Remedy Review Briefing
Site 1 – Former Drum Marshalling Area
Naval Weapons Industrial Reserve Plant
Bethpage, New York

I. Overview

A. Changes in Known Site Conditions

- Post-Record of Decision data indicates significant difference in Site conditions than considered in developing the selected remedy; refer to attached figure

B. Tiger Team Review

- In August, 2006, the Navy assembled a Cleanup Review Tiger Team (CURTT) to assist the Naval Facilities Engineering Command – Mid Atlantic (NAVFAC Midlant) in evaluating and identifying possible remedial alternatives for the Former Drum Marshaling Area, IR Site 1, at the former Naval Weapons Industrial Reserve Plant (NWIRP), located in Bethpage, New York.
- The Tiger Team is comprised of individuals from inside and outside the Navy that have experience relevant to the specific issues at IR Site 1.
  - Ruth Owens of the Naval Facilities Engineering Service Center (NFESC) in Port Hueneme, California is in charge of the CURTT.
  - Kim Parker Brown, P.E., M.S. of NAVFAC Headquarters in Washington, D.C. Ms. Brown currently works at NAVFAC HQ as a Program Manager in the Environmental Cleanup Division.
  - Dan Waddill, P.E., PhD., of the NAVFAC Atlantic Region in Norfolk, Virginia. Dan Waddill currently works in the Technical Support Branch for NAVFAC Atlantic.
  - Other participants include
    - Mark Kelley, P.G., a Senior Environmental Scientist in Battelle's Environmental Restoration Group in Columbus, Ohio.
    - John Finn, P.E., a Senior Engineer and Operations Manager of RETEC's Ithaca, New York office.
    - Mark Nielsen, P.E., a Senior Consultant in ENVIRON's Princeton, New Jersey office.
- Participating members from the remediation project team that is responsible for implementing the Navy's IR program at NWIRP Bethpage include Susan Clarke, Remedial Project Manager for NAVFAC Midlant and David Brayack. P.E., of Tetra Tech NUS, the Navy's CLEAN contractor for NWIRP Bethpage.

II. Site Information

A. General

- Naval Weapons Industrial Reserve Plant (NWIRP), located in the Town of Oyster Bay, Long Island, New York
- 105-Acre Former GOCO Facility situated within the boundary of a 635-acre Northrup Grumman facility.
- Government Ownership - Naval Air Systems Command
- Contractor Operator – Northrop Grumman Corporation

B. Use History

- Site 1 – the Former Drum Marshalling Area, is located within the middle of the NWIRP, east of Plant 3
- Site 1 was used from the 1950s to 1978 for storage of drums containing liquid wastes, transformers, and various equipment.
- Site 1 contained over 100 leach pools that were part of a sanitary wastewater leach field.

C. Regulatory History – CERCLA & RCRA

- A NYCRR Part 373 Permit was issued to Northrup Grumman Corporation on March 1, 1992 and expired in 1997. The Permit was extended under the State Administrative Procedures Act until a final decision is made on the permit renewal request. NYSDEC decided not to issue a permit modification until all the soil removal has been completed. On January 30, 2005, Northrop Grumman submitted a permit renewal application to NYSDEC for corrective action activities.
- The NWIRP is currently listed as an inactive hazardous waste site on NYSDEC's Registry of Inactive Hazardous Waste Sites (#1-30-003B).
- Remedial activities being conducted under State RCRA Permit (Part 373) and State remediation program for inactive hazardous waste sites.

D. Site Investigation History

- Initial Assessment Study conducted in 1986.
    - Two phases of remedial investigation (RI) were conducted: Phase 1 was completed in May 1992 and Phase 2 was completed in October 1993.
    - Interim Remedial Measures were conducted in July 1993, including placing a soil cover over a portion of Site 1 to eliminate risks associated with fugitive dust and dermal contact.
- A Feasibility Study was completed in March 1994.
- The Proposed Remedial Action Plan (PRAP) was issued on October 28, 1994.
- The Record of Decision was issued for soils and shallow groundwater at Site 1 in May 1995.
- The Record of Decision addressing deeper groundwater issues at Site 1 (as part of the remedy for a larger area of groundwater contamination) was issued in 2003.

E. Current Conceptual Site Model for Exposures

- The conceptual site model for potential human exposures includes on-site worker and off-site resident exposures to soil, including:

  On-site
  - Direct contact exposures to contaminated surface soil by on-site outdoor workers (current & future)
  - Direct contact exposures to contaminated soil by on-site construction workers (current & future)
  - Indoor air exposures by on-site indoor workers via vapor migration into buildings (current & future)
  - Exposure to contaminants migrating from soil to groundwater used on-site (future)

  Off-site
  - Indoor air exposures by off-site residents via vapor migration into buildings (current & future)
  - Exposure to particulate emissions from on-site surface soils and vapor emissions from soils by off-site residents (current & future)
  - Exposure to contaminants migrating from soil to groundwater used off-site (future)
- The conceptual site model for potential groundwater exposures include potable use scenarios, both on-site (future) and off-site (future).

III. 1995 Record of Decision

A. Summary of Site Risk Assessment

- A baseline risk assessment was conducted as part of the RI to evaluate the significance of observed soil concentrations. The risk assessment considered:
  - Direct contact (ingestion, dermal contact and inhalation) with soils by on-site workers
  - Off-site residential exposures via inhalation of dust and vapors
  - On-site and off-site exposures to contaminants leaching to groundwater which is used for potable purposes
  - On-site and off-site exposures to contaminants in groundwater via potable use

B. ROD-Specified Remedial Action Objectives

- Comply with contaminant-specific, location-specific, and action-specific ARARs and NY Standards, Criteria and Guidance (for PCBs, the specified SCG is 10 mg/kg).
- Reduce, control, or eliminate the contamination present within site soils.
- Prevent human exposure to contaminated soils at concentrations greater than the remedial action goals.

- Prevent leaching of contaminants in soils which could result in groundwater contamination in excess of groundwater remediation goals (ground water remediation objectives are addressed in the ROD for OU 2).
- Prevent offsite migration of contaminants.

C. 1995 ROD Selected Remedy

- Complete a remedial design to verify components and provide details necessary for a soil excavation & disposal program and vapor extraction/air sparging (VE/AS) program. (*Completed*)
- Excavate arsenic-contaminated soil (600 cy) and PCB-contaminated soil (1,400 cy) for treatment/disposal.
- Remediate VOC-contaminated soils using VE/AS (87,000 cy). (*Completed*)
- Remediate VOCs in the upper portion of the groundwater aquifer using AS. (*Completed*)
- Implement institutional controls.
    - A 6-inch gravel cover and/or vegetated soil cover over those areas (1.5 acres) where residual metal and organic contamination (including VOCs, SVOCs and PCBs) is expected to remain in place. A permeable cover is necessary to promote rain water infiltration and natural attenuation of residual VOCs.
    - A deed restriction to limit the nature of activities in areas where residual contamination is expected to remain.
- Provide as an interim remedial measure (IRM), reimbursement of cost to the Bethpage Water District for providing water treatment to the public water supply wells. (*Completed*)

D. Basis for 1995 ROD Remedy Selection

- According to the ROD, the selected remedy is not the least cost alternative, but was selected because it is considered to best protect human health and the environment, comply with ARARs, is readily implementable, and best satisfies the requirements of reducing the toxicity, mobility and volume of contaminants. In addition, this alternative provides for substantial risk reduction by utilizing permanent solutions and also provides for the safe management of residual contamination that will remain on site.
- Post-remedy risks will be within USEPA's acceptable risk range by addressing the higher levels of contamination, and assuming that the facility will remain in use for industrial purposes.
    - The risks remaining as a result of residual contamination being left in place will then be eliminated by the use of a gravel or vegetated soil cover. This action will serve to eliminate any exposure pathways from the adult worker and the off-site resident.
    - Deed restrictions will also be implemented to further reduce the potential for future exposures.

IV. Review of Work Completed

A. VE/AS Operations

- The SVE/AS system operation was initiated in 1998 and continued through 2002.
- Estimated that 3,000 lbs of VOCs were removed.
- In October 2002, the Navy reported that the objectives of the AS/SVE system had been met (i.e., reduction of VOC contamination in soils), and recommended removal of the system. In December 2003, NYSDEC concurred with this recommendation.

B. Remedial Design Soil Sampling Program

- Post-ROD remedial design studies were conducted during the period of 1995 through 1998.
  - Delineating vertical extent of PCBs in soil at concentrations exceeding the ROD-specified cleanup goal.
  - Analyzing for the presence of other contaminants of potential concern.
- Addition of two dry well areas to the Site 1 scope of work.

C. Institutional Controls

- A Quitclaim Deed was finalized on April 6, 2005 for 96.06 acre Plant 3 property (does not address the Site 1 area).
  - Restricts excavation that could disturb subsurface soils without prior written approval from NYSDEC.
  - Restricts use of groundwater without prior written approval from NYSDEC.
  - Prohibits residential land use.
- OU2 ROD (Groundwater), revised April 2003, requires an institutional control prohibiting the extraction of groundwater from within the boundaries of the 105-acre or Plant 20 parcels located at the Navy's former NWIRP Bethpage facility.

V. Reassessment of ROD Scope

A. PCB-Contaminated Soils

- Based on the remedial design soil sampling program, the volume of soils with PCB concentrations greater than the ROD specified cleanup goal for excavation (10 mg/kg) is currently estimated to be 69,900 cy, with depths extending to 70-feet bgs.
- The current soil volume estimate exceeds the original volume estimate described in the 1995 ROD (i.e., 1,400 cy).
- The current estimated cost to complete the ROD-specified remedy for PCB-contaminated soil is $52 million.

B. Other Contaminants of Potential Concern in Soil

- Other contaminants of concern identified from post-ROD soil sampling: cadmium and chromium.

- Residual levels of VOCs remain following AS/SVE operations which may present a potential concern for vapor migration into future on-site buildings and houses adjacent to the site.

C. Technology Review

- Refer to attached table summarizing evaluation of potentially applicable remedies for addressing PCBs and other contaminants of concern in soil.

D. Regulatory Update

- On October 25, 2006, the State Environmental Board approved 6 NYCRR Subparts 375-1 through 375-4 and Subpart 375-6 covering environmental remediation programs for inactive hazardous waste sites, brownfield sites, and environmental restorations sites.

- "Industrial use" is the land use category which will only be considered for the primary purpose of manufacturing, production, fabrication or assembly process and ancillary services. Industrial use does not include any recreational component.

- PCB cleanup criteria (6NYCRR 375-6.8):
  - for industrial use sites: 25 mg/kg
  - for protection of groundwater: 3.2 mg/kg

- The protection of groundwater soil cleanup objectives may not be applicable where (6NYCRR 375-6.5):

  (1)… (i) the groundwater standard contravention is the result of an on-site source which is addressed by the remedial program;
  (ii) an environmental easement will be put in place which provides for a groundwater use restriction on the site as set forth in paragraph 375-1.8(h)(2);
  (iii) the Department determines that contaminated groundwater at the site:
  (a) is not migrating, or likely to migrate, off-site; or
  (b) is migrating, or is likely to migrate, off-site, however, the remedy includes controls or treatment to address off-site migration; and
  (iv) the Department determines the groundwater quality will improve over time.
  (2) The protection of groundwater soil cleanup objectives are not applicable if the contravention of groundwater standards at the site is determined to be the result of an off-site source, as set forth in paragraph 375-1.8(d)(2).

- Use of cover (6NYCRR 375-3.8):

  (4) Track 4: Restricted use with site-specific soil cleanup objectives. The following provisions apply to a site, or portion thereof, being addressed pursuant to Track 4:

  (i) in developing the site-specific soil cleanup objectives, the Applicant may, solely or in combination:

  (a) use the soil cleanup objectives, as set forth in subpart 375-6;

(b) develop or modify site specific soil cleanup objectives, as set forth at section 375-6.9; or

(c) propose site-specific soil cleanup objectives which are protective of public health and the environment;

(ii) the remedial program may include the use of long-term institutional or engineering controls to address all media; and

(iii) exposed surface soils in a Track 4 remedy will be addressed as follows:

(a) for residential use:

(1) the top two feet of all exposed surface soils which exceed the site background values for contaminants of concern and are not otherwise covered by the components of the development of the site (e.g. buildings, pavement), shall not exceed the applicable contaminant-specific soil cleanup objectives as set forth in subparagraph (2)(ii) above; and

(2) where it is necessary to utilize off-site soil to achieve this requirement, the soil brought to the site will satisfy the requirements of subdivision 375-6.7(d);

(b) for commercial use:

(1) the top one foot of all exposed surface soils which exceed the site background values for contaminants of concern and are not otherwise covered by the components of the development of the site (e.g. buildings, pavement), shall not exceed the applicable contaminant-specific soil cleanup objectives as set forth in subparagraph (2)(ii) above; and

(2) where it is necessary to utilize off-site soil to achieve this requirement, the soil brought to the site will satisfy the requirements of subdivision 375-6.7(d);

(c) for industrial use:

(1) the top one foot of all exposed surface soils which exceed the site background values for contaminants of concern and are not otherwise covered by the components of the development of the site (e.g. buildings, pavement), shall not exceed the applicable contaminant-specific soil cleanup objectives as set forth in subparagraph (2)(ii) above; and

(2) where it is necessary to utilize off-site soil to achieve this requirement, the soil brought to the site will satisfy the requirements of subdivision 375-6.7(d);

VI. Current Remedial Strategy

A. Satisfy the following ROD-specified risk-reduction objectives

- Reduce, control, or eliminate the contamination present within site soils.
- Mitigate human exposure to contaminated soils at concentrations greater than the remedial action goals**.**
- Mitigate leaching of contaminants in soils which could result in groundwater contamination in excess of groundwater remediation goals.
- Mitigate offsite migration of contaminants.

B. Evaluate Remedial Alternatives

- Refer to attached table summarizing evaluation of alternate remedial strategies

C. Rescope the ROD-specified remedial actions to provide an equally protective but more readily implementable and cost-effective remedy.

- Implementation of AS/SVE operations satisfied requirements of the ROD-specified remedy.
- Place cover (soil, asphalt, or building slab) over surface soils that contain contaminants at concentrations that exceed the NYSDEC soil cleanup criteria.
- Maintain and monitor institutional controls.
- Conduct long-term monitoring of groundwater. Install additional wells to establish sentinel well system downgradient of the covered area.
- Conduct soil gas survey to confirm concentration reductions achieved by AS/SVE remediation remain protective.

VII. Next Steps

A. Obtain concurrence from NYSDEC for proposed remedial strategy
B. Document latest sampling efforts (e.g., groundwater, soil gas, etc)
C. Prepare Explanation of Significant Differences

Table
Screening of Remedial Technologies
Soils at Bethpage, NY Site

General Response	Technology and Technical Objective	Contaminant Class Applicability	Technology Status	Representative Processes	Applicability
No Action			Conventional		
Existing Controls	Institutional Controls: Control access of receptors to impacted soils.	All		Environmental Easement	Applicable
				Zoning / Ordinance	Applicable
				Defined Site Use	Applicable
				Site Management Plan	Applicable
	Environmental Monitoring: Provide early warning of potential groundwater impacts.	All		Groundwater Monitoring	Applicable
				Monitored Natural Attenuation	Applicable
Removal	Mechanical Excavation	All	Conventional	Trackhoe and Clamshell Excavation Equipment	Applicable - For deep soils, extensive shoring required. Extensive dewatering required for deep, saturated soils (sand).
Following Removal: On-Site Treatment and Placement of Treated Material	Ex-Situ Solidification/Stabilization	All	Emerging	Pug-mill or excavator mixing with Portland, bentonite, fly ash, slag, activated carbon, blend	Possibly Applicable (Following Excavation)
	Biological Treatment: Destruction of PCBs in soil using fungal or bacterial treatment in bioreactors or landfarming	PCBs	Emerging	Anaerobic/ Aerobic Dechlorination	Not Applicable - Emerging Ex-Situ Processes requires time and land area.
	Chemical Treatment: Destruction of PCBs in soil.	PCBs	Emerging	Oxidation - H_2O_2/Fenton's Reagent/ Permanganate (KMnO4)	Not Applicable - Low Effectiveness
				Base Catalyzed Decomposition (BCA)	Possibly Applicable (Following Excavation)
			Experimental	Mechanico-Chemical Treatment	Not Applicable - Experimental
			Discontinued	Lime Addition	Not Applicable - Low Effectiveness (Volatilization determined to be the loss mechanism).
	Physical Treatment: Concentration of PCBs, Cadmium and Chromium to allow volume reduction.	All	Experimental	Soil Flushing /Surfactant Solvent washing and recovery	Not Applicable - Experimental, Low Effectiveness
	Combined Treatment: Destruction of PCBs in soil.	PCBs	Experimental	Chemical Oxidation/ Biological Treatment	Not Applicable - Experimental, Low Effectiveness
				Surfactant Washing/ Chemical Treatment	Not Applicable - Experimental, Low Effectiveness
Off-Site Treatment/ Disposal	Off-site Treatment/Disposal in Permitted Facility	All	Conventional	Permitted treatment and disposal facilities	Applicable (Following Excavation and Transport)
In-Situ Treatment	In-situ Solidification: 1) Prevents contact between saturated soils and surrounding groundwater. Potentially applicable for Cadmium and Chromium. For PCBs, no appreciable benefit because PCBs are already tightly sorbed to soils.	Cadmium and Chromium	Emerging/ Experimental for depths greater than 50 ft.	Auger Rig Mixed - Portland Cement, bentonite, fly ash, slag, activated carbon, blend	No appreciable benefit because PCBs are already tightly sorbed. Experimental for depths greater than 50 feet.
				Pressure Grout/ Jet Grout - Portland, bentonite, fly ash, slag, activated carbon, blend	No appreciable benefit because PCBs are already tightly sorbed. Applicable to areas with obstructions including buried structures and piping. Pressure grouting beneath buildings not advised due to potential structural damage.
			Emerging	Bucket/blender mixed - Portland, bentonite, fly ash, slag, activated carbon, blend	No appreciable benefit because PCBs are already tightly sorbed. Applicable to surface soils only. Low mixing effectiveness for deeper soils.
			Experimental	Chemical Fixation with Polymer	Not Applicable - Experimental

Table
Screening of Remedial Technologies
Soils at Bethpage, NY Site

General Response	Technology and Technical Objective	Contaminant Class Applicability	Technology Status	Representative Processes	Applicability
In-Situ Treatment (continued)	In-Situ Thermal Treatment: Removal of PCBs	PCBs	Experimental	Steam Stripping, Contained Removal of Wastes (CROW)	Not Applicable - Experimental for PCBs, Low Effectiveness
	Biological Treatment: Destruction of PCBs in saturated soil using fungal or bacterial treatment	PCBs	Emerging	Sequential Anaerobic/ Aerobic Dechlorination	Not Applicable - Emerging Ex-Situ Processes, Low Effectiveness
	Chemical Treatment of saturated soil.	All	Experimental	Oxidation - H_2O_2/Fenton's Reagent/ Permanganate (KMnO4)	Not Applicable - Low Effectiveness
				Soil Flushing /Surfactant Solvent washing and recovery	Not Applicable. Experimental. Insufficient hydraulic control.
				Chemical fixation/ stabilization	See ISS, above.
				Vitrification	Not Applicable - Experimental and Impracticable
	Combined Treatment: Destruction of PCBs in saturated soil.	PCBs		Chemical Oxidation/ Biological Treatment	Not Applicable - Experimental, Low Effectiveness
				Surfactant Washing/ Chemical Treatment	Not Applicable - Experimental, Low Effectiveness
Containment - Soil	Capping: 1) Physical barrier to direct contact. And/or 2) Decrease surface water infiltration to deeper soils.	All	Conventional	Asphalt cap	Applicable
				Gravel	Applicable
				Clay cap	Applicable
				RCRA-Landfill-Type Cap	Applicable
Containment - Groundwater	Containment Cell Bottom: In combination with vertical barriers, it prevents contact between saturated soils and surrounding groundwater.	All	Experimental	Pressure Grouting - Portland. Bentonite or Blend. Cell bottom placed in combination with vertical barriers and impermeable cap.	Not applicable: Not a proven technology at depths below 30 feet. Also not applicable if cap is permeable, due to "bathtub" effect.
	Slurry Wall: 1) In combination with cell bottom and impermeable cap, prevents contact between saturated soils and surrounding groundwater. And/or 2) Prevents migration of vapors in the vadose zone.	All	Conventional	Pumped - Portland, Bentonite, or Blend	No groundwater benefit without impermeable cap a and cell bottom.
	Grout Curtain: 1) In combination with cell bottom and impermeable cap, prevents contact between saturated soils and surrounding groundwater. And/or 2) Prevents migration of vapors in the vadose zone.	All		In-situ Solidification - Portland, Bentonite or Blend	No groundwater benefit without impermeable cap a and cell bottom.
	Sheet Pile Wall: 1) In combination with cell bottom and impermeable cap, prevents contact between saturated soils and surrounding groundwater. And/or 2) Prevents migration of	All		Steel	No groundwater benefit without impermeable cap a and cell bottom.
				HDPE	Not Applicable. HDPE only has advantages over steel in low pH Ground Water where steel will have too short a life. Also due to depth required.
	Hydraulic Containment: Prevents potential migration of impacted groundwater.	All		Downgradient Pump and Treat Capture Zone	Not Applicable to Surface Soil

Comparative Analysis of Alternatives

Site 1, Bethpage, New York

Detailed Analysis Criteria	Excavate and Off-Site Disposal of PCB-Contaminated Soil exceeding 10 mg/kg and Arsenic-Contaminated Soil exceeding TCLP criterion --- Permeable Cover for Areas with Residual Contamination (PCBs, VOCs, PAHs, Metals) Above Cleanup Levels Specified in ROD --- Site Use Restrictions for areas with residual PCB above residential cleanup level (1 mg/kg)	Excavation and Off-Site Disposal of Soils Exceeding Industrial Cleanup Levels[a] --- Site Use Restrictions --- Groundwater Use Restrictions and Groundwater Monitoring	Permeable Cover for Areas with Residual Contamination Above Industrial Cleanup Levels[a] --- Site Use Restrictions --- Groundwater Use Restrictions and Groundwater Monitoring
	1995 ROD REMEDY	**Alternative 1**	**Alternative 2**
1. Overall Protection of Human Health and the Environment	Risks will be eliminated or mitigated to a level acceptable for the intended future land use (i.e., industrial) by partially removing contamination and controlling human exposure to contamination left in place. Risks posed by leaching of residual VOC contamination will be addressed by SVE, groundwater remediation (AS), and groundwater use restrictions. PCBs and other contaminants are not expected to pose a risk via leaching.	Risks will be eliminated or mitigated to a level acceptable for the intended future land use (i.e., industrial) by partially removing contamination and controlling human exposure to contamination left in place. Risks posed by leaching of residual VOC contamination will be addressed by SVE, groundwater remediation (AS), and groundwater use restrictions. PCBs and other contaminants are not expected to pose a risk via leaching.	Risks will be eliminated or mitigated to a level acceptable for the intended future land use (i.e., industrial) by controlling human exposure to contamination left in place. Risks posed by leaching of residual VOC contamination will be addressed by SVE, groundwater remediation (AS), and groundwater use restrictions. PCBs and other contaminants are not expected to pose a risk via leaching.
2. Compliance with SCGs (Standards, Criteria, and Guidance)	Achieved with aid of site-use restrictions.	Achieved with aid of site-use restrictions.	Achieved with aid of site-use restrictions.

Comparative Analysis of Alternatives

Site 1, Bethpage, New York

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	1995 ROD REMEDY	**Alternative 1**	**Alternative 2**
3. Long-term Effectiveness and Permanence	Effective and permanent for eliminating/mitigating risks for intended future land use.	Effective and permanent for eliminating/mitigating risks for intended future land use.	Effective for eliminating/mitigating risks to human health and environment. Uncertainty exists due to leaching potential of residual contamination, but this is low and can be managed with groundwater monitoring. Permanence will be addressed by provisions for ongoing cover maintenance.
4. Reduction of Toxicity, Mobility, or Volume with Treatment	Volume will be significantly reduced as a result (78,100 cy); residual contamination will remain.	Volume of PCB impacted soil will be significantly reduced as a result (42,200 cy. If other contaminants are excavated, V=164,100 cy.	Not applicable since protection of human health and environment is accomplished by preventing direct exposure to contaminants left in place.
5. Short-term Impacts and Effectiveness (how rapidly is it effective?)	High short-term impacts (noise, fugitive dust, traffic related impacts) from prolonged excavation, structure construction, and trucking for off-site disposal. High short-term effectiveness.	High short-term impacts (noise, fugitive dust, traffic related impacts) from prolonged excavation, structure construction, and trucking for off-site disposal. High short-term effectiveness.	Low short-term impacts. High short-term effectiveness.

Comparative Analysis of Alternatives

Site 1, Bethpage, New York

Detailed Analysis Criteria	Excavate and Off-Site Disposal of PCB-Contaminated Soil exceeding 10 mg/kg and Arsenic-Contaminated Soil exceeding TCLP criterion --- Permeable Cover for Areas with Residual Contamination (PCBs, VOCs, PAHs, Metals) Above Cleanup Levels Specified in ROD --- Site Use Restrictions for areas with residual PCB above residential cleanup level (1 mg/kg)	Excavation and Off-Site Disposal of Soils Exceeding Industrial Cleanup Levels[a] --- Site Use Restrictions --- Groundwater Use Restrictions and Groundwater Monitoring	Permeable Cover for Areas with Residual Contamination Above Industrial Cleanup Levels[a] --- Site Use Restrictions --- Groundwater Use Restrictions and Groundwater Monitoring
	1995 ROD REMEDY	**Alternative 1**	**Alternative 2**
6. Implementability	Low. Deep excavations require extensive shoring and groundwater pumping and treatment. Estimated duration 48 months.	Low. Deep excavations require extensive shoring and groundwater pumping and treatment. Estimated duration 72 months.	High. Estimated duration 6 months.
7. Cost FS Range of –30% +50%	$52.4 M	$98.7 M (based on V=164,100 cy)	$2.78 M
8. Community Acceptance	Accepted for pre-ROD conceptual site model; unknown for current conditions.	Unknown since this has to be determined via community participation activities.	Unknown since this has to be determined via community participation activities.

Note: All alternatives include remediation of VOC-contaminated soils using soil vapor extraction and remediation of VOCs in the upper portion of the groundwater aquifer using air sparging.

a. Proposed cleanup levels are the 6 NYCRR Part 375.6 Remedial Program Soil Cleanup Objectives.

BUILDING 003
HOSE HOUSE
SHED
VALVE PIT
GATE
BUILDING
DIRT
RAMP
METAL STORAGE BLDG
11TH STREET
SYCAMORE AVENUE
MAPLE AVENUE
BPS1FWMW03
BPS1FWMW02
BPS1FWMW01
BPHNMW29I
LIFT STATION
WAREHOUSE I BUILDING 017
WAREHOUSE J BUILDING 018
WAREHOUSE K BUILDING 019
WAREHOUSE L BUILDING 020
OVERHEAD PIPES
CONC
BIT
RAMP

N

LEGEND:
- MONITORING WELL LOCATIONS
- PRE-ROD PCB LOCATIONS
- PRE-ROD NON PCB LOCATIONS
- POST-ROD PCB LOCATIONS
- PROPERTY LINE

0 40 80
GRAPHIC SCALE IN FEET

NO.	DESCRIPTION	DATE	APPR

NAVFAC

SEAL

SUBMITTED BY
FIRM MEMBER DATE
APPROVED
ACTIVITY – SATISFACTORY TO DATE
APPROVED
FOR COMMANDER NAVFAC DATE

DES	DR HJB
CHK TWS	QC
DESIGNER	
REVIEWED BY	
QC	
DESIGN MANAGER	
FIRE PROTECTION	
BRANCH MANAGER	
ENGINEERING DIR.	

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND ~ MID-ATLANTIC
NAVAL STATION – NORFOLK, VIRGINIA
NORTHEAST IPT
NWIRP BETHPAGE

PRE ROD DATA VS. CURRENT DATA PLAN MAP

BETHPAGE, NEW YORK

CODE ID. NO. 80091	SIZE D
SCALE:	
MAXIMO NO.	
JOB ORDER NO.	
SPEC. NO.	
CONSTR. CONTR. NO.	
NAVFAC DRAWING NO.	
SHEET OF	

FIGURE - 1

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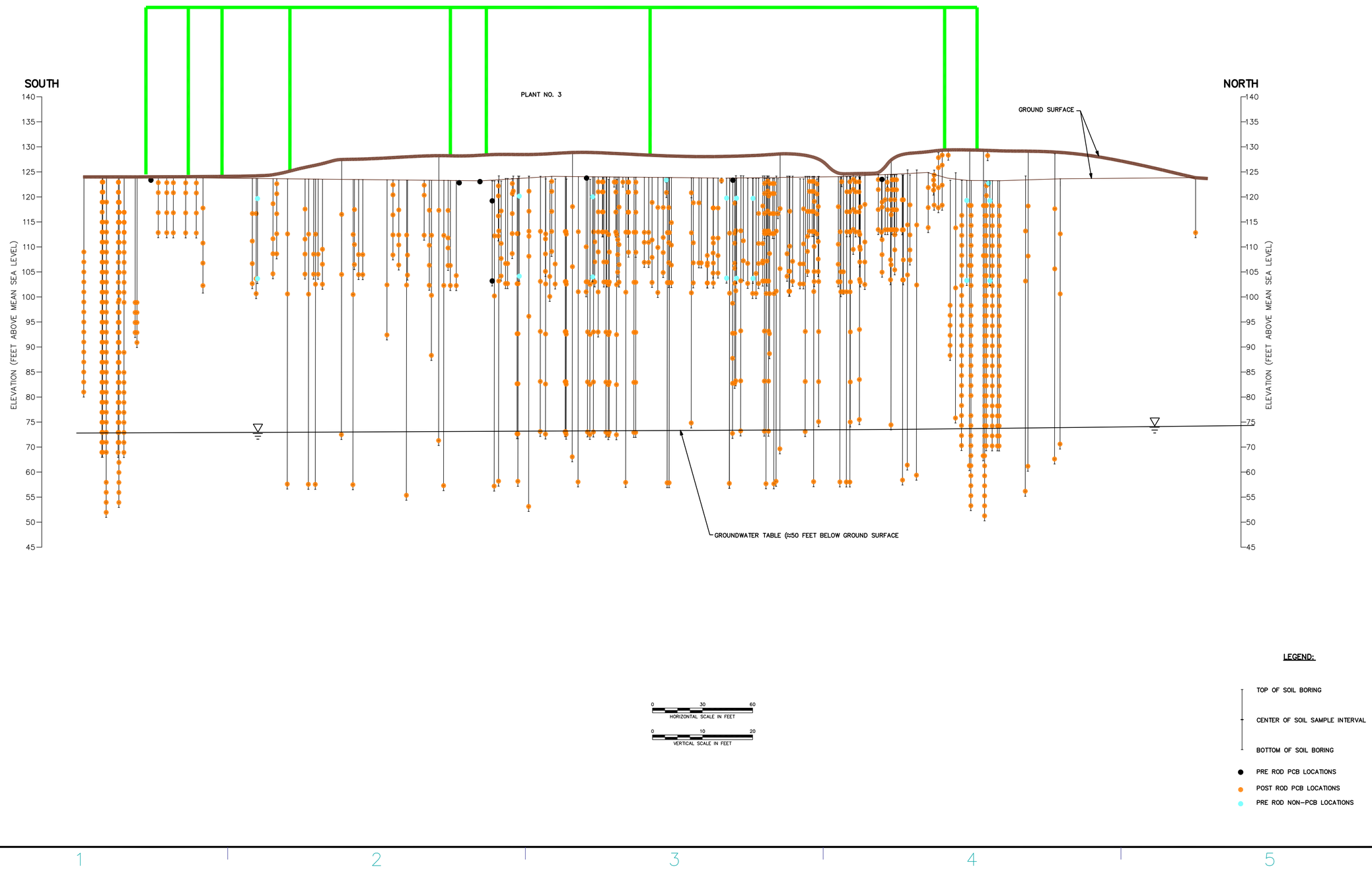


MARK	DATE	DESCRIPTION

NAVFAC

SEAL

SUBMITTED BY

FIRM MEMBER DATE

APPROVED

ACTMTY – SATISFACTORY TO DATE

APPROVED

FOR COMMANDER NAVFAC DATE

DES	DR HJB
CHK TWS	QC
DESIGNER	
REVIEWED BY	
QC	
DESIGN MANAGER	
FIRE PROTECTION	
BRANCH MANAGER	
ENGINEERING DIR.	

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND – MID-ATLANTIC
NAVAL STATION – NORFOLK, VIRGINIA
NORTHEAST IPT

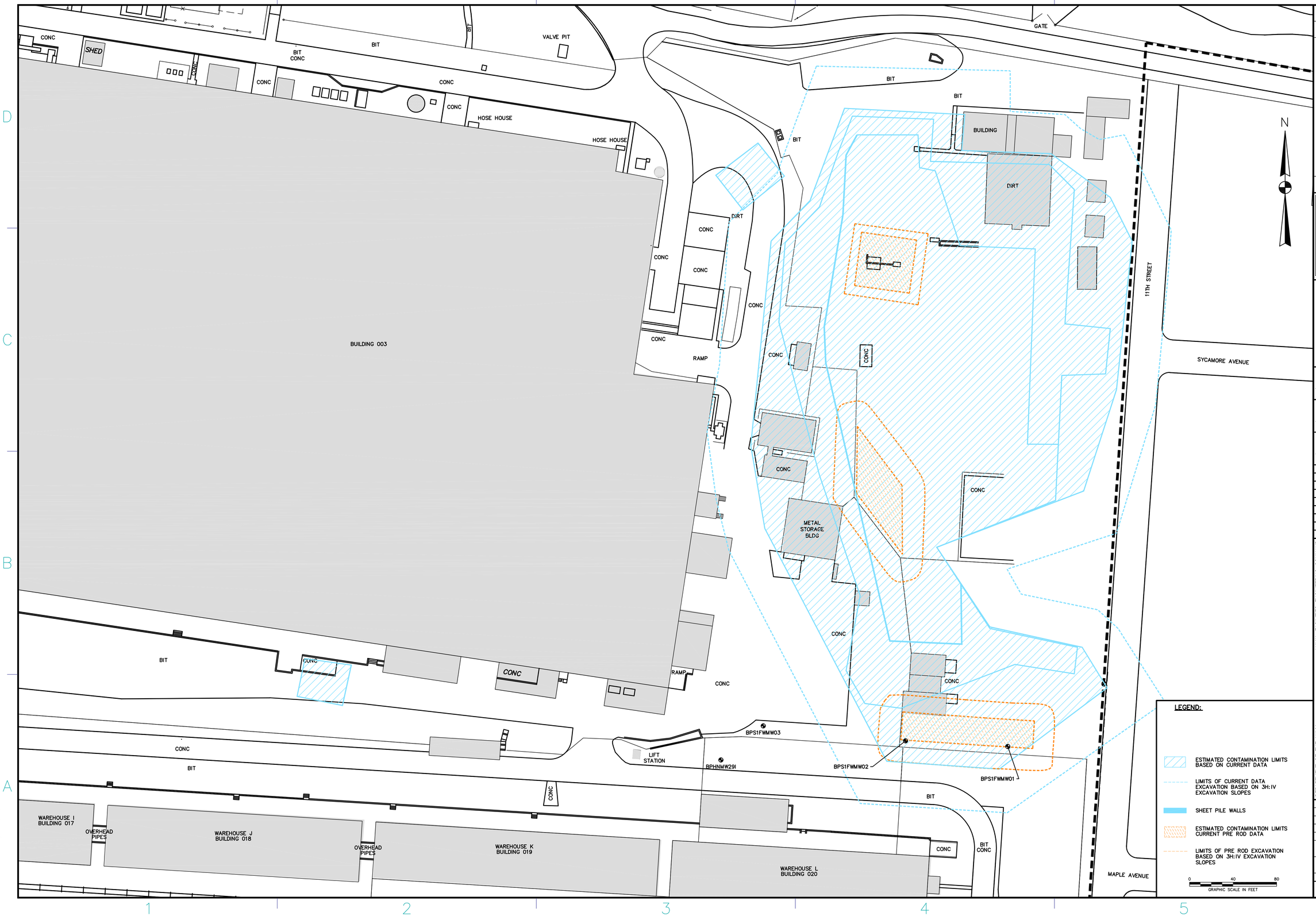
NWIRP BETHPAGE

BETHPAGE, NEW YORK
PRE ROD DATA VX. CURRENT DATA
(PROFILE LOOKING WEST)

CODE ID. NO. 80091	SIZE D
SCALE:	
MAXIMO NO.	
JOB ORDER NO.	
SPEC. NO.	
CONSTR. CONTR. NO.	
NAVFAC DRAWING NO.	
SHEET OF	

FIGURE-2

ACAD: 98450X02.dwg 01/29/07 HJB PIT



APPR | DATE | DESCRIPTION | MKS

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ACTMTY – SATISFACTORY TO DATE

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DES	DR HJB
CHK TWS	QC
DESIGNER	
REVIEWED BY	
QC	
DESIGN MANAGER	
FIRE PROTECTION	
BRANCH MANAGER	
ENGINEERING DR.	

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NWIRP BETHPAGE

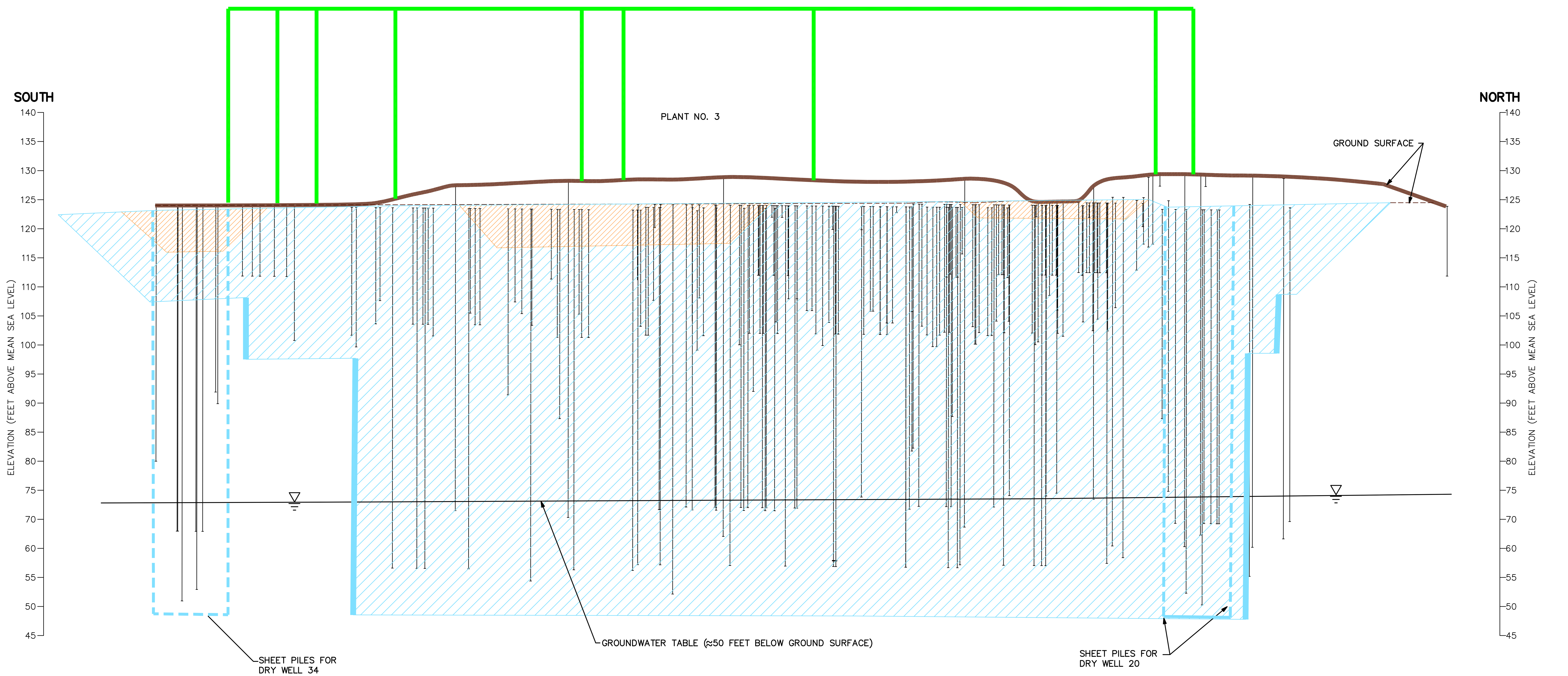
BETHPAGE, NEW YORK

EXCAVATION PLAN
PRE ROD VS. CURRENT DATA

CODE ID. NO. 80091	SIZE D
SCALE:	
MAXIMO NO.	
JOB ORDER NO.	
SPEC. NO.	
CONSTR. CONTR. NO.	
NAVFAC DRAWING NO.	
SHEET	OF

FIGURE - 3

ACAD: 98450P03.dwg 01/29/07 HJB PIT



0 30 60
HORIZONTAL SCALE IN FEET

0 10 20
VERTICAL SCALE IN FEET

LEGEND:

- TOP OF SOIL BORING
- CENTER OF SOIL SAMPLE INTERVAL
- BOTTOM OF SOIL BORING
- ESTIMATED CONTAMINATION LIMITS CURRENT PRE ROD DATA
- ESTIMATED CONTAMINATION LIMITS BASED ON CURRENT DATA
- SHEET PILE WALLS
- SHEET PILE WALLS FOR DRY WELLS

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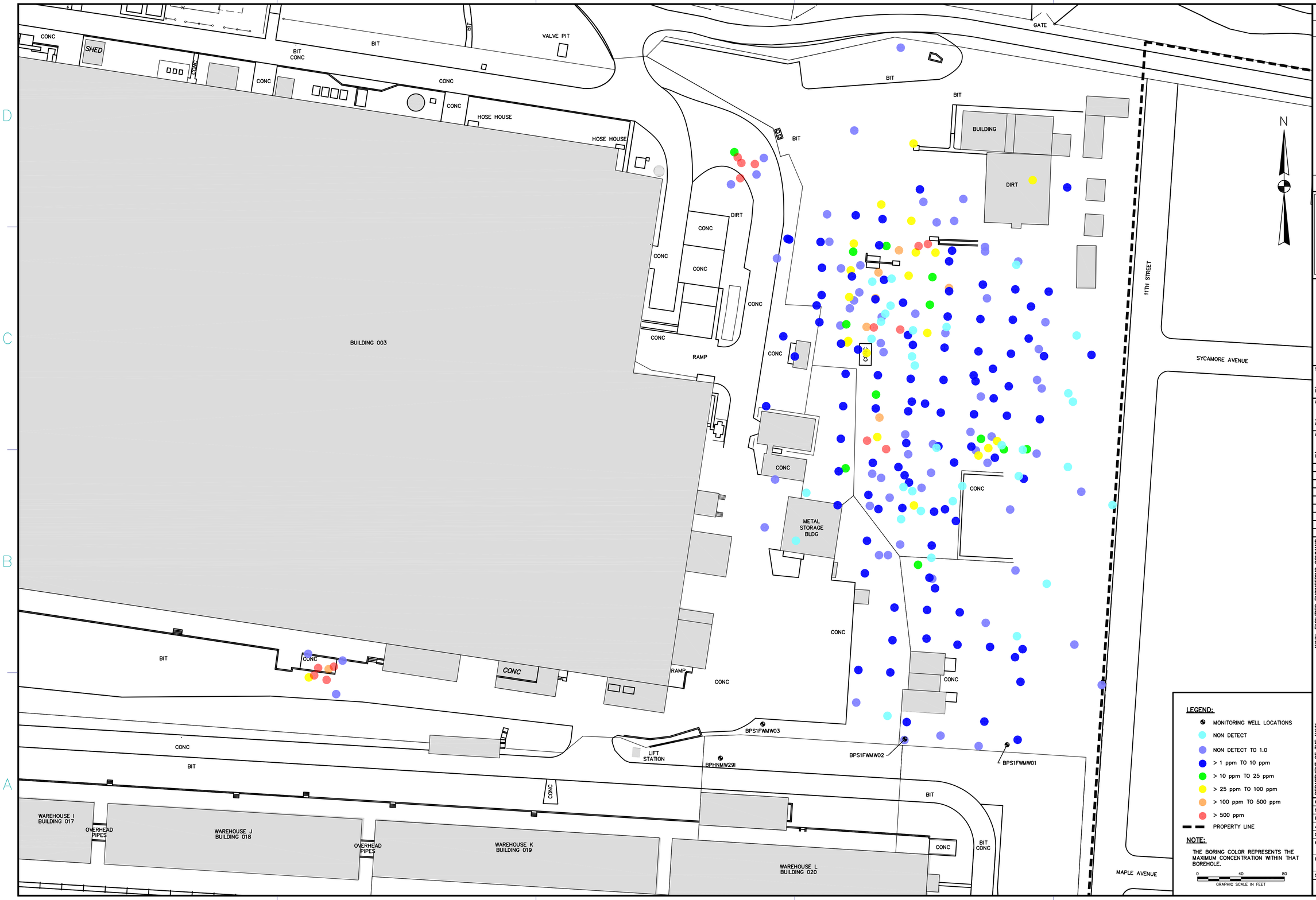
EXCAVATION PLAN
PRE ROD VS. CURRENT DATA

DR HJB
CHK TWS
CODE ID. NO. 80091 SIZE D

FIGURE - 4

ACAD: 98450X04.dwg 01/29/07 HJB PIT



		DESCRIPTION	APPR
			DATE
			MOD

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CHK TWS	QC
DESIGNER	
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QC	
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FIRE PROTECTION	
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ENGINEERING DIR.	

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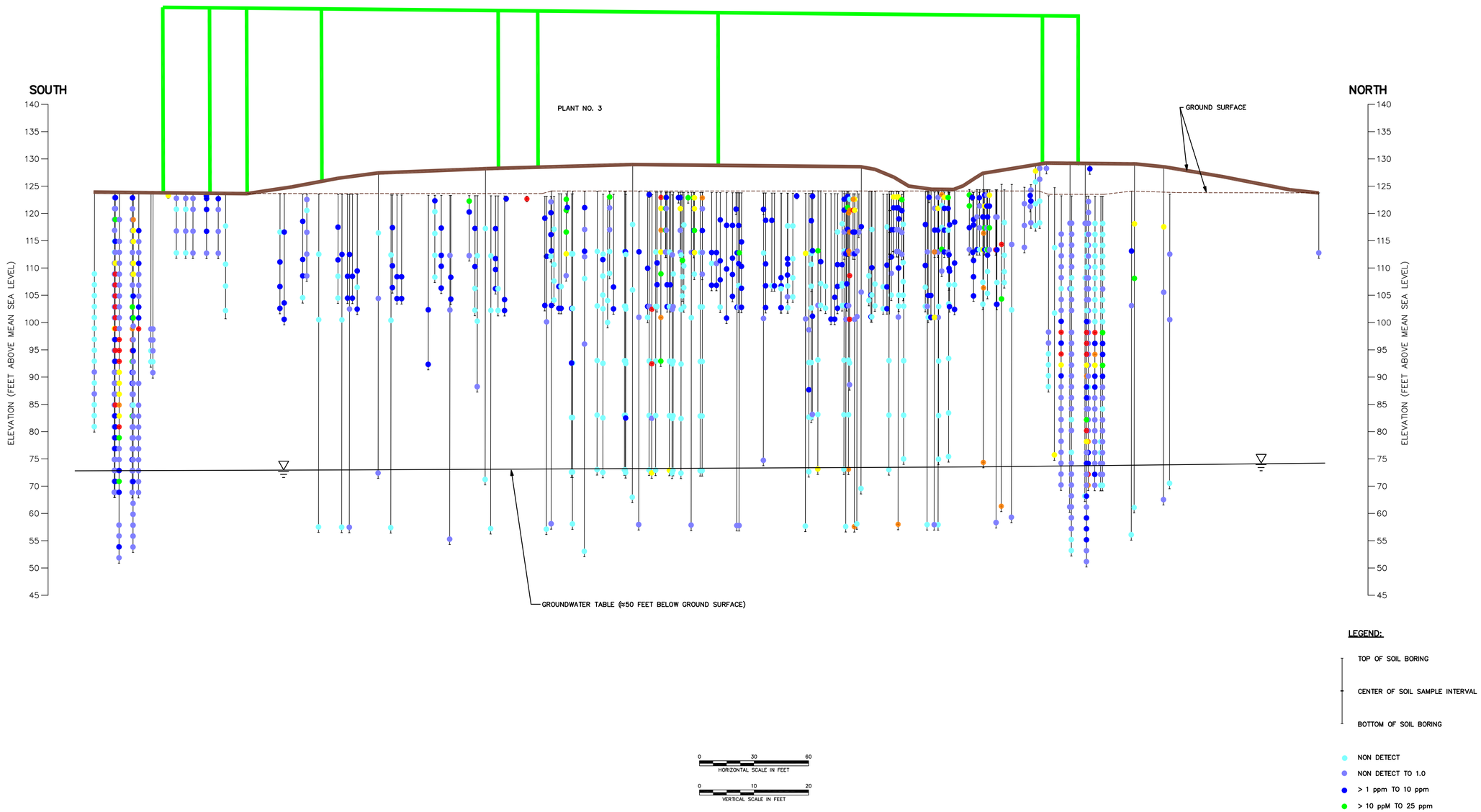
PCB CONCENTRATION DISTRIBUTION PLAN

CODE ID. NO. 80091	SIZE D
SCALE:	
MAXIMO NO.	
JOB ORDER NO.	
SPEC. NO.	
CONSTR. CONTR. NO.	
NAVFAC DRAWING NO.	
SHEET	OF

FIGURE - 5

ACAD: 98450P02.dwg 01/29/07 HJB PIT



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DES		DR	MF
CHK	TWS	QC	

DESIGNER

REVIEWED BY

QC

DESIGN MANAGER

FIRE PROTECTION

BRANCH MANAGER

ENGINEERING DIR.

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PCB SAMPLING LOCATIONS LOOKING WEST

CODE ID. NO. 80091	SIZE D
SCALE:	
MAXIMO NO.	
JOB ORDER NO.	
SPEC. NO.	
CONSTR. CONTR. NO.	
NAVFAC DRAWING NO.	
SHEET	OF

FIGURE-6

ACAD:98456X03.dwg 01/29/07 HJB PIT

BPS1FWMW03 (57–67)

INORGANICS (ug/L)	
CADMIUM (MCL=5)	ND
CHROMIUM (MCL=100)	9.7
PESTICIDES/PCBs (ug/L)	
AROCLOR–1248	0.72
TOTAL AROCLORS (MCL=0.5)	0.72

BPS1FWMW02 (54–64)

INORGANICS (ug/L)	
CADMIUM (MCL=5)	ND
CHROMIUM (MCL=100)	5.2
PESTICIDES/PCBs (ug/L)	
TOTAL AROCLORS (MCL=0.5)	ND

BPHNMW29I (116–126)

INORGANICS (ug/L)	
CADMIUM (MCL=5)	0.11/ND
CHROMIUM (MCL=100)	1.5/1.6
PESTICIDES/PCBs (ug/L)	
AROCLOR–1248	1.1/1
TOTAL AROCLORS (MCL=0.5)	1.1/1

BPS1FWMW01 (54–64)

INORGANICS (ug/L)	
CADMIUM (MCL=5)	1.6
CHROMIUM (MCL=100)	6.6
PESTICIDES/PCBs (ug/L)	
TOTAL AROCLORS (MCL=0.5)	ND

LEGEND:

- ⊗ MONITORING WELL LOCATIONS
- 0.72 GROUNDWATER RESULT
- ND NON–DETECTED VALUES
- ug/L MICROGRAMS PER LITER

NOTE:

GROUNDWATER SAMPLES COLLECTED OCTOBER 2006.

0 40 80
GRAPHIC SCALE IN FEET

DIRECTION OF GROUNDWATER FLOW

N

BUILDING 003 · SHED · HOSE HOUSE · HOSE HOUSE · BUILDING · DIRT · DIRT · RAMP · RAMP · LIFT STATION · METAL STORAGE BLDG · VALVE PIT · GATE · 11TH STREET · SYCAMORE AVENUE · MAPLE AVENUE

WAREHOUSE I BUILDING 017 · OVERHEAD PIPES · WAREHOUSE J BUILDING 018 · OVERHEAD PIPES · WAREHOUSE K BUILDING 019 · WAREHOUSE L BUILDING 020

CONC · BIT · BIT CONC

DESCRIPTION	DATE	APPR

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APPROVED
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DES	DR HJB
CHK TWS	QC

DESIGNER
REVIEWED BY
QC
DESIGN MANAGER
FIRE PROTECTION
BRANCH MANAGER
ENGINEERING DIR.

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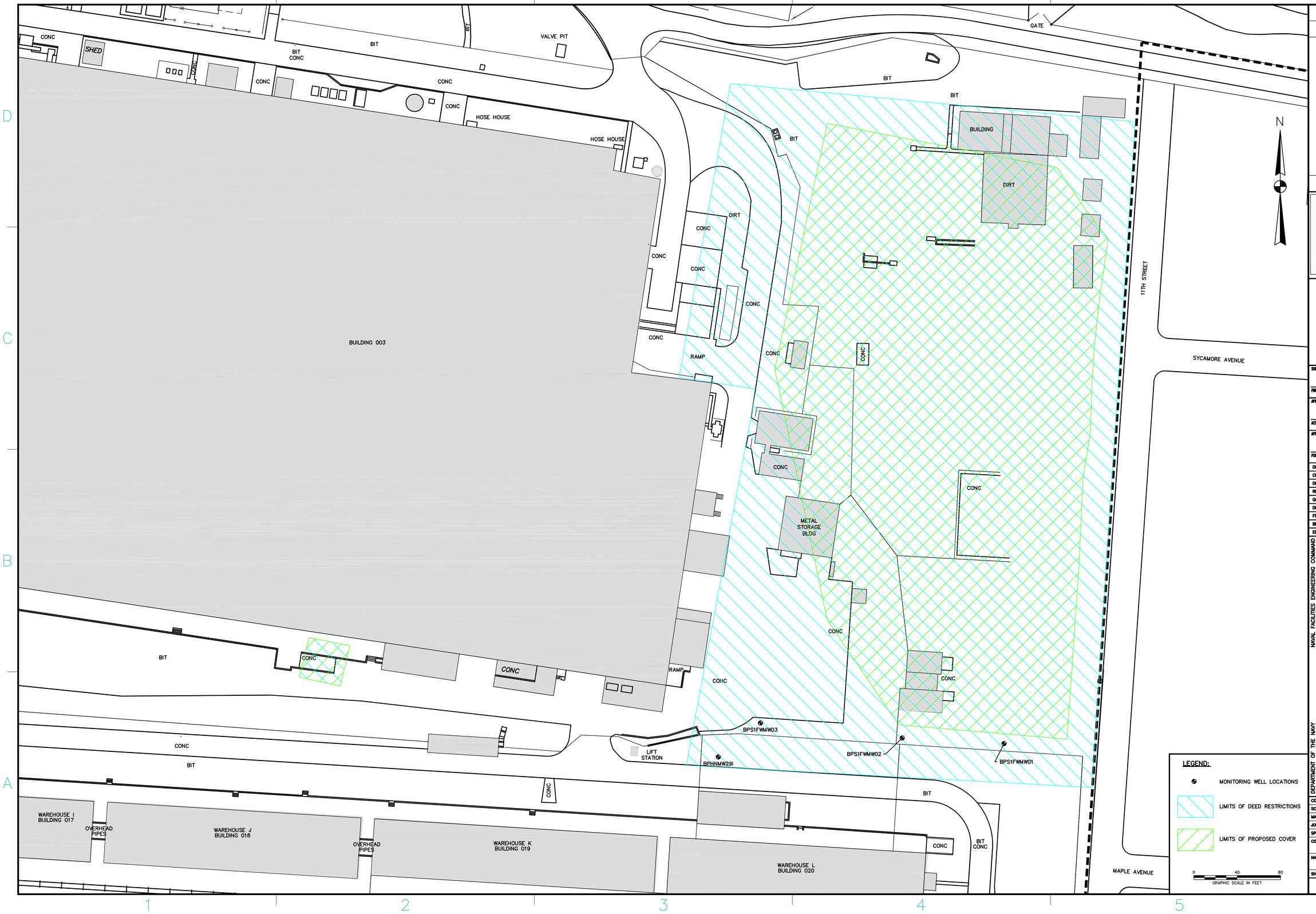
GROUNDWATER ANALYTICAL RESULTS

CODE ID. NO. 80091	SIZE D
SCALE:	
MAXIMO NO.	
JOB ORDER NO.	
SPEC. NO.	
CONSTR. CONTR. NO.	
NAVFAC DRAWING NO.	
SHEET OF	

FIGURE - 7

ACAD:9845GT01.dwg 01/29/07 HJB PIT



		DESCRIPTION	APPR
		DATE	
		SCM	

NAVFAC

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FIRM MEMBER DATE

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FOR COMMANDER NAVFAC DATE

DES	DR HJB
CHK TWS	QC
DESIGNER	
REVIEWED BY	
QC	
DESIGN MANAGER	
FIRE PROTECTION	
BRANCH MANAGER	
ENGINEERING DIR.	

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PROPOSED REMEDY

CODE ID. NO. 80091	SIZE D
SCALE:	
MAXIMO NO.	
JOB ORDER NO.	
SPEC. NO.	
CONSTR. CONTR. NO.	
NAVFAC DRAWING NO.	
SHEET	OF

FIGURE - 8

ACAD: 98450P04.dwg 01/29/07 HJB PIT