Letter Work Plan

for

Pre-Design Field Investigation

Off-Site Location GM-75

Naval Weapons Industrial Reserve Plant

Bethpage, New York

Naval Facilities Engineering Command
Mid-Atlantic
Contract Number N62472-04-D-0055
Contract Task Order 66

September 2008

LETTER WORK PLAN
PRE-DESIGN FIELD INVESTIGATION
OFF-SITE LOCATION GM-75
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
BETHPAGE, NEW YORK

1.0 INTRODUCTION

This Work Plan has been prepared to describe the installation of vertical profile borings (VPBs) to better define the extent of solvent-contaminated groundwater off site of the Naval Weapons Industrial Reserve Plant (NWIRP) Bethpage, Long Island, New York (see Figure 1). Regional groundwater flow is south southeast, but is locally affected by the operation of recharge basins and public water supply wells.

This investigation will specifically address groundwater contamination in one area south of monitoring well GM-75D2 (GM-75 Area), and in a second area north of the Aqua New York's well field on Seamans Neck Road (Aqua 9338/8480, Attachment A). The groundwater being investigated under this work plan has migrated beyond the limits of the Navy/Northrop Grumman property, is outside the extent of the Northrop Grumman groundwater collection system (located on Grumman property north of Central Avenue), and may impact public water supply well fields. Delineation and potential remediation of these areas are addressed under the Navy Operable Unit No. 2 Record of Decision.

The program will consist of the installation of up to eight vertical profile borings to a depth of approximately 800 feet below ground surface. During installation of the borings, water samples will be collected on 20- to 50-foot intervals and analyzed for VOCs. Limited soil samples will be collected and evaluated for physical characteristics. The borings will be located in an area with dense residential development.

1.1 SITE HISTORY

The NWIRP was established in 1933. Since its inception, the plant's primary mission has been the research prototyping, testing, design engineering, fabrication, and primary assembly of military aircraft. The facilities at NWIRP included four plants used for assembly and prototype testing; a group of quality control laboratories, two warehouse complexes (north and south), a salvage

storage area, water recharge basins, the Industrial Wastewater Treatment Plant, and several smaller support buildings. In 1998, operations ended at the facilities.

1.2 BACKGROUND

NWIRP Bethpage is located in east-central Nassau County, Long Island, New York, approximately 30 miles east of New York City (Figure 1). The Navy's property originally totaled 109.5 acres and was formerly a Government-Owned Contractor-Operated (GOCO) facility that was operated by the Northrop Grumman Corporation (NGC) until September 1998. NWIRP Bethpage is in the Hamlet of Bethpage, Town of Oyster Bay, New York. Prior to 2002, the NWIRP property was bordered on the north, west, and south by current or former Northrop Grumman facilities, and on the east by a residential neighborhood. By March 2008, approximately 100 acres of NWIRP property were transferred to Nassau County in three separate actions. The remaining 9 acres and access easements were retained by the Navy to continue remedial efforts at Installation Restoration (IR) Site 1 – Former Drum Marshalling Area and Site 4 – Former Underground Storage Tanks (Area of Concern 22). A parcel of land connecting the two sites was also retained. Currently, the 9-acre parcel of NWIRP is bordered on the east by the residential neighborhood and on the north, south, and west by Nassau County property. Access to the NWIRP is from South Oyster Bay Road to the west.

1.3 OBJECTIVE

The objectives of the pre-design field investigation are to better define the horizontal and vertical extent and concentrations of volatile organic contamination in groundwater that is south of the Navy/Northrop Grumman complex and that cannot be captured by the Northrop Grumman Onsite Groundwater Containment System, and groundwater that is upgradient of the Aqua New York well field.

1.4 SAMPLING APPROACH

Two off-site locations addressed by this Work Plan are as follows:

- GM-75 Area
- Aqua New York

GM-75 Area: The GM-75 Area was first identified as a potential concern in 2003, when trichloroethene (TCE) at a concentration of 1,400 ug/L was detected in a newly installed monitoring well (GM-75D2)(Attachment A). This well is screened from 525 to 545 feet below ground surface. Since that time, the concentration of TCE in GM-75D2 has steadily decreased and by June 2008 was 180 µg/L. Two public water supply wells at Bethpage Water District (BWD) Plant 6 are located approximately 3,000 feet southeast of the GM-75 Area. The shallower BWD Plant 6 well (Well 6-1 screened from 328 to 381 feet) has been impacted by VOCs, and VOC treatment (air stripping tower) is currently being conducted to protect the water supply. A monitoring well (GM-35D2), which is screened at a depth of 330 feet, is located between the GM-75 Area and BWD Plant 6 and contains 240 µg/L of TCE. However, this screen interval is too shallow to evaluate potential migration to the deeper BWD Plant 6 well (Well 6-2 screened from 710 to 770 feet). At a minimum, investigation of deeper groundwater in this area is needed in the area of GM-35D2. To address this need, vertical profile boring (VPB-121) will be installed at the location of monitoring well GM-35D2.

Since 2003, concentrations of TCE in groundwater in the GM-34 Area (monitoring wells GM-34D and GW-34D2) have been increasing. These monitoring wells are located approximately 2,500 feet south of the GM-75 Area, and based on historic TCE concentrations in the GM-75 Area, concentrations may continue to increase in the GM-34 Area. For well GM-34D, which is screened at a depth of 309 to 319 feet, TCE concentrations have increased from 210 µg/L in 2003 to 740 µg/L in June 2008. For well GM-34D2, which is screened at a depth of 510 to 520 feet, TCE concentrations have also increased from 120 µg/L in 2003 to 250 µg/L in June 2008. To better define the extent of this contamination, vertical profile boring VPB-122 will be installed approximately 4,000 feet south of monitoring well GM-75D2 and 1,500 feet south of monitoring well GM-34D.

Groundwater data to the west of monitoring wells GM-75D2 and GM-34D is limited. As a result, a new vertical profile boring (VPB-123) will be installed approximately 1,200 feet west of monitoring well GM-34D.

Aqua New York: A public water supplier - Aqua New York well field (Aqua 8480 and 9338) is located northwest of the intersection of Seaford Oyster Bay Parkway and Southern State Parkway (Attachment A). Individual water supply wells for Aqua New York have been experienced low-level detections of VOCs (approximately 10 percent of the MCL) over the past two years. The detections have been very close to the detection limit of 0.5 µg/L. Outpost monitoring wells (BPOW 3-1 and 3-2) located 1,000 feet north and approximately upgradient of the water supply wells have not detected these VOCs at the 0.5 µg/L, indicating that the impacted groundwater may be flowing into the supply well from either underneath or around the outpost monitoring wells. These wells are in a projected impact area from the GM-75 Area groundwater contamination; however, effects from that contamination were not anticipated for more than 10 years.

To better determine the magnitude and location of groundwater contamination in this area, three vertical profile boring are proposed in this area, VPB-124 – located approximately 2,000 feet northeast of the well field, VPB-125 – located approximately 3,000 feet north of the well field, and VPB-126 located approximately 3,500 feet north of the well field.

2.0 FIELD ACTIVITIES

The scope of work consists of the drilling, sampling, and soil/groundwater analysis of up to eight vertical profile borings. The specific activities to be conducted are as follows.

1. Identify planned and potential drilling locations.
2. Obtain permits and access agreements.
3. Install six vertical profile borings and two contingent vertical profile borings at planned locations.
4. Review analytical results during installation and based on the findings, select up to three additional vertical profile borings.
5. Manage investigation-derived waste.

Planned and potential boring locations are presented on Figure 2. Field activities by boring are presented in Table 1. Sample nomenclature and analysis are presented in Table 2. Field activities will be as follows.

- Install six to eight vertical profile borings to the top of the Raritan Clay layer (approximately 800 feet below ground surface).
- Collect groundwater samples at 50-foot intervals from 50 to 200 feet, (four samples per boring).
- Collect groundwater samples at 20-foot intervals from 200 to 800 feet, (30 samples per boring).
- Collect two to five split spoon samples per vertical profile boring. The samples will be collected just above a groundwater sample. These samples will represent a range of subsurface conditions, based on the progress of the drilling.
- Submit groundwater samples to a local quick-turn laboratory that is New York State approved for volatile organic compound (VOC) analysis. Trip blanks will also be collected and submitted on a daily basis for VOC analysis.
- Submit 10 percent of the groundwater samples to a Navy approved laboratory for VOC analysis to confirm the quick-turn laboratory results.
- Measure typical field parameters (pH, temperature, conductivity, and turbidity) for groundwater samples as volume permits.
- Conduct gamma ray logging to determine lithology.
- Submit six to eight soil samples (total for all borings) for Total Organic Carbon (TOC) analysis.
- Collect additional split spoon samples at approximately 800 feet to determine the presence of the Raritan Clay Unit.
- Survey each boring (to be conducted by a New State licensed surveyor).
- Collect one air sample per boring and analyze for VOCs to evaluate potential emissions.

TABLE 1
PRE-DESIGN FIELD INVESTIGATION SAMPLING
NWIRP BETHPAGE, NEW YORK

Boring Number	Drilling Method	Total Depth (feet)[1]	Depth (feet)	Split Spoon Sampling	Groundwater Sampling	Gamma Log	Air Sample[2]
VPB-121	MR	800	50 to 200	0 to 1	50, 100, 150, and 200 feet (4 samples)	Yes	Yes
			220 to 600	1 to 2	20-foot intervals (20 samples)		
			620 to 780	1 to 2	20-foot intervals (9 samples)		
			800 to 840	Up to 5, at 10-foot intervals	Up to 3, at 20-foot intervals, if sand is encountered.		
VPB-122	MR	800	50 to 200	0 to 1	50, 100, 150, and 200 feet (4 samples)	Yes	Yes
			220 to 600	1 to 2	20-foot intervals (20 samples)		
			620 to 780	1 to 2	20-foot intervals (9 samples)		
			800 to 840	Up to 5, at 10-foot intervals	Up to 3, at 20-foot intervals, if sand is encountered.		
VPB-123	MR	800	50 to 200	0 to 1	50, 100, 150, and 200 feet (4 samples)	Yes	Yes
			220 to 600	1 to 2	20-foot intervals (20 samples)		
			620 to 780	1 to 2	20-foot intervals (9 samples)		
			800 to 840	Up to 5, at 10-foot intervals	Up to 3, at 20-foot intervals, if sand is encountered.		
VPB-124	MR	800	50 to 200	0 to 1	50, 100, 150, and 200 feet (4 samples)	Yes	Yes
			220 to 600	1 to 2	20-foot intervals (20 samples)		
			620 to 780	1 to 2	20-foot intervals (9 samples)		
			800 to 840	Up to 5, at 10-foot intervals	Up to 3, at 20-foot intervals, if sand is encountered.		
VPB-125	MR	800	50 to 200	0 to 1	50, 100, 150, and 200 feet (4 samples)	Yes	Yes
			220 to 600	1 to 2	20-foot intervals (20 samples)		
			620 to 780	1 to 2	20-foot intervals (9 samples)		
			800 to 840	Up to 5, at 10-foot intervals	Up to 3, at 20-foot intervals, if sand is encountered.		

TABLE 1
PRE-DESIGN FIELD INVESTIGATION SAMPLING
NWIRP BETHPAGE, NEW YORK
Page 2 of 2

Boring Number	Drilling Method	Total Depth (feet)[1]	Depth (feet)	Split Spoon Sampling	Groundwater Sampling	Gamma Log	Air Sample[2]
VPB-126	MR	800	50 to 200	0 to 1	50, 100, 150, and 200 feet (4 samples)	Yes	Yes
			220 to 600	1 to 2	20-foot intervals (20 samples)		
			620 to 780	1 to 2	20-foot intervals (9 samples)		
			800 to 840	Up to 5, at 10-foot intervals	Up to 3, at 20-foot intervals, if sand is encountered.		
VPB-127*	MR	800	50 to 200	0 to 1	50, 100, 150, and 200 feet (4 samples)	Yes	Yes
			220 to 600	1 to 2	20-foot intervals (20 samples)		
			620 to 780	1 to 2	20-foot intervals (9 samples)		
			800 to 840	Up to 5, at 10-foot intervals	Up to 3, at 20-foot intervals, if sand is encountered.		
VPB-128*	MR	800	50 to 200	0 to 1	50, 100, 150, and 200 feet (4 samples)	Yes	Yes
			220 to 600	1 to 2	20-foot intervals (20 samples)		
			620 to 780	1 to 2	20-foot intervals (9 samples)		
			800 to 840	Up to 5, at 10-foot intervals	Up to 3, at 20-foot intervals, if sand is encountered.		

* Contingent VPB locations
1. Total depth will be to the top of the Raritan Clay Unit, at a depth of approximately 800 feet below ground surface.
2. Work area summa canister (6 hours).
VBP: Vertical profile boring.
MR: Mud rotary.

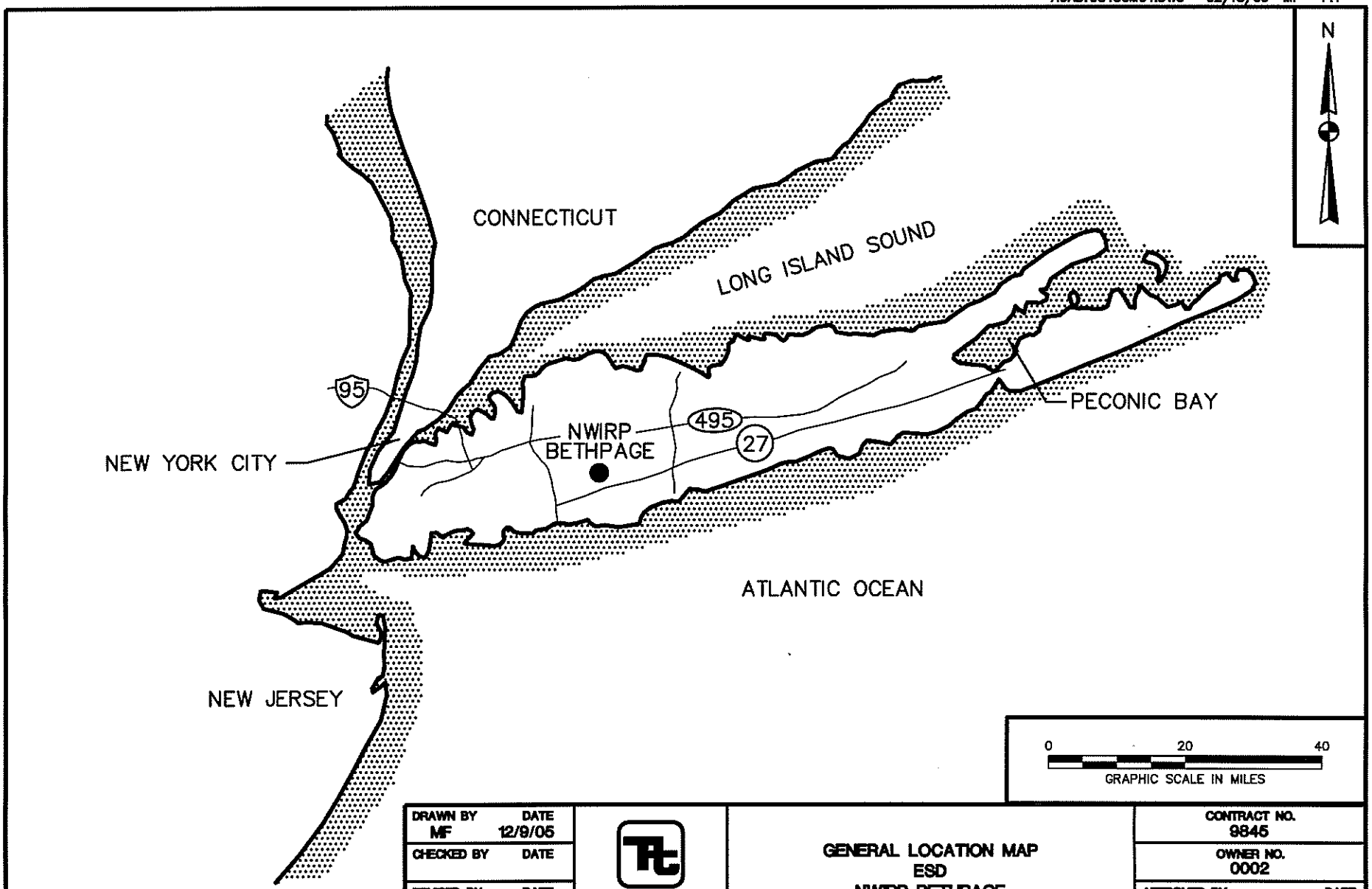
TABLE 2
PRE-DESIGN FIELD INVESTIGATION ANALYSIS
NWIRP BETHPAGE, NEW YORK

Location	Sample ID	Matrix	Number of Samples			
			VOCs - Quick Turn[1]	VOCs - Confirmation[2]	TOC[3]	VOCs - TO 15A[4]
VPB-121	BP-VPB121-SB-XXX	Soil	--	--	0 to 2	--
	BP-VPB121-GW-XXX	Groundwater	33 to 36	4	--	--
	BP-VPB121-AIR- MMDDYY	Air	--	--	--	1
VPB-122	BP-VPB122-SB-XXX	Soil	--	--	0 to 2	--
	BP-VPB122-GW-XXX	Groundwater	33 to 36	4	--	--
	BP-VPB122-AIR- MMDDYY	Air	--	--	--	1
VPB-123	BP-VPB123-SB-XXX	Soil	--	--	0 to 2	--
	BP-VPB123-GW-XXX	Groundwater	33 to 36	4	--	--
	BP-VPB123-AIR- MMDDYY	Air	--	--	--	1
VPB-124	BP-VPB124-SB-XXX	Soil	--	--	0 to 2	--
	BP-VPB124-GW-XXX	Groundwater	33 to 36	4	--	--
	BP-VPB124-AIR- MMDDYY	Air	--	--	--	1
VPB-125	BP-VPB125-SB-XXX	Soil	--	--	0 to 2	--
	BP-VPB125-GW-XXX	Groundwater	33 to 36	4	--	--
	BP-VPB125-AIR- MMDDYY	Air	--	--	--	1
VPB-126	BP-VPB126-SB-XXX	Soil	--	--	0 to 2	--
	BP-VPB126-GW-XXX	Groundwater	33 to 36	4	--	--
	BP-VPB126-AIR- MMDDYY	Air	--	--	--	1
VPB-127[5]	BP-VPB127-SB-XXX	Soil	--	--	0 to 2	--
	BP-VPB127-GW-XXX	Groundwater	33 to 36	4	--	--
	BP-VPB127-AIR- MMDDYY	Air	--	--	--	1
VPB-128[5]	BP-VPB128-SB-XXX	Soil	--	--	0 to 2	--
	BP-VPB128-GW-XXX	Groundwater	33 to 36	4	--	--
	BP-VPB128-AIR- MMDDYY	Air	--	--	--	1

VOCs: Volatile organic compounds.
TOC: Total Organic Carbon.
XXX: Bottom of sample interval, in feet. For example, a groundwater sample collected in VPB 121 at 100 to 102 feet below ground surface would be BP-VPB121-GW-102.
MMDDYY: Sample date in month, day, and year. For example, July 28, 2007 would be 072807.

1) 48-Hour results from local laboratory via method SW846-8260B or equivalent method.
2) 21-Day results from Navy-approved laboratory via method SW-846 8260B.
3) 21-Day results from Navy-approved laboratory via Walkley-Black Method.
4) 21-Day results from Navy-approved laboratory via method TO-15A.
5) Contingent borings to be installed based on results from VPB-121 to VPB-126.

ACAD: 9845CM04.DWG 02/15/06 MF PIT



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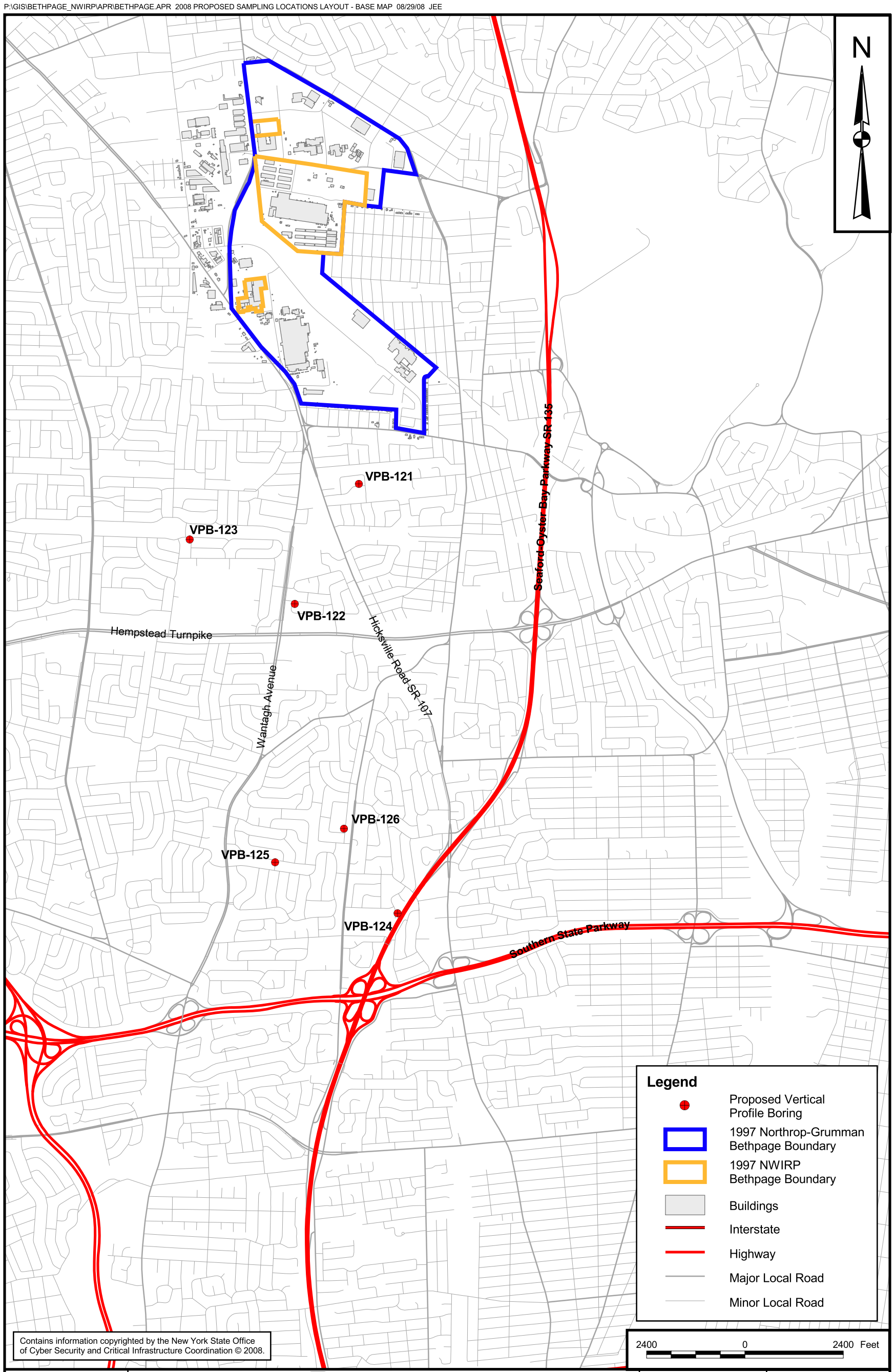
CHECKED BY DATE			OWNER NO. 0002
REVISED BY DATE			APPROVED BY DATE
SCALE AS NOTED			DRAWING NO. FIGURE 1 REV. 0

FORM CADD NO. TTNUS-AH.DWG - REV 1 -9/10/98

P:\GIS\BETHPAGE_NWIRP\APR\BETHPAGE.APR 2008 PROPOSED SAMPLING LOCATIONS LAYOUT - BASE MAP 08/29/08 JEE



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CHECKED BY: D. BRAYACK	DATE: 08/29/08	2008 PROPOSED SAMPLE LOCATIONS MAP NAVAL WEAPONS INDUSTRIAL RESERVE PLANT BETHPAGE, NEW YORK	APPROVED BY: — / DATE: —
COST/SCHEDULE-AREA			APPROVED BY: — / DATE: —
SCALE: AS NOTED			DRAWING NO.: FIGURE 2 / REV: 0

ATTACHMENT A

CITY:MELVILLE DIV/GROUP:ENV DB:ALS LD: PIC: PM:CSG TM:DS LYR:ON=*;OFF=*REF*
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