5	<5	<5	<5	<5	<5
Chloromethane		<5	<5	<5	<5	<5	<5	<5
2-Butanone(MEK)		<10	<10	<10	<10	<10	<10	<10
4-Methyl-2-pentanone		<10	<10	<10	<10	<10	<10	<10
Methylene chloride		<5	<5	<5	<5	<5	<5	<5
Styrene		<5	<5	<5	<5	<5	<5	<5
Tetrachloroethylene		<5	<5	<5	<5	<5	<5	**0.8J**
Toluene		<5	<5	<5	<5	<5	<5	<5
trans-1,3-Dichloropropene		<5	<5	<5	<5	<5	<5	<5
Trichloroethylene		**2J**	**3J**	**5J**	**7**	**7**	**7**	**2J**
trichlorotrifluoroethane		<5	<5	<5	<5	<5	<5	<5
Vinyl Acetate		<5	<5	<5	<5	<5	<5	<5
Vinyl chloride		<2	<2	<2	<2	<2	<2	<2
Xylene (total)		<5	<5	<5	<5	<5	<5	<5

Table 1. Concentrations of VOCs Detected in Vertical Profile Boring VP-104, Former Grumman Settling Ponds (Operable Unit 3 - Bethpage Community Park), Bethpage, New York.

Constituent in ug/L	Sample ID:	VP-104	VP-104	VP-104	VP-104	VP-104	VP-104	VP-104 REP
	Sample Depth:	320 ft bls	340 ft bls	360 ft bls	380 ft bls	400 ft bls	420 ft bls	420 ft bls
	Sample Date:	8/3/2006	8/3/2006	8/3/2006	8/7/2006	8/7/2006	8/7/2006	8/7/2006
1,1,1-Trichloroethane		<5	<5	<5	<5	**3J**	**3J**	**3J**
1,1,2,2-Tetrachloroethane		<5	<5	<5	<5	<5	<5	<5
1,1,2-Trichloroethane		<5	<5	<5	<5	<5	<5	<5
1,1-Dichloroethane		**7**	<5	<5	<5	**10**	**11**	**11**
1,1-Dichloroethylene		**3J**	<5	<5	<5	**3J**	**4J**	**4J**
1,2-Dichloroethane		<5	<5	<5	<5	<5	<5	<5
1,2-Dichloropropane		<5	<5	<5	<5	<5	<5	<5
2-Hexanone		<10	<10	<10	<10	<10	<10	<10
Acetone		<10	<10	<10	<11	<10	<10	<10
Benzene		<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7
Bromodichloromethane		<5	<5	<5	<5	<5	<5	<5
Bromoform		<5	<5	<5	<5	<5	<5	<5
Carbon disulfide		<5	<5	<5	<5	<5	<5	<5
Carbon tetrachloride		<5	<5	<5	<5	<5	<5	<5
Chlorobenzene		<5	<5	<5	<5	<5	<5	<5
Chlorodifluoromethane		<5	<5	<5	<5	<5	<5	<5
Chloroethane		<5	<5	<5	<5	<5	<5	<5
Chloroform		<5	<5	<5	<5	**0.7J**	**0.7J**	**0.6J**
cis-1,2-Dichloroethylene		<5	<5	<5	<5	<5	<5	<5
cis-1,3-Dichloropropene		<5	<5	<5	<5	<5	<5	<5
Dibromochloromethane		<5	<5	<5	<5	<5	<5	<5
Dichlorodifluoromethane		<5	<5	<5	<5	<5	<5	<5
trans-1,2-Dichloroethylene		<5	<5	<5	<5	<5	<5	<5
Ethylbenzene		<5	<5	<5	<5	<5	<5	<5
Bromomethane		<5	<5	<5	<5	<5	<5	<5
Chloromethane		<5	<5	<5	<5	<5	<5	<5
2-Butanone(MEK)		<10	<10	<10	<10	<10	<10	<10
4-Methyl-2-pentanone		<10	<10	<10	<10	<10	<10	<10
Methylene chloride		<5	<5	<5	<5	<5	<5	<5
Styrene		<5	<5	<5	<5	<5	<5	<5
Tetrachloroethylene		<5	<5	<5	<5	**2J**	**2J**	**2J**
Toluene		<5	<5	<5	<5	<5	<5	<5
trans-1,3-Dichloropropene		<5	<5	<5	<5	<5	<5	<5
Trichloroethylene		**0.9J**	<5	<5	<5	**3J**	**3J**	**3J**
trichlorotrifluoroethane		<5	<5	<5	<5	<5	<5	<5
Vinyl Acetate		<5	<5	<5	<5	<5	<5	<5
Vinyl chloride		<2	<2	<2	<2	<2	<2	<2
Xylene (total)		<5	<5	<5	<5	<5	<5	<5

Table 1. Concentrations of VOCs Detected in Vertical Profile Boring VP-104, Former Grumman Settling Ponds (Operable Unit 3 - Bethpage Community Park), Bethpage, New York.

Constituent in ug/L	Sample ID: VP-104 460 ft bls 8/8/2006	VP-104 480 ft bls 8/8/2006	VP-104 500 ft bls 8/8/2006	VP-104 520 ft bls 8/14/2006	VP-104 540 ft bls 8/14/2006	VP-104 560 ft bls 8/14/2006	VP-104 580 ft bls 8/15/2006
1,1,1-Trichloroethane	<5	**6**	**1J**	<5	<25	<25	<5
1,1,2,2-Tetrachloroethane	<5	<5	<5	<5	<25	<25	<5
1,1,2-Trichloroethane	<5	<5	<5	**3J**	<25	**5J**	<5
1,1-Dichloroethane	<5	**15**	**2J**	**3J**	<25	<25	<5
1,1-Dichloroethylene	<5	**9**	**2J**	**2J**	**4J**	**7J**	<5
1,2-Dichloroethane	<5	<5	<5	**16**	<25	**12J**	<5
1,2-Dichloropropane	<5	<5	<5	<5	<200	<250	<5
2-Hexanone	<10	<10	<10	<10	<50	<50	<10
Acetone	<10	<10	<10	**5J**	<50	<50	<10
Benzene	<0.7	<0.7	<0.7	<0.7	<4	<4	<0.7
Bromodichloromethane	<5	<5	<5	<5	<25	<25	<5
Bromoform	<5	<5	<5	<5	<25	<25	<5
Carbon disulfide	<5	<5	<5	<5	<25	<25	<5
Carbon tetrachloride	<5	<5	<5	<5	<25	<25	<5
Chlorobenzene	<5	<5	<5	<5	<25	<25	<5
Chlorodifluoromethane	<5	<5	<5	<5	<25	<25	<5
Chloroethane	<5	<5	<5	<5	<25	<25	<5
Chloroform	<5	**2J**	**6**	<18	<25	<25	<5
cis-1,2-Dichloroethylene	<5	**20**	**84**	**380D**	**470**	**290**	**6**
cis-1,3-Dichloropropene	<5	<5	<5	<5	<25	<25	<5
Dibromochloromethane	<5	<5	<5	<5	<25	<25	<5
Dichlorodifluoromethane	<5	<5	<5	<5	<25	<25	<5
trans-1,2-Dichloroethylene	<5	<5	<5	**6**	**4J**	**5J**	<5
Ethylbenzene	<5	<5	<5	<5	<25	<25	<5
Bromomethane	<5	<5	<5	<5	<25	<25	<5
Chloromethane	<5	<5	<5	<5	<25	<25	<5
2-Butanone(MEK)	<10	<10	<10	<10	<50	<50	<10
4-Methyl-2-pentanone	<10	<10	<10	<10	<50	<50	<10
Methylene chloride	<5	<5	<5	<5	<25	<25	<5
Styrene	<5	<5	<5	<5	<25	<25	<5
Tetrachloroethylene	<5	**19**	**4J**	**12**	**3J**	**7J**	<5
Toluene	<5	<5	<5	<5	<25	<25	<5
trans-1,3-Dichloropropene	<5	<5	<5	<5	<25	<25	<5
Trichloroethylene	**0.3J**	**72**	**190D**	**1400D**	**3200D**	**6300D**	**110**
trichlorotrifluoroethane	<5	<5	<5	**0.5J**	<25	<25	<5
Vinyl Acetate	<5	<5	<5	<5	<25	<25	<5
Vinyl chloride	<2	<2	<2	<2	<10	<10	<2
Xylene (total)	<5	<5	<5	<5	<25	<25	<5

Table 1. Concentrations of VOCs Detected in Vertical Profile Boring VP-104, Former Grumman Settling Ponds (Operable Unit 3 - Bethpage Community Park), Bethpage, New York.

Constituent in ug/L	Sample ID: VP-104 Sample Depth: 600 ft bls Sample Date: 8/15/2006	VP-104 620 ft bls 8/15/2006	VP-104 640 ft bls 8/16/2006	VP-104 660 ft bls 8/16/2006	VP-104 680 ft bls 8/16/2006	VP-104 707 ft bls 8/21/2006	VP-104 720 ft bls 8/22/2006
1,1,1-Trichloroethane	<5	<5	<5	<5	<5	<5	<5
1,1,2,2-Tetrachloroethane	<5	<5	<5	<5	<5	<5	<5
1,1,2-Trichloroethane	<5	<5	<5	<5	<5	<5	<5
1,1-Dichloroethane	<5	<5	<5	<5	<5	<5	<5
1,1-Dichloroethylene	<5	<5	<5	<5	<5	<5	<5
1,2-Dichloroethane	<5	<5	<5	<5	<5	<5	<5
1,2-Dichloropropane	<5	<5	<5	<5	<5	<5	<5
2-Hexanone	<10	<10	<10	<10	<10	<10	<10
Acetone	<10	**4J**	<10	<10	<10	**6J**	<10
Benzene	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7
Bromodichloromethane	<5	<5	<5	<5	<5	<5	<5
Bromoform	<5	<5	<5	<5	<5	<5	<5
Carbon disulfide	<5	<5	<5	<5	<5	<5	<5
Carbon tetrachloride	<5	<5	<5	<5	<5	<5	<5
Chlorobenzene	<5	<5	<5	<5	<5	<5	<5
Chlorodifluoromethane	<5	<5	<5	<5	<5	<5	<5
Chloroethane	<5	<5	<5	<5	<5	<5	<5
Chloroform	<5	<5	<5	<5	<5	<5	<5
cis-1,2-Dichloroethylene	**1J**	**1J**	<5	**0.9J**	<5	<5	<5
cis-1,3-Dichloropropene	<5	<5	<5	<5	<5	<5	<5
Dibromochloromethane	<5	<5	<5	<5	<5	<5	<5
Dichlorodifluoromethane	<5	<5	<5	<5	<5	<5	<5
trans-1,2-Dichloroethylene	<5	<5	<5	<5	<5	<5	<5
Ethylbenzene	<5	<5	<5	<5	<5	<5	<5
Bromomethane	<5	<5	<5	<5	<5	<5	<5
Chloromethane	<5	<5	<5	<5	<5	<5	<5
2-Butanone(MEK)	<10	<10	<10	<10	<10	<10	<10
4-Methyl-2-pentanone	<10	<10	<10	<10	<10	<10	<10
Methylene chloride	<5	<5	<5	<5	<5	<5	<5
Styrene	<5	<5	<5	<5	<5	<5	<5
Tetrachloroethylene	<5	<5	<5	<5	<5	<5	<5
Toluene	<5	<5	<5	<5	<5	<5	<5
trans-1,3-Dichloropropene	<5	<5	<5	<5	<5	<5	<5
Trichloroethylene	**17**	**14**	**8**	**11**	**4J**	**0.5J**	**1J**
trichlorotrifluoroethane	<5	<5	<5	<5	<5	<5	<5
Vinyl Acetate	<5	<5	<5	<5	<5	<5	<5
Vinyl chloride	<2	<2	<2	<2	<2	<2	<2
Xylene (total)	<5	<5	<5	<5	<5	<5	<5

Table 1. Concentrations of VOCs Detected in Vertical Profile Boring VP-104, Former Grumman Settling Ponds (Operable Unit 3 - Bethpage Community Park), Bethpage, New York.

Constituent in ug/L	Sample ID: VP-104 Sample Depth: 740 ft bls Sample Date: 8/22/2006	VP-104 760 ft bls 8/23/2006	VP-104 780 ft bls 8/23/2006	VP-104 800 ft bls 8/23/2006	VP-104 820 ft bls 8/24/2006	VP-104 840 ft bls 8/24/2006	VP-104 860 ft bls 8/25/2006
1,1,1-Trichloroethane	<5	<5	<5	<5	<5	<5	<5
1,1,2,2-Tetrachloroethane	<5	<5	<5	<5	<5	<5	<5
1,1,2-Trichloroethane	<5	<5	<5	<5	<5	<5	<5
1,1-Dichloroethane	<5	<5	<5	<5	<5	<5	<5
1,1-Dichloroethylene	<5	<5	<5	<5	<5	<5	<5
1,2-Dichloroethane	<5	<5	<5	<5	<5	<5	<5
1,2-Dichloropropane	<5	<5	<5	<5	<5	<5	<5
2-Hexanone	<10	<10	<10	<10	<10	<10	<10
Acetone	<10	<10	**5J**	<10	<10	<10	**5J**
Benzene	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7
Bromodichloromethane	<5	<5	<5	<5	<5	<5	<5
Bromoform	<5	<5	<5	<5	<5	<5	<5
Carbon disulfide	<5	<5	<5	<5	<5	<5	<5
Carbon tetrachloride	<5	<5	<5	<5	<5	<5	<5
Chlorobenzene	<5	<5	<5	<5	<5	<5	<5
Chlorodifluoromethane	<5	<5	<5	<5	<5	<5	<5
Chloroethane	<5	<5	<5	<5	<5	<5	<5
Chloroform	<5	<5	<5	<5	<5	<5	<5
cis-1,2-Dichloroethylene	<5	<5	<5	<5	<5	<5	<5
cis-1,3-Dichloropropene	<5	<5	<5	<5	<5	<5	<5
Dibromochloromethane	<5	<5	<5	<5	<5	<5	<5
Dichlorodifluoromethane	<5	<5	<5	<5	<5	<5	<5
trans-1,2-Dichloroethylene	<5	<5	<5	<5	<5	<5	<5
Ethylbenzene	<5	<5	<5	<5	<5	<5	<5
Bromomethane	<5	<5	<5	<5	<5	<5	<5
Chloromethane	<5	<5	<5	<5	<5	<5	<5
2-Butanone(MEK)	<10	<10	<10	<10	<10	<10	<10
4-Methyl-2-pentanone	<10	<10	<10	<10	<10	<10	<10
Methylene chloride	<5	<5	<5	<5	<5	<5	<5
Styrene	<5	<5	<5	<5	<5	<5	<5
Tetrachloroethylene	<5	<5	<5	<5	<5	<5	<5
Toluene	<5	<5	<5	<5	<5	<5	<5
trans-1,3-Dichloropropene	<5	<5	<5	<5	<5	<5	<5
Trichloroethylene	**1J**	**1J**	**0.9J**	**1J**	**0.3J**	<5	<5
trichlorotrifluoroethane	<5	<5	<5	<5	<5	<5	<5
Vinyl Acetate	<5	<5	<5	<5	<5	<5	<5
Vinyl chloride	<2	<2	<2	<2	<2	<2	<2
Xylene (total)	<5	<5	<5	<5	<5	<5	<5

Table 1. Concentrations of VOCs Detected in Vertical Profile Boring VP-104, Former Grumman Settling Ponds (Operable Unit 3 - Bethpage Community Park), Bethpage, New York.

Constituent in ug/L	Sample ID: VP-104 Sample Depth: 880 ft bls Sample Date: 8/25/2006
1,1,1-Trichloroethane	<5
1,1,2,2-Tetrachloroethane	<5
1,1,2-Trichloroethane	<5
1,1-Dichloroethane	<5
1,1-Dichloroethylene	<5
1,2-Dichloroethane	<5
1,2-Dichloropropane	<5
2-Hexanone	<10
Acetone	**6J**
Benzene	<0.7
Bromodichloromethane	<5
Bromoform	<5
Carbon disulfide	<5
Carbon tetrachloride	<5
Chlorobenzene	<5
Chlorodifluoromethane	<5
Chloroethane	<5
Chloroform	<5
cis-1,2-Dichloroethylene	<5
cis-1,3-Dichloropropene	<5
Dibromochloromethane	<5
Dichlorodifluoromethane	<5
trans-1,2-Dichloroethylene	<5
Ethylbenzene	<5
Bromomethane	<5
Chloromethane	<5
2-Butanone(MEK)	<10
4-Methyl-2-pentanone	<10
Methylene chloride	<5
Styrene	<5
Tetrachloroethylene	<5
Toluene	<5
trans-1,3-Dichloropropene	<5
Trichloroethylene	<5
trichlorotrifluoroethane	<5
Vinyl Acetate	<5
Vinyl chloride	<2
Xylene (total)	<5

Table 1. Concentrations of VOCs Detected in Vertical Profile Boring VP-104, Former Grumman Settling Ponds (Operable Unit 3 - Bethpage Community Park), Bethpage, New York.

Detections are boldfaced

D	Constitiuent quantified at secondary dilution
J	Estimated Value
B	Constitiuent detected in associated blank
--	Not Analyzed

ARCADIS

Table 2. Concentrations of VOCs Detected in Vertical Profile Boring VP-100, Former Grumman Settling Ponds (Operable Unit 3 - Bethpage Community Park), Bethpage, New York.

CONSTITUENT (ug/l)	Sample ID: VP-100 Sample Depth: VP-100(75-80) Sample Date: 9/14/2006	VP-100 VP-100(105-110) 9/14/2006	VP-100 VP-100(125-130) 9/13/2006	VP-100 VP-100(145-150) 9/13/2006
Chloromethane	<5	<5	<5	<5
Bromomethane	<5	<5	<5	<5
Vinyl Choride	<2	<2	<2	<2
Chloroethane	<5	<5	<5	<5
Methylene chloride	<5B	<5B	<5	<5
Acetone	<10	<10	<10	<10
Carbon disulfide	<5	<5	<5	<5
1,1-Dichloroethene	<5	<5	<5	<5
1,1-Dichloroethane	<5	<5	<5	<5
Chloroform	**9**	**2J**	**0.7J**	**0.7J**
1,2-Dichloroethane	<5	<5	<5	<5
2-Butanone	<10	<10	<10	<10
1,1,1-Trichloroethane	<5	<5	<5	<5
Carbon tetrachloride	<5	<5	<5	<5
Bromodichloromethane	<5	<5	<5	<5
1,2-Dichloropropane	<5	<5	<5	<5
cis-1,3-Dichloropropene	<5	<5	<5	<5
Trichloroethene	**17**	**22**	**97**	**190**
Dibromochloromethane	<5	<5	<5	<5
1,1,2-Trichloroethane	<5	<5	<5	<5
Benzene	<0.7	<0.7	<0.7	<0.7
trans-1,3-Dichloropropene	<5	<5	<5	<5
Bromoform	<5	<5	<5	<5
4-Methyl-2-pentanone	<10	<10	<10	<10
2-Hexanone	<10	<10	<10	<10
Tetrachloroethene	<5	<5	<5	<5
1,1,2,2-Tetrachloroethane	<5	<5	<5	<5
Toluene	**2J**	**1J**	<5	<5
Chlorobenzene	<5	<5	<5	<5
Ethylbenzene	<5	<5	<5	<5
Styrene	<5	<5	<5	<5
Xylene (total)	<5	<5	<5	<5
Vinyl Acetate	<5	<5	<5	<5
Chlorodifluoromethane	**14**	**3J**	<5	<5
cis-1,2-Dichloroethylene	**100**	**140**	**930D**	**1500D**
Dichlorodifluoromethane	<5	<5	<5	<5
trans-1,2-Dichloroethene	<5	<5	**0.9J**	<5
trichlorotrifluoroethane	<5	<5	<5	<5

Table 2. Concentrations of VOCs Detected in Vertical Profile Boring VP-100, Former Grumman Settling Ponds (Operable Unit 3 - Bethpage Community Park), Bethpage, New York.

CONSTITUENT (ug/l)	Sample ID: / Sample Depth: / Sample Date:	VP-100 VP-100(160-165) 9/12/2006	VP-100 VP-100(180-185) 9/12/2006	VP-100 VP-100(190-195) 9/12/2006	VP-100 VP-100(200-205) 9/11/2006
Chloromethane		<5	<5	<5	<5
Bromomethane		<5	<5	<5	<5
Vinyl Choride		**2J**	<2	<2	<2
Chloroethane		<5	<5	<5	<5
Methylene chloride		<5	<5	<5	<5
Acetone		<10	<10	<10	<10
Carbon disulfide		<5	<5	<5	<5
1,1-Dichloroethene		<5	<5	<5	<5
1,1-Dichloroethane		**3J**	<5	<5	<5
Chloroform		**2J**	<5	**2J**	**0.6J**
1,2-Dichloroethane		<5	<5	<5	<5
2-Butanone		<10	<10	<10	<10
1,1,1-Trichloroethane		<5	<5	<5	<5
Carbon tetrachloride		<5	<5	<5	<5
Bromodichloromethane		<5	<5	<5	<5
1,2-Dichloropropane		<5	<5	<5	<5
cis-1,3-Dichloropropene		<5	<5	<5	<5
Trichloroethene		**78**	**32**	**20**	**11**
Dibromochloromethane		<5	<5	<5	<5
1,1,2-Trichloroethane		<5	<5	<5	<5
Benzene		<0.7	<0.7	<0.7	<0.7
trans-1,3-Dichloropropene		<5	<5	<5	<5
Bromoform		<5	<5	<5	<5
4-Methyl-2-pentanone		<10	<10	<10	<10
2-Hexanone		<10	<10	<10	<10
Tetrachloroethene		<5	<5	**0.6J**	<5
1,1,2,2-Tetrachloroethane		<5	<5	<5	<5
Toluene		<5	<5	<5	**0.8J**
Chlorobenzene		<5	<5	<5	<5
Ethylbenzene		<5	<5	<5	<5
Styrene		<5	<5	<5	<5
Xylene (total)		<5	<5	<5	<5
Vinyl Acetate		<5	<5	<5	<5
Chlorodifluoromethane		<5	<5	<5	<5
cis-1,2-Dichloroethylene		**360D**	**66**	**16**	**11**
Dichlorodifluoromethane		<5	<5	<5	<5
trans-1,2-Dichloroethene		<5	<5	<5	<5
trichlorotrifluoroethane		<5	<5	<5	<5

Table 2. Concentrations of VOCs Detected in Vertical Profile Boring VP-100, Former Grumman Settling Ponds (Operable Unit 3 - Bethpage Community Park), Bethpage, New York.

CONSTITUENT (ug/l)	Sample ID: VP-100 Sample Depth: VP-100(210-215) Sample Date: 9/11/2006	VP-100 VP-100(220-225) 9/11/2006	VP-100 VP-100(230-235) 9/8/2006	VP-100 VP-100(240-245) 9/8/2006
Chloromethane	<5	<5	<5	<5
Bromomethane	<5	<5	<5	<5
Vinyl Choride	<2	<2	<2	<2
Chloroethane	<5	<5	<5	<5
Methylene chloride	<5	<5	<5	<5
Acetone	<10	<10	<10	<10
Carbon disulfide	<5	<5	<5	<5
1,1-Dichloroethene	<5	<5	<5	<5
1,1-Dichloroethane	<5	<5	<5	<5
Chloroform	<5	<5	<5	<5
1,2-Dichloroethane	<5	<5	<5	<5
2-Butanone	<10	<10	<10	<10
1,1,1-Trichloroethane	<5	<5	<5	<5
Carbon tetrachloride	<5	<5	<5	<5
Bromodichloromethane	<5	<5	<5	<5
1,2-Dichloropropane	<5	<5	<5	<5
cis-1,3-Dichloropropene	<5	<5	<5	<5
Trichloroethene	**15**	**14**	**20**	**47**
Dibromochloromethane	<5	<5	<5	<5
1,1,2-Trichloroethane	<5	<5	<5	<5
Benzene	<0.7	<0.7	<0.7	<0.7
trans-1,3-Dichloropropene	<5	<5	<5	<5
Bromoform	<5	<5	<5	<5
4-Methyl-2-pentanone	<10	<10	<10	<10
2-Hexanone	<10	<10	<10	<10
Tetrachloroethene	<5	<5	**2J**	**3J**
1,1,2,2-Tetrachloroethane	<5	<5	<5	<5
Toluene	<5	<5	**1J**	<5
Chlorobenzene	<5	<5	<5	<5
Ethylbenzene	<5	<5	<5	<5
Styrene	<5	<5	<5	<5
Xylene (total)	<5	<5	<5	<5
Vinyl Acetate	<5	<5	<5	<5
Chlorodifluoromethane	**2J**	**2J**	<5	<5
cis-1,2-Dichloroethylene	**22**	**17**	**3J**	**2J**
Dichlorodifluoromethane	<5	<5	<5	<5
trans-1,2-Dichloroethene	<5	<5	<5	<5
trichlorotrifluoroethane	<5	<5	<5	<5

Table 2. Concentrations of VOCs Detected in Vertical Profile Boring VP-100, Former Grumman Settling Ponds (Operable Unit 3 - Bethpage Community Park), Bethpage, New York.

CONSTITUENT (ug/l)	Sample ID: VP-100 Sample Depth: VP-100(250-255) Sample Date: 9/7/2006	VP-100 VP-100(270-275) 9/7/2006	VP-100 VP-100(290-295) 9/6/2006	VP-100 VP-100(310-315) 9/6/2006
Chloromethane	<5	<5	<10	<5
Bromomethane	<5	<5	<10	<5
Vinyl Choride	<2	<2	<4	<2
Chloroethane	<5	<5	<10	<5
Methylene chloride	<5	<5	<10	<5
Acetone	<10	<10	<20	<10
Carbon disulfide	<5	<5	<10	<5
1,1-Dichloroethene	<5	<5	<10	<5
1,1-Dichloroethane	<5	<5	<10	<5
Chloroform	<5	<5	<10	<5
1,2-Dichloroethane	<5	<5	<10	<5
2-Butanone	<10	<10	<20	<10
1,1,1-Trichloroethane	<5	<5	<10	<5
Carbon tetrachloride	<5	<5	<10	<5
Bromodichloromethane	<5	<5	<10	<5
1,2-Dichloropropane	<5	<5	<10	<5
cis-1,3-Dichloropropene	<5	<5	<10	<5
Trichloroethene	**86**	**240D**	**190**	**18**
Dibromochloromethane	<5	<5	<10	<5
1,1,2-Trichloroethane	<5	<5	<10	<5
Benzene	<0.7	<0.7	<1	<0.7
trans-1,3-Dichloropropene	<5	<5	<10	<5
Bromoform	<5	<5	<10	<5
4-Methyl-2-pentanone	<10	<10	<20	<10
2-Hexanone	<10	<10	<20	<10
Tetrachloroethene	**2J**	**3J**	<10	**3J**
1,1,2,2-Tetrachloroethane	<5	<5	<10	<5
Toluene	**8**	**3J**	**1J**	**1J**
Chlorobenzene	<5	<5	<10	<5
Ethylbenzene	<5	<5	<10	<5
Styrene	<5	<5	<10	<5
Xylene (total)	<5	<5	<10	<5
Vinyl Acetate	<5	<5	<10	<5
Chlorodifluoromethane	<5	<5	<10	<5
cis-1,2-Dichloroethylene	**3J**	**8**	**7J**	<5
Dichlorodifluoromethane	<5	<5	<10	<5
trans-1,2-Dichloroethene	<5	<5	<10	<5
trichlorotrifluoroethane	<5	<5	<10	<5

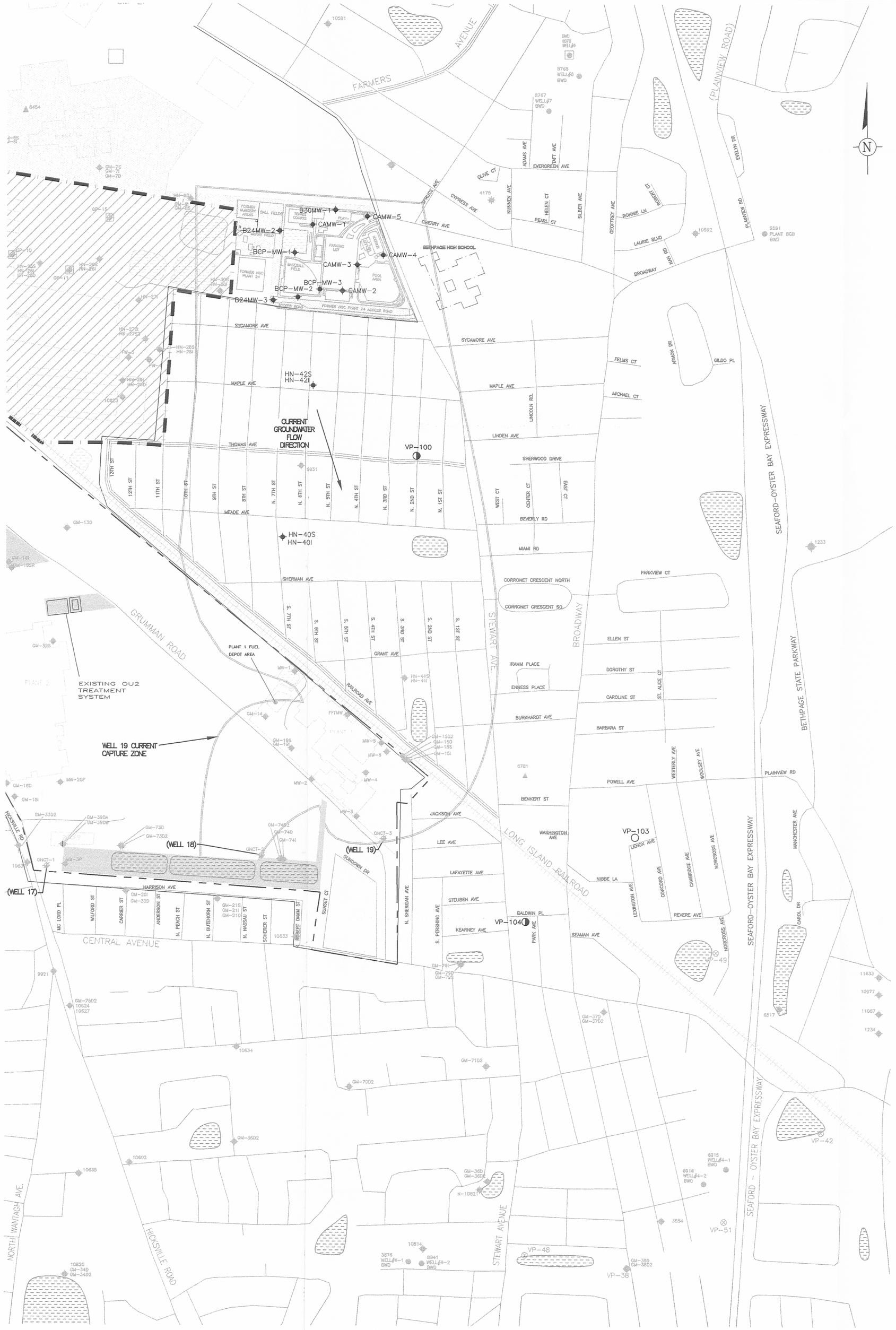
Table 2. Concentrations of VOCs Detected in Vertical Profile Boring VP-100, Former Grumman Settling Ponds (Operable Unit 3 - Bethpage Community Park), Bethpage, New York.

CONSTITUENT (ug/l)	Sample ID: VP-100 Sample Depth: VP-100(330-335) Sample Date: 9/5/2006	VP-100 VP-100(350-355) 9/5/2006	VP-100 VP-100(371-376) 9/1/2006	VP-100 VP-100(394-399) 9/1/2006
Chloromethane	<5	<5	<5	<5
Bromomethane	<5	<5	<5	<5
Vinyl Choride	<2	<2	<2	<2
Chloroethane	<5	<5	<5	<5
Methylene chloride	<5	<5	<5	<5
Acetone	<10	<10	<10	<10
Carbon disulfide	<5	<5	<5	<5
1,1-Dichloroethene	<5	<5	<5	<5
1,1-Dichloroethane	<5	<5	<5	<5
Chloroform	<5	<5	<5	<5
1,2-Dichloroethane	<5	<5	<5	<5
2-Butanone	<10	<10	<10	<10
1,1,1-Trichloroethane	<5	<5	<5	<5
Carbon tetrachloride	<5	<5	<5	<5
Bromodichloromethane	<5	<5	<5	<5
1,2-Dichloropropane	<5	<5	<5	<5
cis-1,3-Dichloropropene	<5	<5	<5	<5
Trichloroethene	**11**	**2J**	**0.6J**	**1J**
Dibromochloromethane	<5	<5	<5	<5
1,1,2-Trichloroethane	<5	<5	<5	<5
Benzene	<0.7	<0.7	<0.7	<0.7
trans-1,3-Dichloropropene	<5	<5	<5	<5
Bromoform	<5	<5	<5	<5
4-Methyl-2-pentanone	<10	<10	<10	<10
2-Hexanone	<10	<10	<10	<10
Tetrachloroethene	**6**	<5	**0.5J**	**0.8J**
1,1,2,2-Tetrachloroethane	<5	<5	<5	<5
Toluene	**1J**	<5	**0.7J**	<5
Chlorobenzene	<5	<5	<5	<5
Ethylbenzene	<5	<5	<5	<5
Styrene	<5	<5	<5	<5
Xylene (total)	<5	<5	<5	<5
Vinyl Acetate	<5	<5	<5	<5
Chlorodifluoromethane	<5	<5	<5	<5
cis-1,2-Dichloroethylene	<5	<5	<5	<5
Dichlorodifluoromethane	<5	<5	<5	<5
trans-1,2-Dichloroethene	<5	<5	<5	<5
trichlorotrifluoroethane	**0.9J**	<5	<5	**0.7J**

Table 2. Concentrations of VOCs Detected in Vertical Profile Boring VP-100, Former Grumman Settling Ponds (Operable Unit 3 - Bethpage Community Park), Bethpage, New York.

Detections are boldfaced

D	Constitiuent quantified at secondary dilution
J	Estimated Value
B	Constitiuent detected in associated blank
--	Not Analyzed



EXPLANATION

- PROPERTY BOUNDARY OF THE FORMER GRUMMAN AEROSPACE SITE
- PROPERTY BOUNDARY OF U.S. NAVY SITE
- LONG ISLAND RAILROAD
- DENOTES NORTHROP GRUMMAN OWNED PROPERTY (AS OF 2003)
- DENOTES U.S. NAVY OWNED PROPERTY (AS OF 2003)
- RECHARGE BASIN
- LAND SURFACE PROJECTION OF THE CAPTURE ZONE OF WELL ONCT 3 (WELL 19) PUMPING AT ITS NORMAL RATE OF 700 GPM (BASED ON MODELING)
- CURRENT DIRECTION OF GROUNDWATER FLOW
- LIMITS OF BETHPAGE HIGH SCHOOL MAIN BUILDING
- 10592 OBSERVATION, MONITORING WELL (GRAY – SHOWN FOR REFERENCE) (BLACK – PROPOSED TO BE SAMPLED IN PHASE 2 RI)
- 6781 INDUSTRIAL WELL
- 9591 PUBLIC SUPPLY WELL
- 4175 IRRIGATION WELL
- WELL-17 NORTHROP GRUMMAN OR NAVY PRODUCTION WELL
- GP-11 ABANDONED PRODUCTION WELL
- VP-49 COMPLETED OU2 VERTICAL PROFILE BORING
- VP-100 COMPLETED OU3 VERTICAL PROFILE BORING
- VP-103 PROPOSED OU3 VERTICAL PROFILE BORING
- BWD BETHPAGE WATER DISTRICT
- VPB VERTICAL PROFILE BORING
- RI REMEDIAL INVESTIGATION
- OU2 OPERABLE UNIT 2
- OU3 OPERABLE UNIT 3

GENERAL NOTES:

1. THIS FIGURE INCLUDES LOCATIONS OF PUBLIC SUPPLY WELLS BASED ON INFORMATION RECEIVED BY ARCADIS IN RESPONSE TO A SEPTEMBER 2001 LETTER TO WATER DISTRICTS.
2. BASIN LOCATIONS OBTAINED FROM USGS TOPOGRAPHIC MAPS (HUNTINGTON, HICKSVILLE, FREEPORT AND AMITYVILLE QUADRANGLES) AND INFORMATION PROVIDED BY NORTHROP GRUMMAN.
3. NORTHROP GRUMMAN PROPERTY HOLDINGS BASED ON DATA PROVIDED IN JUNE 2003.
4. LOCATIONS OF MONITORING WELLS INSTALLED BY DVIRKA & BARTILUCCI (D&B) AT PLANT 1 (i.e., MW-1 TO MW-6) ARE APPROXIMATE BASED ON D&B SITE PLAN, PROVIDED ON DECEMBER 19, 2002.
5. LOCATIONS OF MONITORING WELLS INSTALLED BY DVIRKA & BARTILUCCI (D&B) AT BETHPAGE COMMUNITY PARK ARE APPROXIMATE BASED ON DATA PROVIDED BY D&B SITE PLAN, DATED DECEMBER 2003.
6. LOCATIONS OF BETHPAGE PARK MONITORING WELLS INSTALLED BY THE TOWN OF OYSTER BAY ARE APPROXIMATE, BASED ON THE 2005 H2M REPORTS. (H2M 2005a;b).

0 500' 1000' 1500'
SCALE IN FEET

DRAFT

BETHPAGE COMMUNITY PARK EXTENTS AND FEATURES DVIRKA AND BARTILUCCI CONSULTING ENGINEERS 2003

ALL COORDINATES REFERENCED TO NORTH AMERICAN DATUM 1929

NO.	ISSUED DATE	REVISION DESCRIPTION	BY/CKD
0	11/9/06	LETTER REPORT TO DEC	DES

KEYPLAN

PROJECT TITLE

OPERABLE UNIT 3
NORTHROP GRUMMAN SYSTEMS CORPORATION
BETHPAGE, NEW YORK

SHEET TITLE

ARCADIS
Two Huntington Quadrangle
Suite 1S10
Melville, NY 11747
Tel: 631-249-7600 Fax: 631-249-7610
www.arcadis-us.com

SEAL	SEAL
PROJECT MANAGER: C. SAN GIOVANNI	DEPARTMENT MANAGER: M. WOLFERT
LEAD DESIGN PROF.	CHECKED BY: M. REINDL
TASK/PHASE NUMBER	DRAWN BY: A. SANCHEZ
PROJECT NUMBER: NY001348	DRAWING NUMBER: 1

Current Plotstyle : ByColor
Layout Tab: OU3
Acad Version : R17.0s (LMS Tech) Date\Time : Thu, 09 Nov 2006 – 10:51am
User Name : dsanchez Path\Name : G:\APROJECT\Northrop Grumman\Cadd\OU3\2006\Off-Site_Navy mtg.dwg