TETRA TECH

NOR-01104

May 31, 2011

Mr. Stephen Scharf
New York Department of Environmental Conservation
Division of Environmental Remediation
Bureau of Remedial Action A
625 Broadway, 11th Floor
Albany, New York 12233-7015

Reference: CLEAN Contract No. N62472-03-0057
Contract Task Order 66

Subject: Draft 2011 Letter Work Plan Addendum for
OU 2 Off-Site Groundwater Investigation
NWIRP Bethpage, New York

Dear Mr. Scharf:

On behalf of the Navy, please find enclosed a copy of the subject document. This document outlines the approach for installation of three vertical profile borings (VPB-130, VPB-131, and VPB-132) and three outpost monitoring wells (BPOW 2-3, BPOW 5-1, and BPOW 5-2) at Naval Weapons Industrial Reserve Plant (NWIRP) Bethpage, New York.

If you have any questions please contact Ms. Lora Fly, NAVFAC Mid-LANT, at (757) 341-2012.

Sincerely

David Brayack

David D. Brayack, P.E.
Project Manager

Enclosure: (1) Draft 2011 Letter Work Plan Addendum for
OU 2 Off-Site Groundwater Investigation
NWIRP Bethpage, New York

Tetra Tech NUS, Inc.
5700 Lake Wright Drive, Suite 309, Norfolk, VA 23502
Tel 757.461.3768 Fax 757.461.4148 www.ttnus.com

Distribution:

Mid-Lant, Lora Fly
NYSDEC (Albany), Henry Wilkie
NYSDOH (Troy), Steve Karpinski
NAVAIR, Richard Smith
USEPA, Carol Stein
NGC, Kent Smith
David Stern
Arcadis, Rich Humann
Tetra Tech NUS, Dave Brayack
ECOR Solutions, Al Taormina
Administrative Record
Project File

Tetra Tech NUS, Inc.
5700 Lake Wright Drive, Suite 309, Norfolk, VA 23502
Tel 757.461.3768 Fax 757.461.4148 www.ttnus.com

2011 LETTER WORK PLAN ADDENDUM
PRE-DESIGN FIELD INVESTIGATION
OU 2 OFF-SITE GROUNDWATER INVESTIGATION
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT (NWIRP)
BETHPAGE, NEW YORK

1.0 INTRODUCTION

This Letter Work Plan Addendum has been prepared by Tetra Tech NUS, Inc. (Tetra Tech) for the Naval Facilities Engineering Command Mid-Atlantic under Contract Task Order (CTO) 066 of the Comprehensive Long-Term Environmental Action Navy (CLEAN) contract number N62472-03-D-0057. This Work Plan outlines the approach for the installation of vertical profile borings (VPBs) and outpost monitoring wells and as a supplement to the 2010 Letter Work Plan, Pre-Design Field Investigation, OU 2 Off-Site Groundwater Investigation, NWIRP Bethpage, New York (Tetra Tech, 2010). This investigation is being conducted to better define the extent of solvent-contaminated groundwater off site of the Naval Weapons Industrial Reserve Plant (NWIRP) Bethpage, Long Island, New York (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 in three locations as follows (Figure 2):

- VPB-130 north of South Farmingdale Water District Plant 3 (SFWD-6150);
- VPB-131 northwest of South Farmingdale Water District Plant 3 (SFWD-6150);
- VPB-132 north of South Farmingdale Water District Plant 6 (SFWD-6866/8665)

Delineation and potential remediation of groundwater in these areas are addressed under the Navy Operable Unit No. 2 Record of Decision.

1.1 SCOPE AND OBJECTIVE

The objectives of the pre-design field investigation are to better define the horizontal and vertical extent of groundwater contamination, evaluate migration, and determine concentrations of volatile organic compounds (VOCs) in groundwater that is south of the Navy/Northrop Grumman complex. This contamination is up-gradient of several potable water supply wells in the area and continues to migrate to the south southeast.

The program will consist of the installation of three vertical profile borings to a depth of approximately 840 feet below ground surface (bgs) and three monitoring wells up to 750 feet bgs. During installation of the

vertical profile borings, groundwater samples will be collected on 20- to 50-foot intervals and analyzed for VOCs. The final screen intervals of the proposed monitoring wells will be based on the groundwater sample results from the vertical profile borings and screen intervals on existing public water supply wells.

1.2 SITE HISTORY

NWIRP Bethpage is located in east-central Nassau County, Long Island, New York, approximately 30 miles east of New York City (Figure 1). NWIRP Bethpage is in the Hamlet of Bethpage, Town of Oyster Bay, New York. Since its inception in 1941, the plant's primary mission was 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.

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. 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 [AOC] 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.

1.3 VERTICAL PROFILE BORINGS/MONITORING WELLS

Three vertical profile borings and three monitoring wells will be installed at areas associated with South Farmingdale Water District (SFWD) Plant 3 and 6, as provided below. Figure 2 provides the location of the proposed vertical profile borings and monitoring wells. Geological cross sections presenting the proposed vertical profile borings and monitoring wells are provided as Figures 3 and 4.

- South Farmingdale Water District Plant 3 (SFWD-6150)
    - North of SFWD-6150 (VPB-130 and outpost monitoring well BPOW 2-3)
    - Northwest of SFWD-6150 (VPB-131)
- South Farmingdale Water District Plant 6 (SFWD-6866/8665)

- North of SFWD 8664/8665 (VPB-132 and outpost monitoring wells BPOW 5-1 and 5-2)

1.3.1 South Farmingdale Water District Plant 3

Vertical profile boring VPB-130 and outpost monitoring well (BPOW 2-3) will be installed north of SFWD Plant 3 well (SFWD-6150). VBP-130 is being installed to assess groundwater conditions up gradient of SFWD Plant 3. The screen interval for BPOW 2-3 will be determined from an evaluation of lithology and groundwater data collected from VPB-130 and well screen intervals for SFWD-6150.

Vertical Profile Boring VPB-131 is being installed to assess groundwater conditions side gradient of SFWD Plant 3. VPB-131 will be installed approximately 1000 feet to the northwest of the SFWD Plant 3. Vertical Profile Boring VPB-128, installed approximately 1,800 feet west of SFWD Plant 3 identified a plume of VOC-impacted groundwater migrating through this area at a depth of approximately 670 feet below ground surface.

1.3.2 South Farmingdale Water District Plant 6

Vertical profile boring VPB-132 and two outpost monitoring well (BPOW 5-1 and 5-2) will be installed north of the SFWD Plant 6 (SFWD-6866 and SFWD-8665). VBP-132 is being installed to assess groundwater conditions up gradient of SFWD Plant 6. The screen intervals of BPOW 5-1 and 5-2 will determined from an evaluation of lithology and groundwater data collected from VPB-132 and well screen intervals for SFWD-6866 and SFWD-8665.

2.0 FIELD ACTIVITIES

The scope of work consists of the drilling, sampling, and soil/groundwater analysis of three vertical profile borings and installation and development of three outpost monitoring wells. The specific activities to be conducted are as follows:

2.1 VERTICAL PROFILE BORINGS

The three planned vertical profile boring locations are presented on Figure 2. Vertical profile borings will be installed to the top of the Raritan Clay layer (approximately 800 feet bgs). Field activities are presented in Table 1. Cross sections depicting these locations are presented in Figures 3 and 4. Sample nomenclature and analysis are presented in Table 2. Groundwater grab samples will be collected from a hydropuch-type sampler at the following depth intervals:

- 50-Foot intervals from 50 to 200 feet bgs, (four samples per boring).
- 20-Foot intervals from 200 to 800 feet bgs, (30 samples per boring).

Two to five split spoon samples will be collected per vertical profile boring to confirm lithology. These samples are used to correlate gamma logs with soil type. Up to two soil samples per boring will be submitted to a laboratory for Total Organic Carbon (TOC) analysis. These samples will represent a range of subsurface conditions, such as sands, silts, and clays. The following provides the analytical program requirements for the vertical profile borings:

- Groundwater samples will be analyzed by a local laboratory (48 hour turnaround time [TAT]) that is New York State approved for VOC analysis. Trip blanks will also be collected and submitted on a daily basis for VOC analysis.
- Ten percent of the groundwater samples will be submitted to a Navy-approved laboratory for VOC analysis to confirm the quick-turn laboratory results (48 hour TAT).

During the collection of groundwater samples, typical field parameters will be measured (pH, temperature, specific conductivity, and turbidity) as volume permits. Gamma ray logging will be performed to determine lithology. A final split spoon sample may be collected at approximately 800 feet bgs to determine the presence of the Raritan Clay Unit. During drilling activities one air sample per boring will be collected and analyzed for VOCs to evaluate potential emissions.

2.2 MONITORING WELL INSTALLATION

Three outpost monitoring wells will be installed during this investigation (Figure 2). Cross sections

illustrating the anticipated screen intervals of these wells are presented in Figures 3 and 4.

The monitoring wells will be installed using mud rotary. Table 3 provides a summary of the proposed wells and screen intervals. Final screen intervals will be determined from lithology, groundwater data collected from the vertical profile borings, and associated supply well screen intervals. A typical well construction detail is provided in Attachment 1.

The outpost monitoring wells will be constructed of 4-inch diameter, schedule 80 National Sanitation Foundation (NSF)-grade Polyvinyl Chloride (PVC) well casing and screen. Well screens will be 10 slot (0.010 inches) and 40 foot in length. After setting the well screen and casing, the gravel pack (W.G. No. 1) will be placed within the boring annulus, to a depth as indicated in Table 3. The well gravel pack will be placed as follows:

- Well total depth (TD) 50 to 365 feet bgs: to a minimum of 10 feet above top of screen.
- Well TD 365 to 530 feet bgs: to a minimum of 20 feet above top of screen.
- Well TD 530 to 780 feet bgs: to a minimum of 25 feet above top of screen.

A fine sand layer (finer than gravel pack) will be placed in the annulus on top of the gravel pack in the same manner as the gravel pack, as follows:

- Well TD 50 to 365 feet bgs: 5 feet thick above the top of the gravel pack.
- Well TD 365 to 530 feet bgs: 10 feet thick above the top of the gravel pack.
- Well TD 530 to 780 feet bgs: 15 feet thick above the top of the gravel pack.

The gravel pack and fine sand thickness may be changed based on subsurface conditions. A 4- to 8- foot thick bentonite seal will be installed above the fine sand layer. A bentonite/cement grout will be installed within the annular space above the bentonite seal. Wells will be completed at grade using a 12-inch diameter, locking curb box in place over the wells. A drain hole will be installed at the bottom of the curb box to allow water to drain. A 0.5 foot thick concrete apron measuring 2 feet by 2 feet square will be installed around each well. Well locks will be used to secure the wells.

2.3 Monitoring Well Development

Monitoring wells will be developed using a combination of air lift and mechanical surging. Field parameters, including pH, temperature, specific conductivity, and turbidity will be monitored and recorded throughout well development.

Well development will also include purging stagnant water from the well above the screen interval and rinsing the interior well casing above the water table using only water from that well. The well will be covered with a clean well cap.

In compliance with New York State Department of Environmental Conservation (NYSDEC) policy, wells will be developed until turbidity is less than 50 nephelometric turbidity units (NTU). However, in some instances, the 50 NTU standard may not be attainable. If after a "best well development effort", the 50 NTU standard cannot be attained and turbidity stabilizes (above the 50 NTU standard), the well will be considered acceptable.

2.4 SAMPLING PUMP INSTALLATION

A dedicated sampling pump system will be installed in four monitoring wells. These pumps will be 3-inch variable speed submersibles with an associated packer system. The pumps will be installed at a depth of approximately 20 feet above the screen interval, but no deeper than 500 feet below top of well casing.

2.5 INVESTIGATION DERIVED WASTE

Investigation Derived Waste (IDW) accumulated during drilling activities will be collected, containerized, accumulated at NWIRP Bethpage, and disposed off site.

2.6 DECONTAMINATION

A centrally located decontamination pad located at NWIRP Bethpage will be used for the collection of all decontamination-generated fluids. All decontamination fluids will be collected and staged for characterization and subsequent disposal.

2.7 SURVEYING

The location of each vertical profile boring and all newly installed monitoring wells will be surveyed by a New York State licensed surveyor.

2.8 DOCUMENTATION

A summary report will be developed to provide documentation of this investigation. Documentation required to support this project will consist of the following items:

- Field notebook

- Boring log for each boring
- Groundwater, soil, and air sample log sheets
- Well completion form for each well
- Well development record

Once the summary report is prepared for submittal, a copy will be sent to NYSDEC for review.

TABLES

TABLE 1
VERTICAL PROFILE BORING SAMPLING PROGRAM
PRE-DESIGN FIELD INVESTIGATION ANALYSIS
OFF-SITE LOCATION OU-2 ADDENDUM (2011)
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-130	MR	840	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-131	MR	840	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-132	MR	840	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.		

1. Total depth will be to the top of the Raritan Clay Unit, at a depth of approximately 840 feet below ground surface.
2. Work area summa canister (6 to 8 hours).

VBP: Vertical profile boring.
MR: Mud rotary.

TABLE 2
VERTICAL PROFILE BORING ANALYTICAL SUMMARY
PRE-DESIGN FIELD INVESTIGATION ANALYSIS
OFF-SITE LOCATION OU-2 ADDENDUM (2011)
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-130	BP-VPB130-SB-XXX	Soil	--	--	0 to 2	--
	BP-VPB130-GW-XXX	Groundwater	33 to 36	4	--	--
	BP-VPB130-AIR- MMDDYY	Air	--	--	--	1
VPB-131	BP-VPB131-SB-XXX	Soil	--	--	0 to 2	--
	BP-VPB131-GW-XXX	Groundwater	33 to 36	4	--	--
	BP-VPB131-AIR- MMDDYY	Air	--	--	--	1
VPB-132	BP-VPB132-SB-XXX	Soil	--	--	0 to 2	--
	BP-VPB132-GW-XXX	Groundwater	33 to 36	4	--	--
	BP-VPB132-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 130 at 100 to 102 feet below ground surface would be BP-VPB130-GW-102.
MMDDYY: Sample date in month, day, and year. For example, June 29, 2011 would be 062911.

1) 48-Hour results from local laboratory via method EPA 524.2 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.

TABLE 3
OUTPOST MONITORING WELLS BPOW 2-3, 5-1, AND 5-2
PROPOSED CONSTRUCTION DETAILS
OFF-SITE LOCATION OU-2 ADDENDUM (2011)
NWIRP BETHPAGE, NEW YORK

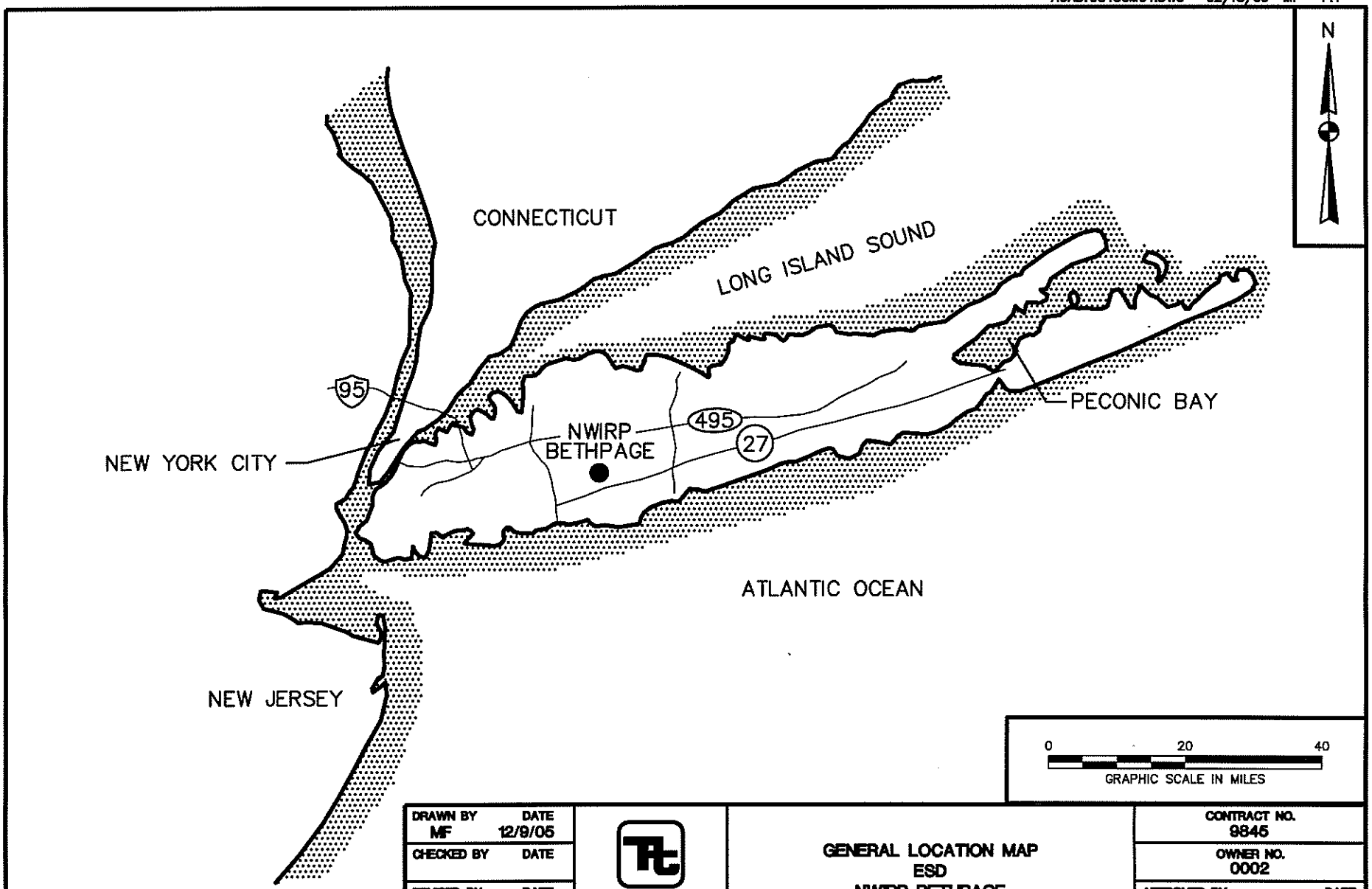
Outpost Monitoring Well Designation	Screend Interval (ft bgs) [1]	Total Well Depth (ft bgs) [1]	Height Gravel Pack (ft bgs) [2]	Height Fine Sand (ft bgs) [2]	Purpose
BPOW 2-3	560 to 600	600	535	520	Monitor groundwater upgradient of South Farmingdale Water District Supply Wells N-6150
BPOW 5-1	520 to 560	560	500	490	Monitor groundwater upgradient of South Farmingdale Water District Supply Well N-8664
BPOW 5-2	560 to 600	600	535	520	Monitor groundwater upgradient of South Farmingdale Water District Supply Well N-8665

BPOW - Bethpage Outpost Well
bgs - below ground surface
ft - feet

[1] Based on the local USGS quad sheet, ground surface is assumed to range from 60 to 74 feet above mean sea level. Depth presented are approximate, final depths will be determined based on lithology and groundwater data collected from vertical profile borings and screen intervals from associated water supply wells.
[2] Height of gravel pack and fine sand layer will be determined by total well depth. Details are provided in Section 2.2 of the work plan.

FIGURES

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



DRAWN BY MF DATE 12/9/05	Tetra Tech NUS, Inc.	GENERAL LOCATION MAP ESD NWIRP BETHPAGE BETHPAGE, NEW YORK	CONTRACT NO. 9845
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

112G01041\0275\112G01041GM06.dwg 05/28/11 MKB

N

HWD-10208 HWD-8779 BWD-8768 BWD-8767 BWD-9591

VPB-21 VPB-27 VPB-19A MW-201-1 MW-202-1 MW-203-1 MW-200-1 FW-02 FW-03 FW-01 HN-24I HN-24S HN-29IR HN-29D HN-42I HN-42S VPB-106 MW-108-1 VPB-107 VPB-105 MW-102-1 VPB-108 MW-100-1 MW-100-2 MW-100-3 MW-107-1 VPB-102

GM-13D GM-16I GM-16SR HN-40I HN-40S VPB-100 VPB-115 MW-109-3

N-10597 GP-3 WELL 3 MW-1GF GM-32S GM-17SR GM-17I GM-17D GP-1 WELL 1

VPB-109R VPB-101 VPB-109 MW-4 GM-19I GM-19S MW-5 MW-6 GM-15S GM-15I GM-15D GM-15D2 MW-111-4 VPB-110 Well 19 MW-3 VPB-110R MW-2 VPB-113

MW-2GF GM-18S GM-18I GM-18D VPB-39 GM-39DA GM-39DB GM-73D VPB-73 GM-73D2 GM-33D2 N-10631 MW-3R Well 17 GM-74I GM-74D GM-74D2 Well 18 VPB-111

N-10600 GM-78S GM-78I GM-20I GM-20D GM-21S GM-21I GM-21D N-10633 VPB-103

N-9921 GM-79I GM-79D N-10628 VPB-49C VPB-114 GM-37D GM-37D2

GM-75D2 N-10627 N-10624 N-10634 VPB-104 GM-71D2 GM-70D2 VPB-112

VPB-121 GM-35D2 MW-116-5 VPB-42 VPB-116 BWD-6915 BWD-6916 VPB-51

GM-36D2 GM-36D VPB-117 MW-117-5 N-10821

VPB-123 GM-34D GM-34D2 (N-10820) BWD-8941 BWD-3876 GM38-RW03 GM-38D GM-38D2 VPB-48 VPB-38 GM38-RW01 VPB-118 MW-118-5 VPB-47

LWD-7076 VPB-122 VPB-40 BWD-8004 VPB-119 VPB-77

VPB-76 VPB-129 TT-101D TT-101D2 BPOW 1-4 BPOW 1-5 VPB-127 VPB-43

BPOW 1-1 BPOW 1-2 BPOW 1-3 SFWD-7377 SFWD-5148 SFWD-4043 VPB-45

VPB-46 BPOW 4-2 BPOW 4-1 LWD-5303 VPB-44

VPB-131 BPOW 2-3 VPB-50 VPB-128 BPOW 3-3 BPOW 3-4 BPOW 2-1 BPOW 2-2 VPB-130 SFWD-6150

VPB-126 BPOW 3-2 BPOW 3-1 VPB-125

BPOW 5-1 POW 5-2 VPB-132 ANY-9338 ANY-8480 VPB-124 SFWD-8664 SFWD-8665

A A' B B' C C' D D' E E' F F' G G' H H' I I'

0 1,800 3,600

SCALE IN FEET

TETRA TECH NUS, INC.

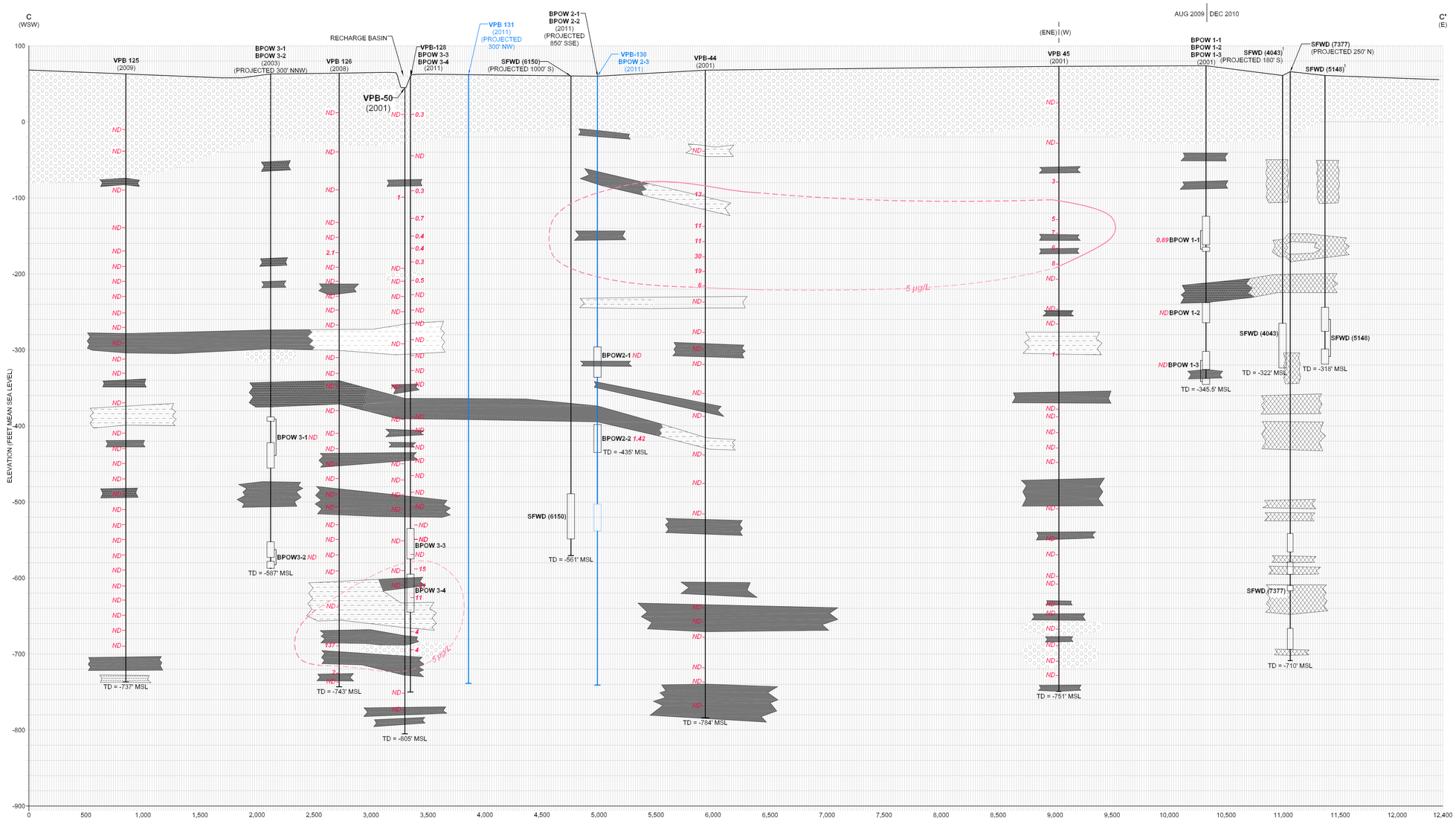
LEGEND

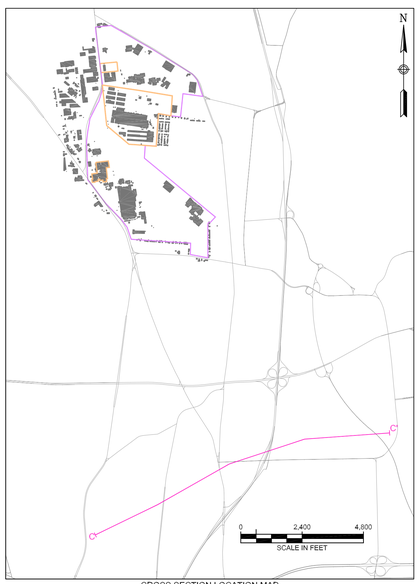
- GROUNDWATER SAMPLING LOCATION
- PROPOSED GROUNDWATER SAMPLING LOCATION
- WATER SUPPLY WELL
- VERTICAL PROFILE BORING
- PROPOSED VERTICAL PROFILE BORING
- BUILDING
- HIGHWAY
- MAJOR LOCAL ROAD
- MINOR LOCAL ROAD
- 1997 NORTHROP-GRUMMAN BETHPAGE BOUNDARY
- 1997 NWIRP BETHPAGE BOUNDARY

OPERABLE UNIT 2 (SITE 1) CROSS SECTION MAP NAVAL WEAPONS INDUSTRIAL RESERVE PLANT BETHPAGE, NEW YORK

FILE	SCALE
112G01041GM06	AS NOTED
FIGURE NUMBER: FIGURE 2	REV: 0 / DATE: 05/28/11

112G\01041\0275\112G01041GS20.DWG 05/26/11 MKB





CROSS SECTION LOCATION MAP

LEGEND

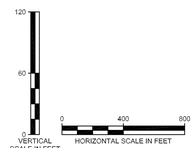
- SAND AND GRAVEL
- F-M SAND WITH VARYING AMOUNTS OF SILT, CLAY, AND C. SAND

CONFINING UNITS

- INTERBEDDED CLAY AND SAND
- SANDY CLAY
- CLAY
- CONFINING UNIT FROM ARCADIS CROSS-SECTION, NO SPECIFIC LITHOLOGY GIVEN
- [1] ARCADIS CROSS SECTION (2004)
- * TVOC DATA FROM ARCADIS

BPOW 3-2 — MONITORING WELL ID
(2003) — INSTALLATION YEAR
(PROJECTED 450' ESE) — PROJECTION
GROUND SURFACE (APPROXIMATED TO BE FLAT)
CONFINING UNIT (DASHED WHERE INFERRED)
BPOW 3-2 — MONITORING WELL SCREEN
374 — VERTICAL PROFILE BORING TVOC RESULTS IN µg/L
ND — NOT DETECTED
TCE PLUME
TD = -743' MSL — TOTAL DEPTH (MEAN) SEA LEVEL

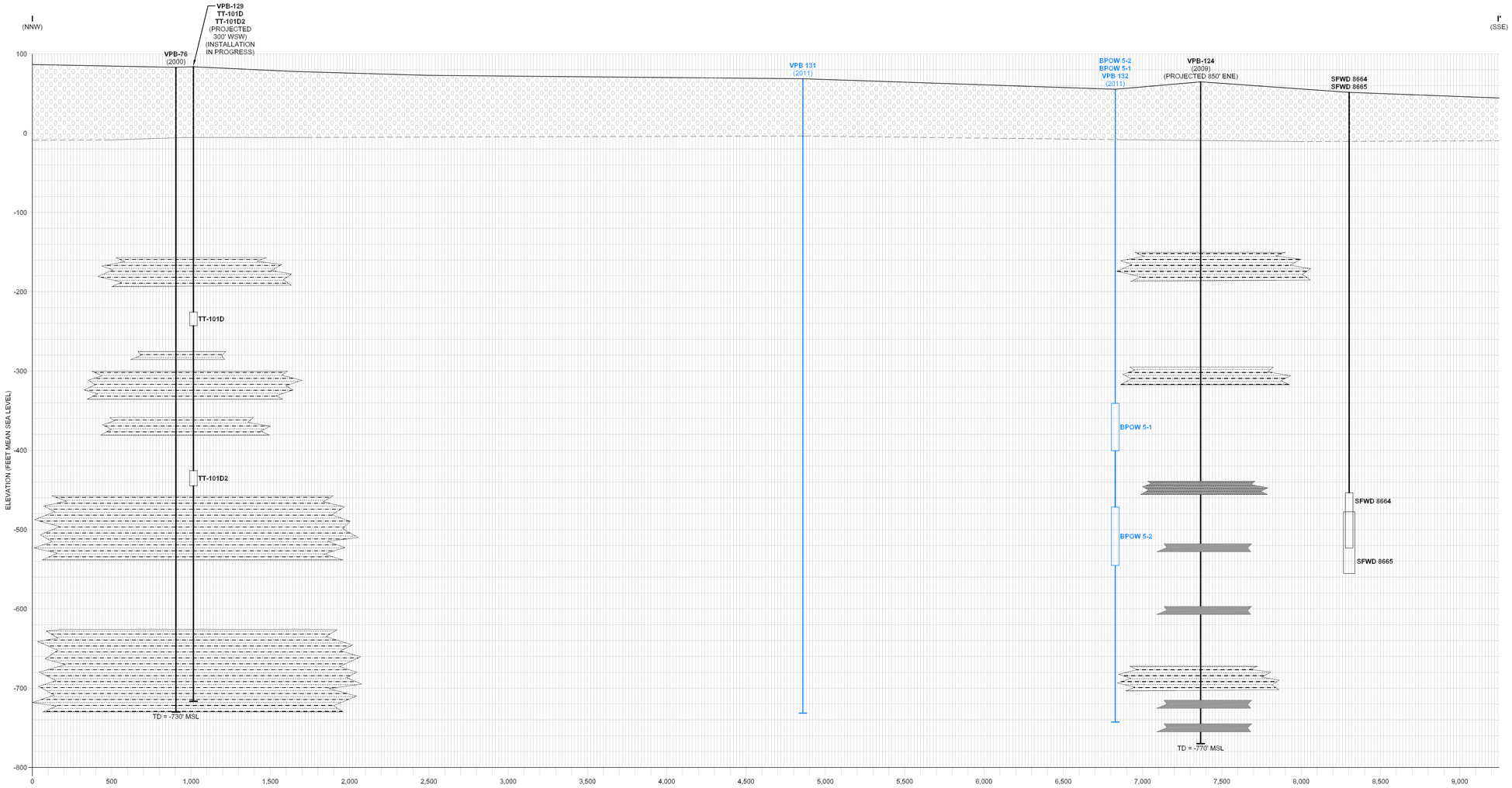
BPOW 2-3 — PROPOSED MONITORING WELL ID
(2011) — PROPOSED INSTALLATION YEAR
(PROJECTED 300' NW) — PROJECTION
PROPOSED MONITORING WELL
BPOW 2-3 — PROPOSED MONITORING WELL SCREEN

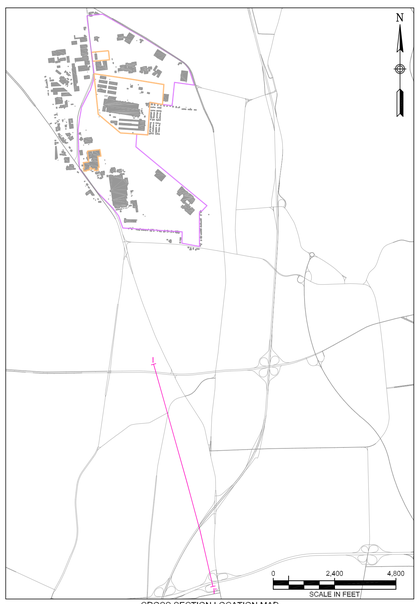


TETRA TECH NUS, INC.

CROSS SECTION C – C'
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
BETHPAGE, NEW YORK

FILE	SCALE
112G01041GS20	AS NOTED
FIGURE NUMBER	REV / DATE
FIGURE 3	0 / 05/26/11





CROSS SECTION LOCATION MAP

LEGEND

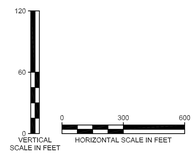
- SAND AND GRAVEL
- F-M SAND WITH VARYING AMOUNTS OF SILT, CLAY, AND C. SAND

CONFINING UNITS

- INTERBEDDED CLAY AND SAND
- SANDY CLAY
- CLAY

TT-101D — MONITORING WELL ID
(2000) — INSTALLATION YEAR
(PROJECTED 300' WSW) — PROJECTION
GROUND SURFACE (APPROXIMATED TO BE FLAT)
CONFINING UNIT (DASHED WHERE INFERRED)
TT-101D — MONITORING WELL SCREEN
TD = -730' MSL — TOTAL DEPTH (MEAN) SEA LEVEL

BPOW 5-2 — PROPOSED MONITORING WELL ID
(2011) — PROPOSED INSTALLATION YEAR
(PROJECTED 850' ENE) — PROJECTION
PROPOSED MONITORING WELL
BPOW 5-2 — PROPOSED MONITORING WELL SCREEN



TETRA TECH NUS, INC.

CROSS SECTION I – I'
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
BETHPAGE, NEW YORK

FILE	SCALE
112G01041GS21	AS NOTED
FIGURE NUMBER: FIGURE 4	REV: 0 — DATE: 04/26/11

ATTACHMENT 1
TYPICAL MONITORING WELL
CONSTRUCTION DETAIL

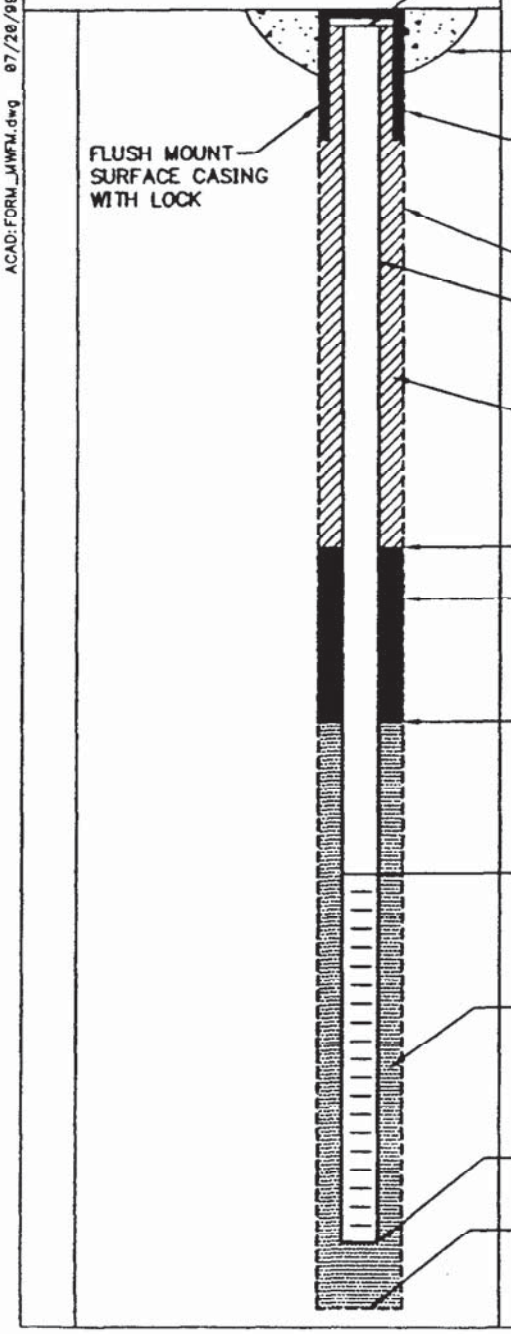
FIGURE 4
TYPICAL MONITORING WELL CONSTRUCTION

WELL NO.: _____

Tetra Tech NUS, Inc.

OVERBURDEN
MONITORING WELL SHEET
FLUSH - MOUNT

PROJECT NWTRP Bethpage	LOCATION _____	DRILLER _____
PROJECT NO. N4037	BORING _____	DRILLING METHOD Mud Rotary
DATE BEGUN _____	DATE COMPLETED _____	DEVELOPMENT METHOD Air Lift / Pump
FIELD GEOLOGIST _____		
GROUND ELEVATION _____	DATUM _____	



ELEVATION TOP OF RISER: _____

TYPE OF SURFACE SEAL: 2'x2' Cement Pad

TYPE OF PROTECTIVE CASING: Steel

I.D. OF PROTECTIVE CASING: 12"

DIAMETER OF HOLE: 8"

TYPE OF RISER PIPE: PVC-Sch. 80

RISER PIPE I.D.: 3.8

TYPE OF BACKFILL/SEAL: Bent / Cement to 100' below ground surface

ELEVATION/DEPTH TOP OF SEAL: 1

TYPE OF SEAL: Bentonite

ELEVATION/DEPTH TOP OF SAND: 1

5' to 15' Fine Sand (WG00)
10' to 25' Coarse Sand (WG#1) above Screen

ELEVATION/DEPTH TOP OF SCREEN: 1

TYPE OF SCREEN: PVC-Schedule 80

SLOT SIZE x LENGTH: No 10 Slot, ~40'

TYPE OF SAND PACK: WG #1 Silica Sand

ELEVATION / DEPTH BOTTOM OF SCREEN: 1

ELEVATION / DEPTH BOTTOM OF SAND: 1

ELEVATION/DEPTH BOTTOM OF HOLE: 1

BACKFILL MATERIAL BELOW SAND: _____

ACAD:FORM_MWFM.dwg 07/20/99 INL