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ENVIRONMENT

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

Subject:
Phase 2 Remedial Investigation Work Plan Addendum No. 7,
Former Grumman Settling Ponds (Operable Unit 3, - Bethpage Community Park),
Bethpage, New York.

Date:
November 13, 2006

Contact:
David Stern

Phone:
631-391-5284

Email:
dstern@arcadis-us.com

Our ref:
NY001348.0806.00003

Dear Mr. Scharf:

On behalf of Northrop Grumman Systems Corporation (NGC), ARCADIS has prepared this Work Plan Addendum No. 7 for continuation of Phase 2 of the Remedial Investigation (RI) for the Former Grumman Settling Ponds (Operable Unit 3 – Bethpage Community Park), Bethpage, New York Site. This Work Plan Addendum No. 7 presents the rationale and proposed scope for:

- Additional soil investigation to be performed on the Bethpage Community Park (Park) and NGC properties using Membrane Interface Probe (MIP) methodology.
- Additional off-site groundwater investigation to be performed using vertical profile boring (VPB) methodology.

The NYSDEC-approved RI/FS Work Plan, dated March 8, 2006, contains the detailed methodologies for MIP borings and VPBs proposed herein and is incorporated into this Work Plan Addendum by reference.

This Work Plan Addendum includes the following sections:

1. "Background and Rationale" provides information and rationale in support of the proposed field work.
2. "Technical Work Plan" provides the specifications pertaining to the proposed drilling and sampling activities.
3. "Community Outreach, Schedule, and Logistics" provides the updated plan for additional community outreach, the Work Plan Addendum schedule, and an updated discussion pertaining to coordination with the Town.

Background and Rationale

On-Site

Two clusters of MIP borings are proposed to be drilled, one cluster in the Park, southwest of the "Monument Area", and a second cluster southwest of the Park, on NGC property. The MIP borings will help better define the potential source(s) of volatile organic compounds (VOCs) in soil (as suggested by the soil gas and groundwater data) in these areas and the MIP data will also be used to meet RI objectives and to refine the conceptual site model (CSM). Additional details are provided below, in Table 1, and on Figure 1.

Based on soil gas and groundwater data obtained during the Phase 2 RI (data provided to NYSDEC under separate cover), ARCADIS has concluded that a source of VOC impacts to groundwater may exist in soil in the Monument Area.

Based on preliminary evaluation of existing data, the area southwest of the Park on NGC property does not appear to be substantially contributing to VOCs in groundwater; however, the elevated soil gas data appear to indicate a possible nearby area of elevated soil VOC concentrations.

Off-Site

The two proposed off-site VPBs will be drilled and sampled with the overall goal of meeting RI objectives for groundwater (see the revised RI/FS Work Plan for details) and updating the overall CSM for OU3. Specific objectives for the VPBs proposed are determining the downgradient and side-gradient extent of VOCs in groundwater near recently completed VPB VP-103. Additional details are provided below, in Table 1, and on Figure 2.

The data from VP-103 are currently being validated per the RI/FS Work Plan and will be provided as soon as possible in a forthcoming progress report, as required under the NGC-NYSDEC Consent Order (CO).

Technical Work Plan

Prior to drilling in on- and off-site areas, subsurface utilities will be identified and marked out. All work will be conducted in accordance with the RI/FS Work Plan (including the Community Air Monitoring Plan, Quality Assurance Project Plan, Field Sampling Plan, Health and Safety Plan (HASP), etc.).

On-Site

Figure 1 depicts the expanded alphanumeric grid (used to locate previously drilled MIP borings) along with existing and proposed MIP borings. Table 1 provides MIP boring specifications and detailed rationale. Overall, eleven MIP borings are proposed. Nine MIP borings (Borings N-5, O-5, O-6, P-4, P-5, P-6, Q-4, Q-5, and Q-6) are proposed in the Park, near the Monument Area. Two MIP borings (Borings C-0 and C-99) are proposed on NGC property, near SGP-11. The final number of MIP borings will be determined in the field based on the results obtained. MIP borings will be advanced to the water table (approximately 55 ft bls); the total depth may be modified depending on field conditions and results obtained.

There is sufficient information as to local stratigraphy; as such, the cone penetrometer (CPT) rig will not be mobilized as part of this phase of work. However, a geophysical log (electrical conductivity) will be run at each MIP boring to verify local stratigraphy.

Consistent with the approach to the soil RI, the magnitude and extent of VOC impacts identified by MIP borings will be confirmed through the collection and laboratory analysis of soil samples. Thus, after completion of the MIP borings and evaluation of the results, a subsequent work plan addendum specifying the confirmatory soil boring drilling/sampling will be prepared and submitted to NYSDEC. The number, locations, and depths of soil samples will be determined based on the MIP results. Based on the analytical data obtained during previous sampling rounds, soil samples collected will likely be analyzed for the Target Compound List (TCL) VOCs. Soil sample collection and analytical procedures will be performed consistent with those set forth in the approved RI/FS Work Plan.

Off-Site

Figure 2 depicts the off-site area, south of the Park, along with existing and proposed VPBs. A total of two deep VPBs (VP-109 and VP-110) will be drilled with the Mud Rotary (MR) methodology; groundwater will be sampled with Hydropunch methodology and analyzed for TCL VOCs. The VPBs will be drilled on public rights of ways. The specified total depth for VP-109 and VP-110 is 700 ft bls. See Table 1 for detailed VPB drilling, logging and sampling specifications and rationale.

Community Outreach, Schedule, and Logistics

With respect to the on-site portion of the proposed work, ARCADIS understands that the Town intends to initiate their Interim Remedial Measure (IRM) in late November 2006. ARCADIS' field work schedule has been developed to minimize the impact of the OU3 RI on Town IRM activities. The MIP borings will commence on or about November 14, 2006. ARCADIS expects that up to three MIP borings can be drilled per day. Assuming eleven MIP borings are ultimately drilled; ARCADIS expects that the work can be completed in four days. ARCADIS expects to receive the final MIP report within two weeks of completion of field work. Following evaluation of the MIP data, the work plan addendum for confirmatory soil sampling will be prepared and submitted to NYSDEC. ARCADIS is hopeful that the confirmatory soil sampling can be completed in December 2006 or early January 2007; however, the timing and scope of confirmatory sampling are not currently known.

Depending on when the Town commences its IRM activities, it is increasingly likely that ARCADIS' field work will conflict with Town IRM activities. In this regard, NGC reiterates its request that the NYSDEC direct the Town to re-plan the schedule for IRM intrusive work or other potentially interfering activities to allow the portion of the OU3 RI within the IRM "Construction Area" to proceed to completion.

In keeping with the intent of the NYSDEC-approved Community Participation Plan (CPP) (see RI/FS Work Plan for details), community notification will be made for off-site locations in a manner similar to recently drilled off-site VPBs. ARCADIS expects the off-site field work to begin on or about November 27, 2006. The off-site VPBs will be drilled in sequence to maximize ARCADIS' ability to make decisions and optimize the field program. Each VPB is expected to require four weeks to complete.

ARCADIS appreciates NYSDEC's expedited review and approval of this addendum. If you have questions or comments, please contact us.

Sincerely,

ARCADIS G&M, Inc.

David E. Stern
Senior Hydrogeologist

Carlo San Giovanni
Project Manager

Michael Wolfert
Project Director

Enclosures

Copies:
John Cofman, Northrop Grumman Corporation
Larry Leskovjan, Northrop Grumman Corporation
File

Table 1. Summary of Proposed Additional MIP Borings and Off-Site Phase 2 Vertical Profile Borings and Rationale, Work Plan Addendum No. 7, Former Grumman Settling Ponds (Operable Unit 3 - Bethpage Community Park), Bethpage, New York.

Activity	Proposed Sample ID	Proposed Total Depth (ft bls)	Proposed Groundwater Sampling Intervals (ft bls)	Proposed Groundwater Analysis	Proposed Geophysics	General Rationale
MIP Borings						
Monument Area	N-5	55	--	--	Conductivity	SGP-9, drilled in the "Monument Area" in the eastern portion of the Parking Lot identified elevated concentrations of VOCs (total VOCs ranged from 86,000 µg/m3 to 966,000 µg/m3). Nearby Phase 1 RI VPBs VP-23 and VP-24 and Monitoring Well CAMW-3 exhibited elevated VOC concentrations in groundwater (ranging from 801 µg/L to 1,025 µg/L). Based on both soil gas and groundwater data, the principal VOCs detected include cis-1,2-DCE and TCE. Collectively, the data suggest a possible soil source of VOC impacts to groundwater in the Monument Area. Locations shown on Figure 1 subject to field verification.
	O-5	55	--	--	Conductivity	
	O-6	55	--	--	Conductivity	
	P-4	55	--	--	Conductivity	
	P-5	55	--	--	Conductivity	
	P-6	55	--	--	Conductivity	
	Q-4	55	--	--	Conductivity	
	Q-5	55	--	--	Conductivity	
	Q-6	55	--	--	Conductivity	
NGC property	C-0	55	--	--	Conductivity	On NGC property, Phase 2 RI Soil Gas Point SGP-11 indicated an elevated TCE concentrations (11,000 µg/m^3). The data suggest a possible source of VOCs in soil. Locations shown on Figure 1 subject to field verification.
	C-99	55	--	--	Conductivity	
Off-Site Vertical Profile Borings						
	VP-109	700	160 - 700 (1)	TCL VOC (2)	Gamma	Phase 2 RI VPB VP-103 indicated elevated VOCs in groundwater (maximum TVOC concentration detected was 2,244 µg/L at 320 ft bls). Additional VPBs proposed to delineate VOC impacts to groundwater in the area. Locations shown on Figure 2 subject to field verification.
	VP-110	700	160 - 700 (1)	TCL VOC (2)	Gamma	

see notes on last page

Table 1. Summary of Proposed Additional MIP Borings and Off-Site Phase 2 Vertical Profile Borings and Rationale, Work Plan Addendum No. 7, Former Grumman Settling Ponds (Operable Unit 3 - Bethpage Community Park), Bethpage, New York.

Footnotes:

(1) Groundwater sampling will commence at 160 ft bls and proceed at 20 ft intervals to final depth. Final depth will be determined based on the analytical data obtained from the VPB groundwater samples.

(2) Laboratory analysis of groundwater samples shall be performed using the following methods (see Revised RI/FS Work Plan QAPP - Appendix B for details). VOCs: TCL List of VOCs using NYSDEC ASP 2000 Method OLM 4.2. Results will be obtained on a 24-48 hour TAT.

Definitions:

ft bls	feet below land surface
VPB	Vertical Profile Boring
QAPP	Quality Assurance Project Plan
TAT	turnaround time
MIP	Membrane Interface Probe
ug/m3	micrograms per cubic meter
ug/L	micrograms per liter
VOC	Volatile Organic Compound
TCE	Trichloroethene
cis-1,2-DCE	cis-1,2 dichloroethene

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-110 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).

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
1	11/10/06	WORK PLAN ADDENDUM #7	DES
0	11/9/06	LETTER REPORT TO DEC	DES

KEYPLAN

PROJECT TITLE

OPERABLE UNIT 3
NORTHROP GRUMMAN
SYSTEMS CORPORATION
BETHPAGE, NEW YORK

SHEET TITLE

SITE PLAN
SHOWING PROPOSED AND
COMPLETED VERTICAL
PROFILE BORINGS

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SEAL	SEAL

PROJECT MANAGER	DEPARTMENT MANAGER
C. SAN GIOVANNI	M. WOLFERT
LEAD DESIGN PROF.	CHECKED BY
	M. REINDL
TASK/PHASE NUMBER	DRAWN BY
	A. SANCHEZ
PROJECT NUMBER	DRAWING NUMBER
NY001348	2

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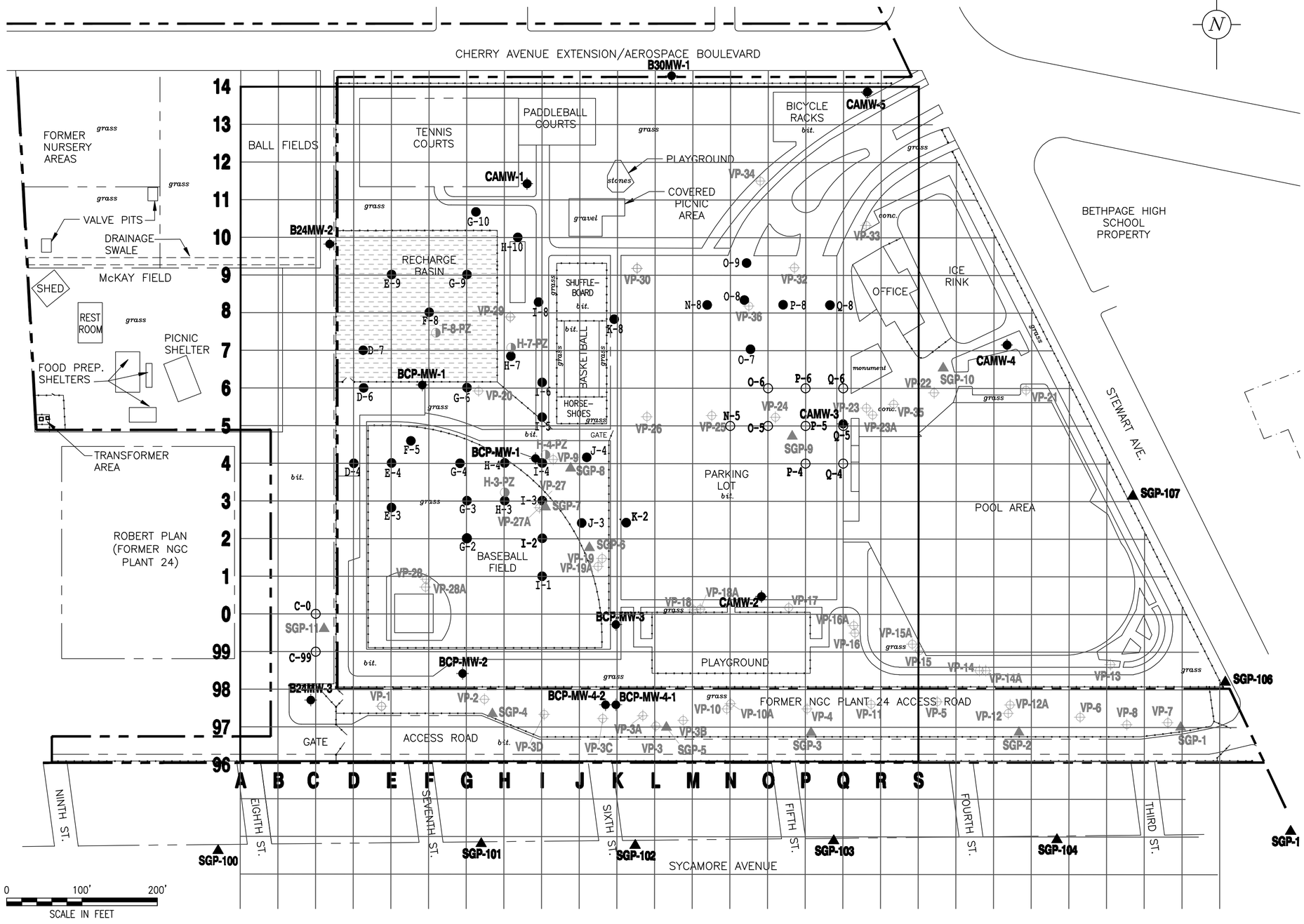

EXPLANATION

- NORTHROP GRUMMAN CORPORATION PROPERTY LINE
- FENCE
- LIMITS OF BETHPAGE HIGH SCHOOL MAIN BUILDING
- BASIN
- bit. — BITUMINOUS PAVEMENT
- C-6 ● — COMPLETED CPTU/MIP BORING LOCATION AND DESIGNATION
- O-6 ○ — PROPOSED MIP BORING
- BCP-MW-3 ● — EXISTING MONITORING WELL
- VP-1 — COMPLETED VERTICAL PROFILE BORING (BY ARCADIS)
- SGP-1 ▲ — COMPLETED SOIL GAS POINT (BY ARCADIS)

FT MSL	FEET RELATIVE TO MEAN SEA LEVEL
FT BLS	FEET BELOW LAND SURFACE
MIP	MEMBRANE INTERFACE PROBE

NOTES:

1. WELL, SGP, AND VPB-21 TO VPB-33 LOCATIONS ARE APPROXIMATE.
2. LOCATIONS OF WELLS INSTALLED BY THE TOWN OF OYSTER BAY ARE BASED ON THE 2005 REPORTS, LOCATIONS ARE APPROXIMATE (H2M 2005a;b).
3. GRID BOX DIMENSIONS ARE 50-FT SQUARE.
4. PROPOSED CPT/MIP BORINGS WILL BE DRILLED TO THE WATER TABLE (EST. 55 FT BLS), OR UNTIL REFUSAL IS ENCOUNTERED, WHICHEVER IS DEEPER.

DRAWING REFERENCE:
DVIRKA AND BARTILUCCI CONSULTING ENGINEERS 2003

NO.	ISSUED DATE	REVISION DESCRIPTION	BY/CKD
0	11/08/06	WORK PLAN ADDENDUM #7	DES

SEAL

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PROJECT TITLE

OPERABLE UNIT 3
FORMER GRUMMAN
SETTLING PONDS
BETHPAGE, NEW YORK

PROJECT MANAGER: C. SAN GIOVANNI	DEPARTMENT MANAGER: M. WOLFERT
LEAD DESIGN PROF.	CHECKED BY: D. STERN
SHEET TITLE: SITE PLAN SHOWING PROPOSED AND COMPLETED CPT/MIP BORINGS	TASK/PHASE NUMBER: 00003
	DRAWN BY: A. SANCHEZ
	PROJECT NUMBER: NY001348.0806
	DRAWING NUMBER: 1

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Current Plotstyle : ByColor
Layout Tab: Bethpage Park Plan

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ENVIRONMENT

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

Subject:
Phase 2 Remedial Investigation Work Plan Addendum No. 4, Former Grumman Settling Ponds (Operable Unit 3, - Bethpage Community Park), Bethpage, New York.

Date:
August 7, 2006

Contact:
David Stern

Phone:
631-391-5284

Email:
dstern@arcadis-us.com

Our ref:
NY001348.0806.00003

Dear Mr. Scharf:

ARCADIS has prepared this Work Plan Addendum No. 4 for Phase 2 of the Remedial Investigation (RI) at the Former Grumman Settling Ponds (Operable Unit 3 – Bethpage Community Park), Bethpage, New York Site. This Work Plan Addendum No. 4 presents the rationale and scope for drilling, installing, developing, and sampling of an initial pair of permanent monitoring wells on the Northrop Grumman Plant 24 Access Road property, adjacent to the Bethpage Community Park. The NYSDEC-approved revised RI/FS Work Plan, dated March 8, 2006, is incorporated herein by reference and contains additional information as to the goals and objectives of the overall RI. The following sections provide the rationale and scope of the work proposed under this RI Work Plan Addendum.

Rationale

Table 1 provides the details and rationale for the proposed monitoring wells. The monitoring wells will be located near Phase 2 RI vertical profile boring (VPB) VPB-3C for the following reasons: better quantify volatile organic compounds (VOCs) in groundwater at the Northrop Grumman Plant 24 Access Road southern boundary and develop local groundwater quality data trends. Figure 1 depicts the location of the proposed wells and completed VPB-3C, total VOC concentrations in groundwater from VPB-3C, and nearby site features.

Scope of Work

Two monitoring wells (BCP-MW4-1 and BCP-MW4-2) will be drilled, installed, developed, and sampled. Well BCP-4-1 will be installed to straddle the water table (approximately 55 ft bls); Well BCP-MW4-2 will be installed to intersect the highest VOC concentrations in groundwater at the site boundary (see Figure 1). The

monitoring wells will be drilled, installed, developed and sampled consistent with NYSDEC-approved protocols.

Beginning one week subsequent to completion of development, groundwater from the wells will be sampled by ARCADIS on a varying frequency (dependent on the data obtained) for the Target Compound List of VOCs using analytical protocols consistent with the NYSDEC-approved RI/FS Work Plan (the list of analytes may be modified, depending on future data needs). The monitoring well construction information and groundwater data obtained will be incorporated into the RI Report.

Schedule

ARCADIS' objective is to begin monitoring local groundwater quality (via collection of groundwater samples from the newly installed wells) as soon as possible. We expect well drilling to commence on August 8, 2006. Assuming the wells are completed on or about August 16, 2006, we expect that the first groundwater sampling event will occur on August 23, 2006. ARCADIS will notify the NYSDEC in advance of groundwater sample collection.

We appreciate NYSDEC expedited review of this work plan addendum. If you have any questions, please feel free to contact us.

Sincerely,

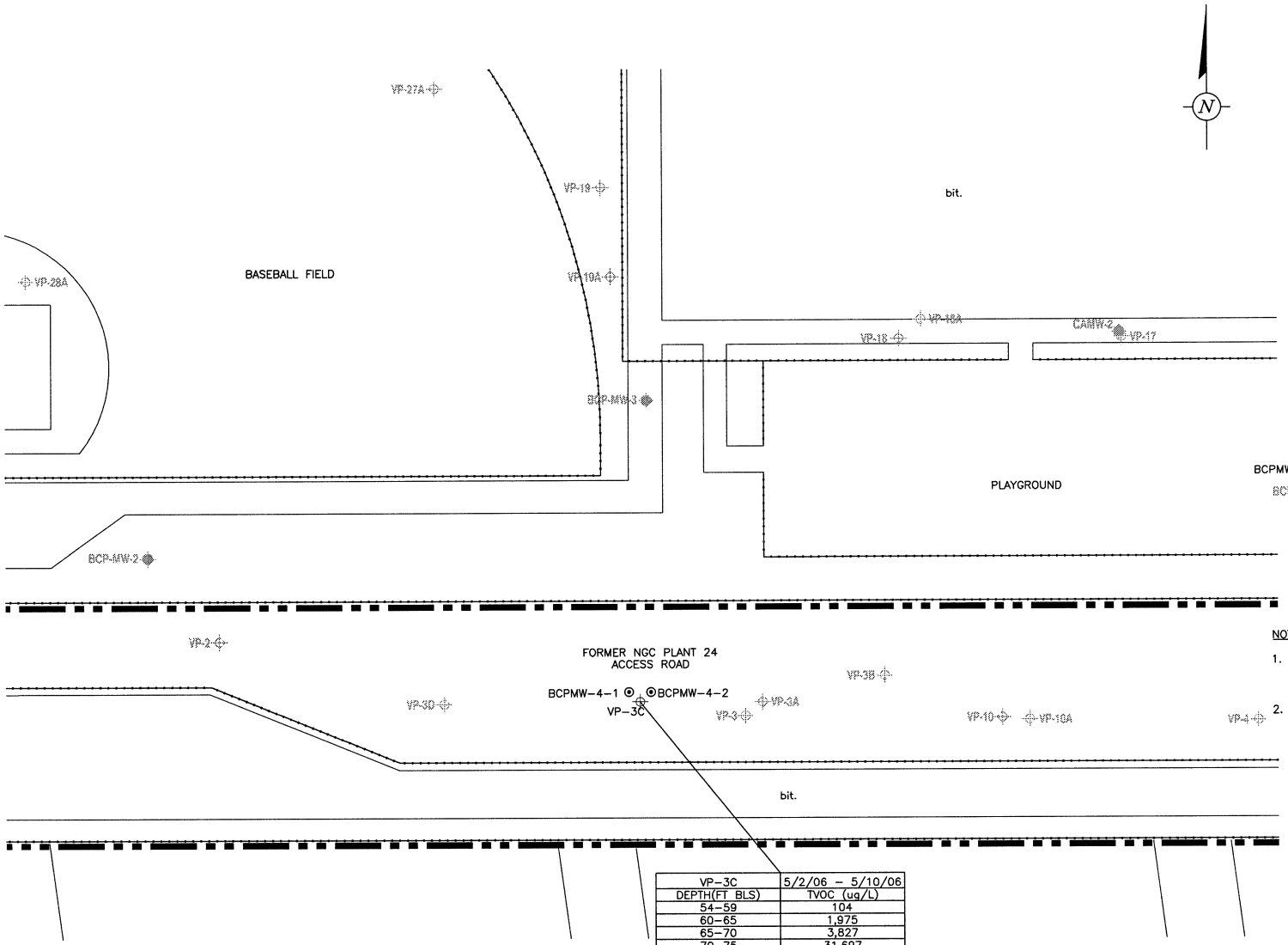
ARCADIS G&M, Inc.

David E. Stern
Senior Hydrogeologist

Carlo San Giovanni
Project Manager

Enclosures

Copies:
Michael F. Wolfert, ARCADIS
John Cofman, Northrop Grumman Corporation
Larry Leskovjan, Northrop Grumman Corporation



VP-3C	5/2/06 – 5/10/06
DEPTH(FT BLS)	TVOC (ug/L)
54–59	104
60–65	1,975
65–70	3,827
70–75	31,697
75–80	12,294
80–85	23,143
85–90	2,911
90–95	244
95–100	64
105–110	12
115–120	4

BASE MAP REFERENCE
DVIRKA AND BARTILUCCI
CONSULTING ENGINEERS 2003

NO.	DATE	REVISION DESCRIPTION	BY / CKD
0	8/4/06	WORK PLAN ADDENDUM NO.4	DES

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PROJECT TITLE
OPERABLE UNIT 3
FORMER GRUMMAN
SETTLING PONDS
BETHPAGE, NEW YORK

PROJECT MANAGER	DEPARTMENT MANAGER	LEAD DESIGNER	CHECKED BY
C. SAN GIOVANNI	M. WOLFERT		D. STERN

SHEET TITLE
SITE PLAN SHOWING
PROPOSED WELL LOCATIONS

TASK/PHASE NUMBER	DRAWN BY
00003	A. SANCHEZ
PROJECT NUMBER	DRAWING NUMBER
NY001348.0806	1