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Five-Year Review Report

Portsmouth Naval Shipyard

Kittery, Maine

Naval Facilities Engineering Command
Mid-Atlantic

Contract Number N62472-03-D-0057
Contract Task Order 022

June 2007

REVISION 0
JUNE 2007

FIVE-YEAR REVIEW REPORT

PORTSMOUTH NAVAL SHIPYARD
KITTERY, MAINE

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

Submitted to:
Naval Facilities Engineering Command Mid-Atlantic
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Norfolk, Virginia 23511-3095

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CONTRACT TASK ORDER 022

JUNE 2007

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LIST OF REVISIONS

Section	Revision	Description
Navy Five-Year Review Signature Cover	Revision 0; June 2007	The Navy Cover was signed and included in the final document. Page numbering was updated based on the addition of the List of Revisions.
Table of Contents	Revision 0; June 2007	The List of Revisions was added to the Table of Contents and the page numbering was updated.
Acronyms and Abbreviations	Revision 0; June 2007	Page numbering was updated based on the addition of the List of Revisions.
1.0 – Introduction, pages 1-10 and 1-14	Revision 0; June 2007	The bullet for Clean Water Act was corrected as provided in the responses to comments on the draft final document, included in Appendix C.
4.4.1 – Document and Data Review, page 4-13	Revision 0; June 2007	The last sentence of the section was revised as provided in the responses to comments on the draft final document, included in Appendix C.
Appendix C	---	The responses to comments on the draft final document were included in Appendix C.

Navy Five-Year Review Signature Cover

Key Review Information

Site Identification			
Site Name: Portsmouth Naval Shipyard			EPA ID: *ME7170022019*
Region: 1	State: ME	City/County: Kittery/York	
Site Status			
NPL Status: Final			
Remediation Status (under construction, operating, complete): Under Construction and Operating			
Multiple OU's* (highlight): **Y** N		Number of Sites/OUs: 12/7	
Construction Completion Date: To be determined			
Fund/PRP/Federal Facility Lead: Federal Facility		Lead Agency: Department of the Navy Naval Facilities Engineering Command (NAVFAC) Mid-Atlantic	
Has site been put into reuse? (highlight): **Y** N			
Review Status			
Who conducted the review (EPA Region, State, Federal Agency): NAVFAC Mid-Atlantic			
Author Name: Kirk Stevens		Author Title: Remedial Project Manager	
Author Affiliation: Department of the Navy, Naval Facilities Engineering Command Mid-Atlantic			
Review Period: July 2006 to January 2007		Date(s) of Site Inspection: August 29-30 and September 25-26, 2006; January 16-17, 2007	
Highlight: **Statutory**	Policy Type (name): 1. Pre-SARA **2. Ongoing** 3. Removal Only 4. Regional Discretion	Review Number (1, 2, etc) 1	
Triggering Action Event: Initiation of the remedial action for Site 8 – Jamaica Island Landfill (OU3)			
Trigger Action Date: *June 2002*			
Due Date: *June 2007*			

* OU refers to Operable Unit

Issues:

One major item was noted at OU3: Internal drain pipe outlets could not be located as shown on final construction drawings.

The following minor items were also noted for each OUs and study area at PNS:

- OU1: One well cover bolt should be replaced and one crawl space sign should be reattached at Site 10. There are no items at Site 21.
- OU2: Monitoring wells should be maintained and additional rip-rap should be placed over the fabric in the eastern portion of the shoreline controls.
- OU3: A comprehensive figure showing all necessary features for site inspection is needed. Wells should be labeled and repaired as necessary. Screens should be placed over all gas vents and an adequate vertical distance between the ground surface and gas vent openings should be maintained. Trailer parking and use of blocks to prevent damage to the asphalt cover should be monitored. Brush, debris, and cattails in culvert inlets and/or ditches should be removed to prevent growth or debris from impeding flow.
- OU7: Monitoring wells should be maintained.
- Site 30: Monitoring wells should be maintained.

No items were noted at OU4, OU8, and OU9.

The Navy's proposed schedule for addressing these items is discussed in Section 10.0 of the Five-Year Review Report.

Recommendations and Required Actions:

The Navy/PNS should continue to enforce the Shipyard dig policy. Any planned and approved digging or excavation at an Installation Restoration Program (IRP) site should be conducted following the appropriate health and safety protocols for hazardous waste sites and any excavated material should be managed appropriately. Groundwater at the Shipyard is not used for drinking, irrigation, industrial processes, firefighting, or any other purpose; therefore, no groundwater restrictions are required. Additional recommendations and actions required for each OU and study area are as follows:

- OU1: Address minor maintenance items and complete RI/FS process to determine the appropriate remedial action(s) for Site 10 and to document No Further Action (NFA) for Site 21.
- OU2: Address minor maintenance items and complete RI/FS process to determine the appropriate remedial action(s) for Sites 6 and 29.
- OU3: Continue post-remedial operations, maintenance, and monitoring for OU3, address the noted maintenance items, and finalize the Land Use Control Plan.
- OU4: Collect and evaluate Rounds 9 and 10 of the Interim Offshore Monitoring Program and complete the Additional Scrutiny Report.
- OU7: Address minor maintenance items and complete RI/FS process to determine the appropriate remedial action(s) for Site 32.
- OU8: Begin the RI/FS process to determine the appropriate remedial action(s) for Site 31.
- OU9: Conduct removal action as planned and then begin the RI/FS process to determine the appropriate remedial action(s) for Site 34.
- Site 30: Address minor maintenance items, periodically inspect for crystal growth, remove crystals until the removal action is implemented, and conduct planned removal action. Following completion of the removal action, evaluate whether further investigation or action is needed for Site 30.

Protectiveness Statement(s):

The remedial actions that have been completed for the sites at PNS are protective of human health and the environment. Remedial actions to address immediate or potential future threats from exposure to soil and migration of groundwater have been implemented for OU3. The groundwater monitoring program has been initiated at OU3, but monitoring results have not yet been reported. At OU4, the results of the Rounds 1 through 7 Interim Offshore Monitoring Report, Additional Scrutiny sampling, and Round 8 monitoring do not indicate any imminent threats to human health or the environment under current land use scenarios. The Navy is continuing CERCLA investigations of the remaining IRP sites. Additionally, PNS maintains a "no dig" policy through the Shipyard's Solid Waste Operations Manual. Chapter 12 of the Manual, Control of Excavation Activities, provides instructions requiring authorization and approval from the PNS Environmental Division for all excavation through use of a permit. Groundwater at the Shipyard is not used for drinking or any other use. Environmental investigations at the IRP sites are conducted following the appropriate health and safety protocols for hazardous waste sites.

This Five-Year Review shows that the Navy is meeting the requirements of the RODs for the sites at PNS.

Other Comments:

In accordance with Navy guidance, the five-year review completed for PNS included all relevant CERCLA/IRP sites, regardless of whether decision documents have been prepared for the sites. It is believed that inclusion of all of the sites in this First Five-Year Review Report will simplify preparation of future five-year review reports.

Next Review:

The next five-year review of PNS sites will be completed by June 2012.

Signature of U.S. Department of the Navy and Date

CAPT USN

J.C. Iverson
Captain, USN
Commander
Portsmouth Naval Shipyard
Kittery, Maine

6/12/2009
Date

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ACRONYMS AND ABBREVIATIONS

AOC	Area of Concern
ARAR	Applicable or Relevant and Appropriate Requirement
bgs	Below ground surface
CDC	Child Development Center
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CIA	Controlled Industrial Area
CLEAN	Comprehensive Long-Term Environmental Action Navy
COC	Chemical of concern
COPC	Chemical of potential concern
CSF	Cancer Slope Factor
CTO	Contract Task Order
DoD	Department of Defense
DRMO	Defense Reutilization and Marketing Office
EE/CA	Engineering Evaluation/Cost Analysis
EERA	Estuarine Ecological Risk Assessment
ER-L	Effects Range-Low
ER-M	Effects Range-Median
ESD	Explanation of Significant Difference
FCS	Final Confirmation Study
FDA	Food and Drug Administration
FFA	Federal Facility Agreement
FS	Feasibility Study
FY	Fiscal Year
GCL	Geosynthetic clay liner
HSWA Permit	Corrective Action Permit under the RCRA Hazardous and Solid Waste Amendments of 1984
HMW	High molecular weight
IAS	Initial Assessment Study
IRG	Interim Remediation Goal
IRP	Installation Restoration Program
JILF	Jamaica Island Landfill
MBI and MBII	Mercury Burial Sites (I and II)
MCL	Maximum Contaminant Level
MEDEP	Maine Department of Environmental Protection

mg/kg	Milligram per kilogram
MTADS	Multi-sensor Towed-Array Detection System
NAVFAC	Naval Facilities Engineering Command
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NFA	No Further Action
NOAA	National Oceanic and Atmospheric Administration
NPL	National Priorities List
O&M	Operation and maintenance
OM&M	Operation, Maintenance and Monitoring
OU	Operable Unit
PAH	Polycyclic aromatic hydrocarbon
PCB	Polychlorinated biphenyl
PNS	Portsmouth Naval Shipyard
PRG	Preliminary Remediation Goal
QAPP	Quality Assurance Project Plan
RAB	Restoration Advisory Board
RAO	Remedial Action Objective
RBC	Risk-Based Concentration
RCRA	Resource Conservation and Recovery Act
RfD	Reference Dose
RFI	RCRA Facility Investigation
RI	Remedial Investigation
ROD	Record of Decision
SMP	Site Management Plan
SVOC	Semivolatile organic compound
SWMU	Solid Waste Management Unit
TBC	To be considered
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TtEC	Tetra Tech EC, Inc.
TtNUS	Tetra Tech NUS, Inc.
TW	Temporary well
US Army	United States Army Corps of Engineers
USC	United States Code
USEPA	United States Environmental Protection Agency
VOC	Volatile organic compound
WW	World War

EXECUTIVE SUMMARY

This is the first five-year review of Portsmouth Naval Shipyard (PNS). This review covers seven Operable Units (OUs) and one Study Area, totaling 12 sites. The triggering action for this review was the initiation of the remedial action for OU3, which began in June 2002. Because hazardous substances remain at OU3 above levels that allow for unrestricted use and unlimited exposure, subsequent five-year reviews are required. A Record of Decision (ROD) has been signed for OU3, and an interim ROD has been signed for OU4. Although the remainder of the OUs in this review are still under investigation under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and therefore do not have decision documents, a five-year review was conducted for those sites because hazardous substances, pollutants, or contaminants remain on site in excess of levels that allow for unlimited use and unrestricted exposure.

The technical assessment conducted during a five-year review examined the following three questions:

- Question A: Is the remedy functioning as intended by the decision documents?

- Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy selection still valid?

- Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

These questions have been answered for the sites at PNS where a remedy has been implemented or is currently being implemented (i.e., OU3) or an interim remedy is currently being implemented (i.e., OU4). It was determined that recalculation of risk or a risk assessment was not necessary to determine whether a remedy protects human health and the environment. Where applicable, monitoring and sampling data and the documentation of operation and maintenance (O&M) were also examined, and the information is included in the site-specific sections. In addition, as part of the five-year review, the PNS excavation restriction policy was also reviewed. PNS maintains a “no dig” policy through the Shipyard’s Solid Waste Operations Manual; no change in the instructions related to the “no dig” policy is necessary based on this review. Groundwater at PNS is not used for drinking, irrigation, industrial processes, firefighting, or any other purposes; therefore, the Shipyard has not developed a groundwater use policy.

United States Department of Environmental Protection (USEPA) and Maine Department of Environmental Protection (MEDEP) input was incorporated through review and comment on the draft versions of the Five-Year Review Report, and the draft report was submitted to the Restoration Advisory Board (RAB)

members and presented at a RAB meeting. Community RAB members typically provide input to environmental activities conducted as part of the Installation Restoration Program (IRP) through RAB presentations. The RAB members are included on the distribution of correspondence, meeting minutes, technical memorandum, and reports that are prepared as part of the IRP. An announcement about the Five-Year Review was provided at the September 26, 2006 RAB meeting, and the draft Five-Year Review Report was presented at the December 7, 2006 RAB meeting. The RAB update fact sheets are also provided to other interested community members. A public notice of the availability of the final Five-Year Review Report will be made, and the final report will be placed in the Information Repositories for PNS.

The 12 sites addressed in this five-year review were visually inspected in August/September 2006. An additional inspection of selected sites was conducted in January 2007. No conditions presenting immediate threats or unacceptable risks were observed.

The remedy at OU3 is currently protective of human health and the environment. The source of contamination is contained. The hazardous waste landfill cover minimizes infiltration and subsequent contaminant migration and prevents direct contact with soil. A landfill gas monitoring and O&M program is being implemented to verify that the cap is performing as designed, and preliminary results suggest that the cap is performing as planned. Groundwater monitoring is being implemented to address migration of groundwater. Continued implementation of land use controls and O&M will maintain the effectiveness of the remedy into the future.

A final remedy at OU4 has not yet been selected. The selected interim remedy (monitoring) is protective of human health and the environment in the short term and is intended to provide adequate means to take protective measures until the final ROD is signed. The interim remedy complies with federal and State ARARs for this limited-scope action and is cost effective.

Remedies have not been selected for OUs 1, 2, 7, 8, or 9 or Site 30; however, the CERCLA process is being carried out at these sites. Although final remedial actions have not been determined, no conditions presenting an immediate threat or unacceptable risk were observed. Land use at the sites is industrial/commercial, and groundwater is not used for drinking or other purposes. Continuation of the CERCLA process has been recommended for these sites.

1.0 INTRODUCTION

This first Five-Year Review Report for Portsmouth Naval Shipyard (PNS), Kittery, Maine was prepared by Tetra Tech NUS, Inc. (TtNUS) for the United States Department of Navy, Naval Facilities Engineering Command (NAVFAC) Mid-Atlantic under the Comprehensive Long-Term Environmental Action Navy (CLEAN) program, Contract Number N62472-03-D-0057, Contract Task Order (CTO) 022. This report describes the results of the five-year review that was conducted for the current PNS Installation Restoration Program (IRP) sites and study areas where remedial actions have been completed, are ongoing, or are pending. The report reflects the status of the IRP sites and study area as of January 31, 2007. The report was prepared to fulfill the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as discussed in Section 1.1.

The Navy conducted the first five-year review of the remedial actions implemented at PNS, Kittery, Maine. United States Environmental Protection Agency (USEPA) Region I and Maine Department of Environmental Protection (MEDEP) provided input through review and comment on the draft and draft final reports.

The National Superfund electronic database identification (CERCLIS ID) number for PNS is ME7170022019.

1.1 PURPOSE AND SCOPE OF THE FIVE-YEAR REVIEW

The purpose of the five-year review is to evaluate the implementation and performance of the remedies at the sites to determine whether the remedies are protective of human health and the environment. The methods, findings, and conclusions of the reviews are documented in five-year review reports. In addition, five-year review reports identify deficiencies found during the review, if any, and provide recommendations to address them.

This five-year review is required by statute. The Navy must implement five-year reviews consistent with CERCLA [40 United States Code (USC) Sections §§9601 et seq.] and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) [40 Code of Federal Regulations (CFR) Part 300]. CERCLA Section §121(c), as amended, states:

> If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented.

The NCP, 40 CFR Part 300.430(f)(4)(ii), states:

> If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.

This is the first five-year review of PNS. The triggering action for this review was the initiation of the remedial action for Operable Unit (OU) 3 that began in June 2002. Because hazardous substances remain at OU3 above levels that allow for unrestricted use and unlimited exposure, subsequent five-year reviews are required.

As discussed in the USEPA Comprehensive Five-Year Review Guidance (USEPA, June 2001), a five-year review determines whether the remedy at a site is protective of human health and the environment. When a remedial action is still under construction, a five-year review determines whether immediate threats have been addressed and whether the remedy is expected to be protective when all remedial actions are completed. In addition, a five-year review identifies any deficiencies and recommends steps to correct them. To do this, the technical assessment conducted during a five-year review examines the following three questions:

- Question A: Is the remedy functioning as intended by the decision documents?

- Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy selection still valid?

- Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

These questions will be answered for the sites at PNS where a remedy has been implemented or is currently being implemented (i.e., OU3) or an interim remedy is currently being implemented (i.e., OU4). To answer these questions, this five-year review included review of documents, discussions with personnel associated with the sites, site inspection, and review of newly promulgated standards and changes in the standards that were identified as Applicable or Relevant and Appropriate Requirements (ARARs), to-be-consider criteria (TBCs), and the factors used to develop site-specific, risk-based levels at the time the Record of Decision (ROD) was signed. This information was reviewed to determine whether changes since the time of the ROD or interim ROD may call into question the protectiveness of the

remedy. It was determined that recalculation of risk or a risk assessment was not necessary to determine whether a remedy protects human health and the environment, as will be discussed in later sections. Where applicable, monitoring and sampling data and the documentation of operation and maintenance (O&M) were also examined, and the information is included in the subsequent site-specific sections. In addition, as part of the five-year review, the PNS excavation restriction policy was also reviewed. PNS maintains a "no dig" policy through the Shipyard's Solid Waste Operations Manual. Chapter 12 of the Manual, Control of Excavation Activities, provides instructions requiring authorization and approval from the PNS Environmental Division for all excavation through use of a permit. The instruction, dated April 24, 2003, was updated February 4, 2005. Only editorial revisions were made to Chapter 12; there was no change in the instructions related to the "no dig" policy. Groundwater is not used for drinking, irrigation, industrial processes, fire fighting, or any other purposes; therefore, the Shipyard has not developed a groundwater use policy.

For completeness, this five-year review also includes evaluation of the sites and study area that are pending remedial action based on ongoing remedial or site screening investigations. Site inspections were conducted for these sites and study area to determine whether there are any changes in status. No status changes were noted based on the site inspection and review of the PNS land use figure (included in Appendix A). During the site inspection it was determined that there were no imminent concerns, although minor maintenance items were identified, as discussed in later sections.

The IRP sites that are included in the five-year review are grouped into seven OUs and one study area. The OUs that have final or interim remedies are OU3 and OU4. The OUs where Remedial Investigations (RIs) are being conducted are OU1, OU2, OU7, OU8, and OU9. The study area, Site 30, is in the site screening investigation stage. A general site location map of PNS is presented as Figure 1-1, and the locations of the OUs and associated sites are shown on Figure 1-2. The sites within each OU are also listed in Section 1.2.3, and site information and evaluations are provided in Section 2.0 through 9.0.

No Further Action (NFA) decision documents have been prepared under CERCLA for six former IRP sites. An NFA Decision Document for Site 12 - Boiler Blowdown Tank, Building 72, Site 13 - Rinse Water Tank, Building 76, Site 16 - Rinse Water Tank, Building 174, and Site 23 - Chemical Cleaning Facility Tank, Building 174 was prepared to document that no further response actions are warranted for these sites (Navy, July 1997). In August 2001, NFA under CERCLA decision documents were signed for Sites 26 and 27 (Navy, August 2001a and 2001b).

Site 12 consisted of an underground storage tank that was used from 1974 as a flow-through tank for boiler blowdown, acting as a lift station and allowing the water to cool prior to discharge to the sanitary sewer system (that discharged to the Kittery Sewage Treatment Plant). Testing of the tank and tank contents

showed that the tank was sound, intact, and stable and that the contents were determined to be non-hazardous. Therefore, it was determined that actual or threatened releases of hazardous substances from this site was not a concern and that no further remedial action was necessary for Site 12 to ensure protection of human health and the environment. Subsequently, in 1996, the tank was taken out of service because of operational changes. The tank was excavated and determined to be intact with no evidence of leaking (Navy, July 1997).

Sites 13, 16, and 23 consisted of underground storage tanks that were used to hold industrial discharges for treatment (off site) before discharge to the sanitary sewer system. The tanks were used from the mid to late 1970s until the mid to late 1980s. The tanks were excavated and found to be intact, and there was no evidence of spills or leaks. Confirmation soil samples (subsurface) were collected from the tank excavation, and the area was backfilled and covered with 18 inches of sandy gravel and 4 inches of asphalt. Because the sites were located in a controlled industrial area, risks for occupational exposure (e.g., construction worker) to subsurface soil were evaluated and determined to be acceptable. Based on the history of use, the tank removals, and results of confirmation samples, it was determined that actual or threatened releases of hazardous substances from these sites were not a concern and that no further remedial action was necessary for Sites 13, 16, and 23 (Navy, July 1997). Although these sites were closed using industrial standards, the Navy believes that no restrictions are required for these sites because there was no potential impact to surface soil from site operations (i.e., temporary storage in underground storage tanks) or residual contamination that would be a concern for non-industrial exposure.

Site 26 was part of OU4 and Site 27 was the only site in OU5. Site 26 was recommended for NFA under CERCLA (and therefore recommended for removal from OU4) because the tanks at Site 26 are portable tanks and are used for petroleum wastes only as mandated by state and federal laws. Site 27 (OU5) was recommended for NFA under CERCLA. The only contaminant of concern at Site 27 is petroleum product. Petroleum wastes and products are exempt from the definition of hazardous substances, pollutants, and contaminants under CERCLA.

Based on the NFA decisions, Sites 12, 13, 16, 23, 26, and 27 are not discussed further in this five-year review document. A map showing the former locations of these sites is provided in Appendix A.

1.2 OVERVIEW OF PNS

PNS is a military facility with restricted access on an island located in the Piscataqua River, as shown on Figure 1-1. PNS is referred to on National Oceanic and Atmospheric Administration (NOAA) nautical charts as Seavey Island, with the eastern tip given the name Jamaica Island. Clark's Island is to the east attached by a rock causeway to Seavey Island. The Piscataqua River is a tidal estuary that forms the southern boundary between Maine and New Hampshire. PNS is located in Kittery, Maine, north of

Portsmouth, New Hampshire, at the mouth of the Great Bay Estuary (commonly referred to as Portsmouth Harbor).

1.2.1 Land Use

PNS is engaged in the conversion, overhaul, and repair of submarines for the Navy. The long history of shipbuilding in Portsmouth Harbor dates back to 1690, when the first warship launched in North America, the Falkland, was built. PNS was established as a government facility in 1800, and it served as a repair and building facility for ships during the Civil War. The first government-built submarine was designed and constructed at PNS during World War I. A large number of submarines have been designed, constructed, and repaired at this facility since 1917. PNS continues to service submarines as its primary military focus.

Military activities are concentrated in the western portion of the facility in the Controlled Industrial Area (CIA) (the southern and southwestern portions of Dennett's Island). This area includes all of the dry docks and submarine berths and numerous buildings that house trade shops related to maintenance activities. Access to the area is tightly controlled and limited to individuals having appropriate clearances. The CIA is covered with buildings and asphalt to support military operations at PNS. Uses of other portions of PNS include administration offices, officers' residences, equipment storage, parking, and recreational facilities. Outside the CIA, areas are covered with asphalt, grass, and/or buildings depending on the use of the area. As part of the remedy for OU3, wetlands were constructed north of the OU3, adjacent to Jamaica Cove, and a parking lot and a recreational area were constructed on top of the OU3 landfill cap.

Water for operations and drinking at the Shipyard are supplied by the Kittery Water District. Kittery's water supply originates from surface reservoirs located in the vicinity of York, Maine. Groundwater at PNS is not used for drinking, irrigation, industrial processes, fire fighting, or any other purposes.

A portion of PNS is on the National Register of Historic Places. The area between the two bridges connecting PNS to Kittery, Maine was placed on the Register by the National Park Service in 1977. Based on a Cultural Resources Survey of PNS (Louis Berger Group, Inc., April 2003), the boundary of the PNS Historic District was expanded and includes the majority of the CIA. Two other historic districts were also identified (Portsmouth Naval Hospital and Portsmouth Naval Prison Historic Districts).

1.2.2 Regulatory History and Overview of Environmental Investigations

Prior to CERCLA and Resource Conservation and Recovery Act (RCRA) regulation at PNS, years of shipbuilding and submarine repair work at PNS resulted in hazardous substances being released into the

soils, groundwater, surface water, and sediment on and around Seavey Island. As a result, investigation and remediation activities were performed under the Department of Defense (DoD) IRP. The IRP parallels CERCLA and is further discussed in the Site Management Plan (SMP) for PNS [Amended Fiscal Year (FY07), Navy, July 2006]. Investigations of hazardous substance releases at PNS began in 1983. USEPA became involved with PNS in 1985 when the agency requested information on PNS' hazardous wastes and conducted a visual site inspection under the authority of RCRA. Since 1988, MEDEP has also provided oversight of investigation and remediation of PNS. In March 1989, USEPA issued a Corrective Action Permit under the RCRA Hazardous and Solid Waste Amendments of 1984 (HSWA Permit) (USEPA, March 1989) that required PNS to investigate 13 Solid Waste Management Units (SWMUs) and take appropriate corrective action. Until the mid-1990s, investigations at the PNS were conducted under RCRA authority. Effective May 31, 1994, PNS was included on the National Priorities List (NPL), and subsequent studies have been conducted under the authority of CERCLA, commonly known as Superfund. Consistent with the transition from RCRA to CERCLA, the SWMU terminology was replaced with “site.” Ongoing work meets the intent of the HSWA Permit, but the ongoing studies to develop and evaluate remedial activities are conducted as part of a Feasibility Study (FS) (CERCLA terminology) and combines both RCRA and CERCLA criteria.

The Federal Facility Agreement (FFA) for PNS was signed between USEPA and the Navy in September 1999, became effective February 2000, and supersedes the HSWA Permit. The State of Maine has elected not to be a party to the FFA at this time. However, the State is afforded a participatory role in the site remediation process by virtue of CERCLA. Among other things, an FFA outlines roles and responsibilities, establishes deadlines/schedules, outlines work to be performed, and provides a dispute resolution process for primary documents. The FFA ensures that CERCLA decisions will be consistent with RCRA and other federal and State hazardous waste statutes and regulations as appropriate for the sites at PNS. The USEPA, MEDEP, and Navy continue to work toward site cleanup under CERCLA.

During the initial investigations of PNS, 28 potential sites (referred to as SWMUs at that time) located onshore and offshore of PNS were identified. After the 28 potential sites were examined in greater depth, 15 were eliminated from further investigation, leaving 13 sites that required investigation and appropriate corrective action (Kearney & Baker/TSA, July 1986). These 13 sites, Sites 5, 6, 8, 9, 10, 11, 12, 13, 16, 21, 23, 26, and 27, were the sites listed in the HSWA Permit. Subsequent to the HSWA, four sites (Sites 12, 13, 16, and 23) were identified as NFA sites, and four site screening areas (Sites 30, 31, 32, and 34) were identified. In addition, a portion of Site 6 was separated and given a separate site number (Site 29). Therefore, the FFA included Sites 5, 6, 8, 9, 10, 11, 21, 26, 27, 29, 30, 31, 32, and 34. NFA under CERCLA documents for Sites 26 and 27 were signed in 2001.

A list of important PNS historical events related to environmental investigations and relevant dates is shown below. The identified events are illustrative, not comprehensive. Additional information on site- or OU-specific investigations is provided in the discussion related to the specific OU or site screening area (Sections 2.0 through 9.0).

Event	Date
Initial Assessment Study (IAS) completed	1983
USEPA involvement began	1985
Final Confirmation Study (FCS) completed	1986
RCRA Facility Assessment completed	1986
MEDEP oversight began	1988
PNS Corrective Action Permit under the HSWA issued	March 1989
RCRA Facility Investigation (RFI) Report and Addendum to RFI Report and On-shore Ecological Risk Assessment completed	1992 and 1993
Sampling to support offshore risk assessments conducted	1991 through 1993
Placed on the NPL	May 31, 1994
Onshore and offshore components of investigation separated	1994
Offshore Human Health Risk Assessment completed	1994
RFI Data Gap Report and Air Monitoring Report completed	1995 and 1996
Four rounds of groundwater and intertidal seep and sediment monitoring conducted	1996/1997
FFA signed, supersedes the HSWA Permit	1999
Onshore/offshore Contaminant Fate and Transport Modeling completed	1999
Interim ROD for OU4 signed, Interim Offshore Monitoring Plan completed, and monitoring started	1999
Estuarine Ecological Risk Assessment (EERA) for offshore areas of concern (AOCs) completed	2000
Site investigations for Sites 10, 29, 30, 31, and 32 conducted	2000
ROD for OU3 signed	2001
Start of significant construction for OU3 remedy	June 24, 2002

1.2.3 Site Information

The sites identified in the HSWA Permit as well as the newly identified sites were grouped, based on similar characteristics or proximity, into OUs. As of the signing of the FFA, four sites were determined to require NFA under CERCLA (Sites 12, 13, 16, and 23) and therefore were not included in an OU. The sites listed in the FFA were grouped into five OUs (OU1 through OU5). Since then, four additional OUs (OU6 through OU9) were identified. Subsequently, two of the nine OUs have been deleted, OU5 was removed

from the CERCLA program (based on the NFA under CERCLA determination for Site 27), and OU6 was recombined with OU3. Between 2000 and 2005, OU6 was identified to address management of migration of groundwater from OU3; however, as of October 2005, OU6 was recombined with OU3. In 2001, Site 26 was removed from OU4 (based on the NFA under CERCLA determination for this site). There is one study area at PNS, Site 30. The following is a list of the current IRP sites in each OU:

- OU1 contains Site 10 – Former Battery Acid Tank No. 24 and Site 21 – Former Acid/Alkaline Drain Tank (groundwater only). In 1996, a Consensus Document for NFA for soils at Site 21 was prepared to document that no further remedial action is required for soils at this site; however, further investigation and evaluation of potential groundwater impact from the site was required (Navy, October 1996).

- OU2 contains Site 6 – Defense Reutilization and Marketing Office (DRMO) Storage Yard including DRMO Impact Area, Quarters S, N, and 68 and Site 29 – Former Teepee Incinerator Site.

- OU3 contains Site 8 – Jamaica Island Landfill (JILF), Site 9 – Former Mercury Burial Sites (MBI and MBII), and Site 11 – Former Waste Oil Tanks Nos. 6 and 7. The JILF Impact Area, Former Child Development Center (CDC), was previously included as part of Site 8; however, based on the OU3 ROD (Navy, August 2001c), this area was separated from Site 8 and further investigated separately. Based on the results of an investigation in 2003, it was determined that NFA is necessary for this area (TtNUS, April 2004).

- OU4 contains Site 5 – Former Industrial Waste Outfalls and Offshore Areas Potentially Impacted by PNS Onshore Sites. As part of the EERA (NCCOSC, May 2000), the offshore area was investigated based on six AOCs; the interim offshore monitoring program (TtNUS, October 1999) includes 14 monitoring stations within the offshore area.

- OU7 contains Site 32 – Topeka Pier Site.

- OU8 contains Site 31 – West Timber Basin.

- OU9 contains Site 34 – Former Oil Gasification Plant, Building 62.

- The study area is Site 30 – Galvanizing Plant, Building 184.

The OUs and study area are discussed further in Sections 2.0 through 9.0.

1.3 FIVE-YEAR REVIEW PROCESS

The five-year review was led by Kirk Stevens, the Navy Remedial Project Manager. The following team members assisted in the review:

- Matt Audet, USEPA Region I Remedial Project Manager
- Iver McLeod, MEDEP Remedial Project Manager
- Ken Plaisted, PNS Environmental Division Head
- John Gildersleeve, PNS IRP Coordinator
- Deborah Cohen, TtNUS Facility Coordinator/Project Manager (Navy CLEAN contractor)
- Nina Balsamo, TtNUS Lead Engineer (Navy CLEAN contractor)

The five-year review consisted of a review of relevant documents and site inspections conducted by the Navy and Navy contractor. PNS personnel also attended the site inspection of OU3. No official interviews were conducted as part of the five-year review. Current site information was obtained during discussions with PNS Environmental personnel as part of planning, implementation, and reporting of environmental investigations. USEPA and MEDEP input was provided through review and comment on the draft and draft final Five-Year Review Report. Responses to regulatory comments are provided in Appendix C.

The draft report was submitted to the Restoration Advisory Board (RAB) members and presented at a RAB meeting. Community RAB members typically provide input to the environmental activities as part of the IRP through RAB presentations. The RAB members are included on the distribution of correspondence, meeting minutes, technical memorandum, and reports that are prepared as part of the IRP. An announcement about the review was provided at the September 26, 2006 RAB meeting, and the draft Five-Year Review Report was presented at the December 7, 2006 RAB meeting. The RAB update fact sheet from the September 26, 2006 RAB, which provided an announcement about the start of the review, was submitted to the PNS distribution list, which includes Navy, PNS, USEPA, MEDEP, Trustees, and RAB members, on November 16, 2006. Meeting minutes and RAB update fact sheet for the December 7, 2006 RAB meeting were submitted to the PNS distribution list on February 13, 2007. The RAB update fact sheets are also provided to other interested community members. Public notices announcing the date, time, location, and topic for RAB meetings are placed in the Portsmouth Herald and Fosters Daily Democrat the week before the RAB meetings. A public notice of the availability of the final Five-Year Review Report will be provided in these two newspapers.

The final report will be placed in the Information Repositories for PNS. Most project documentation can be found at the following Information Repository locations:

Kittery Town Hall
200 Rogers Rd. Ext.
Kittery, ME 03904
Telephone: (207) 439-1633
Mon.-Fri.: 9:00 am to 5:00 pm

Portsmouth Public Library
175 Parrott Street
Portsmouth, NH 03801
Telephone: (603) 427-1540
Mon.-Thur: 9:00 am to 9:00 pm
Fri: 9:00 am to 5:30 pm
Sat: 9:00 am to 5:00 pm

1.4 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS AND SITE-SPECIFIC ACTION LEVEL CHANGES

The five-year review is being conducted to verify that the remedy at a site remains protective of human health and the environment by evaluating the implementation and performance of the selected remedy. In addition to evaluating the protectiveness of the in-place remedy, changes in ARARs or site-specific action levels were reviewed to determine whether the changes may call into question the protectiveness of the remedy.

The chemical-specific ARARs and TBCs identified in the OU3 ROD (Navy, August 2001c) and the OU4 Interim ROD (Navy, May 1999) were reviewed, as were new federal and state regulations that have been promulgated since finalization of the RODs. This section describes the overall impacts of the new or changed ARARs on the risk posed to human health or the environment. It was determined that recalculation of risk or risk assessments was not necessary to determine whether the OU3 remedy or the OU4 interim remedy protects human health and the environment. This section also indicates changes in site-specific action levels and how the changes would affect the status of the other OUs and study area where ongoing RIs are being conducted. Based on the changes discussed herein, there is no change in status of any of the OUs or study area.

The chemical-specific ARARs and TBCs for OU3 are as follows:

- Clean Water Act, Section 304 (a), National Recommended Water Quality Criteria (Relevant and Appropriate ARAR) and Maine Surface Water Toxics Control Program, Chapter 530.5, Statewide Water Quality Criteria (Applicable ARAR).

- USEPA health advisories for drinking water, risk Reference Doses (RfDs), and Cancer Slope Factors (CSFs) (TBCs).

- State of Maine Guidance Manual for Human Health Risk Assessments at Hazardous Substance Sites (June 1994) (TBC)

These National and statewide water quality criteria are used as ecological action levels for the groundwater monitoring program as part of the Post-Remedial Operations, Maintenance, and Monitoring (OM&M) Plan for OU3 (TtNUS, June 2006a). The water quality criteria are updated periodically, and any updates that affect the monitoring program will be taken into account during the evaluation of the groundwater monitoring data as part of the monitoring program. The first two rounds of OM&M were conducted in July and December 2006, and the associated data packages will be completed 2007.

The human health risk assessment for OU3 was completed in 2000 using the TBCs identified. Except for monitoring, the components of the remedial action for OU3 (capping, shoreline controls, and institutional controls) are not chemical specific and therefore any updates to risk assessment guidance, RfDs, and/or CSFs would not impact the protectiveness of these components of the OU3 remedy. The human health action levels for the groundwater monitoring program as part of the OU3 OM&M plan were calculated using the RfDs and CSFs. The RfDs and CSFs are updated periodically and any updates that affect the monitoring program will be taken into account during the evaluation of the groundwater monitoring data as part of the monitoring program. In addition, updates to risk assessment guidance will be taken into account as part of the monitoring program as discussed further in Section 4.4.2.

The chemical-specific ARARs and TBCs for OU4 are as follows:

- Clean Water Act, Section 304 (a), National Recommended Water Quality Criteria (Relevant and Appropriate ARAR) and Maine Surface Water Toxics Control Program, Chapter 530.5, Statewide Water Quality Criteria (Relevant and Appropriate ARAR).

- Food and Drug Administration (FDA) Action Levels and USEPA Proposed Sediment Quality (TBCs).

- NOAA Effects-Range Low (ER-L) and Effects-Range Median (ER-M) concentrations (Long et al., 1995) and NOAA National Status and Trends Program Mussel Watch Data (TBCs)

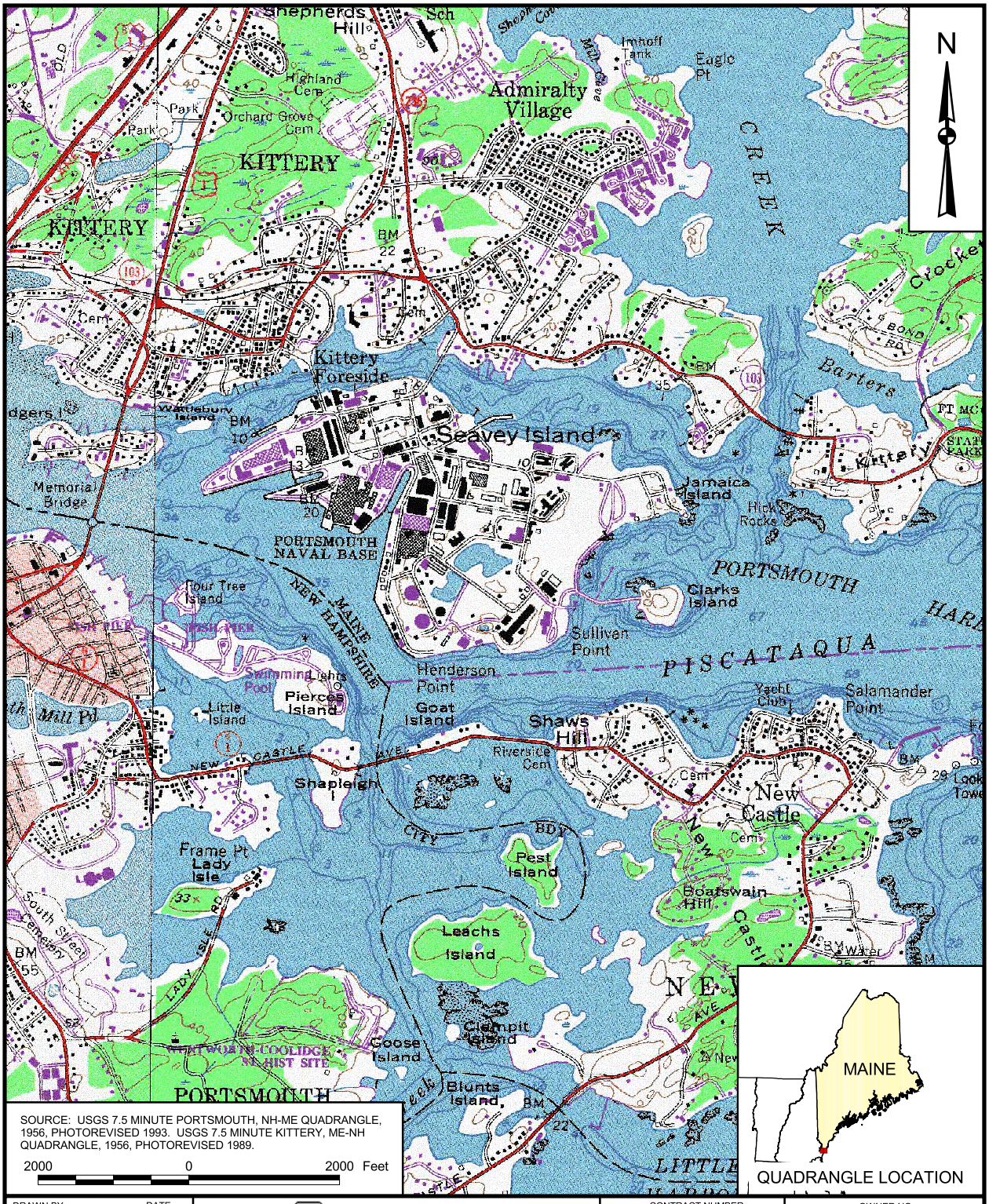
Of the above listed ARARs and TBCs, only the water quality criteria and ER-L and ER-M concentrations were used to develop Preliminary Remediation Goals (PRGs) for OU4 (TtNUS, November 2001). The PRGs are used as part of the interim offshore monitoring program as discussed in the Interim Offshore Monitoring Plan (TtNUS, October 1999) and related documents. There were minor changes in water quality criteria (2002) since development of the PRGs and the changes would not significantly affect the PRG calculations. The ER-L and ER-M concentrations have not changed, and there is no new sediment

guidance that would affect the PRGs. At the time the FS for OU4 is conducted, ARARs and TBCs should be re-evaluated and changes to the PRGs made as necessary for use in the FS.

For sites under RI, the benchmarks used to select chemicals of potential concern (COPCs) for direct contact with soil and sediment included USEPA Region III Risk-Based Concentrations (RBCs) until approximately 1998; subsequently, USEPA Region IX PRGs are used for selecting COPCs. The benchmarks used to select COPCs for groundwater for sites with fresh groundwater included USEPA Region III RBCs (until approximately 1998), USEPA Region IX PRGs (after 1998), and USEPA Maximum Contaminant Levels (MCLs). For sites with freshwater and saline/brackish groundwater, facility-specific screening levels for construction worker exposure are used. For sites with potential for groundwater migration to the offshore, water quality criteria (with consideration of dilution as appropriate) are used for screening groundwater. For sites with intertidal areas (OU3 and OU7), human health screening levels were developed for exposure to seeps and surface water in the intertidal area. The various screening levels are updated periodically based on changes to RfDs and CSFs. Region IX PRGs are generally similar to Region III RBCs. Updates to screening levels and other benchmarks would not significantly change the risk conclusions for the sites under remedial investigation. Risk assessment as part of a RI, PRG development as part of an FS, and/or clean-up level development as part of a ROD for each OU will use the most current risk assessment guidance and RFDs, CSFs, and other benchmarks as appropriate.

1.5 REPORT ORGANIZATION

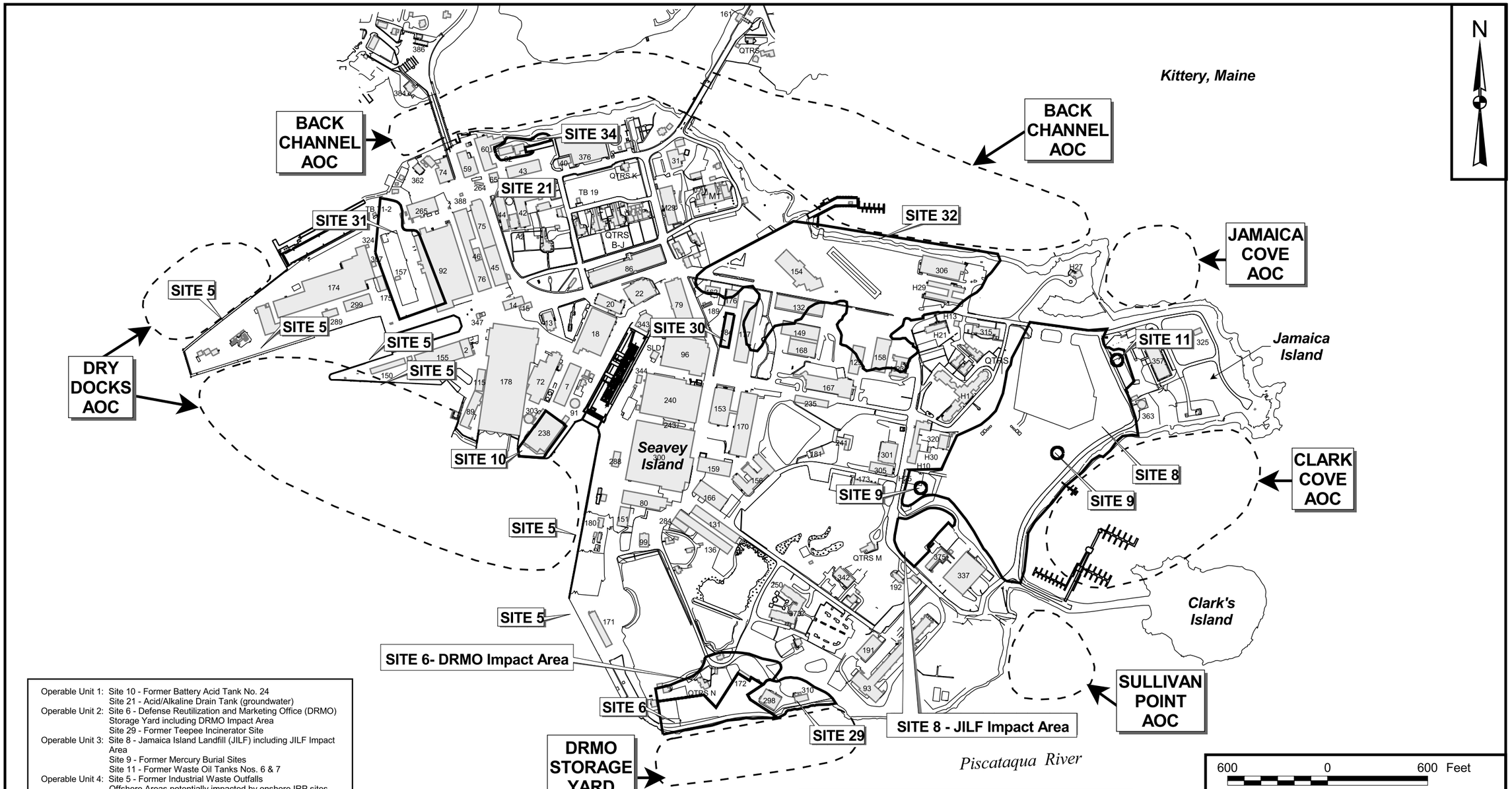
This report has been organized with the intent of meeting the general format requirements specified in the Comprehensive Five-Year Review Guidance document (USEPA, June 2001) and summarizing the results of the five-year review for the eight IRP areas in a cohesive and comprehensive manner. Section 1.0 gives an overview of PNS and the five-year review process, as well as a discussion of changes in ARARs and site-specific action levels. Sections 2.0 through 9.0 summarize the five-year reviews conducted for each of the individual OUs and one study area. Section 10.0 provides a general summary, conclusions, and protectiveness statement for PNS. This section also identifies when the next five-year review is required and the other tasks that should be performed as part of that five-year review. Three appendices are included in this report. Appendix A contains the five-year review inspection checklist for OU3 and items related to the inspection of the IRP sites, Appendix B contains photographs of the sites, and Appendix C contains responses to comments on the Five-Year Review Report.



DRAWN BY J. LAMEY — DATE 12/29/03	Tetra Tech NUS, Inc.	CONTRACT NUMBER 1291	OWNER NO. CTO 022
CHECKED BY D. COHEN — DATE 10/26/06	PORTSMOUTH NAVAL SHIPYARD VICINITY MAP FIVE-YEAR REVIEW REPORT PORTSMOUTH NAVAL SHIPYARD KITTERY, MAINE	APPROVED BY — DATE —	
COST/SCHEDULE-AREA		APPROVED BY — DATE —	
SCALE AS NOTED		DRAWING NO. FIGURE 1 - 1	REV 0

P:/GIS/PORTSMOUTH_NSY/APR/INTERIM_OFFSHORE_MONITORING.APR VICINITY LAYOUT (5 YEAR REPORT) 10/26/06 SP

P:\GIS\PORTSMOUTH_NSY\APR\INTERIM_OFFSHORE_MONITORING.APR APPOXIMATE AOC LOCATIONS LAYOUT 3/06/07 SP



Operable Unit 1: Site 10 - Former Battery Acid Tank No. 24
Site 21 - Acid/Alkaline Drain Tank (groundwater)
Operable Unit 2: Site 6 - Defense Reutilization and Marketing Office (DRMO) Storage Yard including DRMO Impact Area
Site 29 - Former Teepee Incinerator Site
Operable Unit 3: Site 8 - Jamaica Island Landfill (JILF) including JILF Impact Area
Site 9 - Former Mercury Burial Sites
Site 11 - Former Waste Oil Tanks Nos. 6 & 7
Operable Unit 4: Site 5 - Former Industrial Waste Outfalls
Offshore Areas potentially impacted by onshore IRP sites (Six AOCs have been delineated)
Operable Unit 7: Site 32 - Topeka Pier Site
Operable Unit 8: Site 31 - West Timber Basin
Operable Unit 9: Site 34 - Former Oil Gasification Plant, Building 62

Site Screening Area: Site 30 - Galvanizing Plant, Building 184

Note: 2006 PNS Base Map

DRAWN BY J. LAMEY	DATE 4/20/04	Tetra Tech NUS, Inc.	CONTRACT NUMBER 1291 / OWNER NUMBER CTO 022
CHECKED BY D. COHEN	DATE 3/06/07	FACILITY SITE MAP FIVE-YEAR REVIEW REPORT PORTSMOUTH NAVAL SHIPYARD KITTERY, MAINE	APPROVED BY — / DATE —
COST/SCHEDULE-AREA			APPROVED BY — / DATE —
SCALE AS NOTED			DRAWING NO. FIGURE 1 - 2 / REV 0

2.0 OPERABLE UNIT 1

OU1 consists of Site 10 – Former Battery Acid Tank No. 24 and Site 21 – Former Acid/Alkaline Drain Tank (groundwater only). An RI is currently being conducted for OU1. Although OU1 is still under investigation under CERCLA, a five-year review is being conducted because hazardous substances, pollutants, or contaminants are at Site 10 in excess of levels that would allow for unlimited use and unrestricted exposure. As provided in the paragraph below, the selected remedy for Site 21 is expected to be NFA because no hazardous substances, pollutants, or contaminants remain on site in excess of levels that allow for unlimited use and unrestricted exposure, and therefore NFA is expected to be protective of human health and the environment. Therefore, the five-year review for OU1 focuses only on Site 10 and not on Site 21.

Site 21 was a 695-gallon underground steel tank used from 1974 until 1991 to hold discharge from two washing machines. The washing machines were used to clean air filters that were used to remove dirt and debris from ships. In 1991, as part of the RFI for PNS, the tank was excavated and removed in accordance with a closure plan. The tank was not intact. Stained fill and exposed bedrock were evident in the excavation. Confirmation soil samples were collected from the excavation, which was then backfilled with clean fill and covered with asphalt. A Consensus Document for NFA for soils at Site 21 (Navy, October 1996) was prepared to document that no further remedial action is required for soils at this site; however, further investigation and evaluation of potential groundwater impact from the site was required. Site 21 groundwater was investigated as part of the Site 31 Site Screening Investigation, and the results indicated that groundwater has not been impacted by Site 21. The Navy recommended NFA for groundwater (TtNUS, May 2000). The NFA decision for Site 21 will be documented as part of the remedy selection (i.e., ROD) for OU1 or in a separate document for Site 21.

2.1 HISTORY AND SITE CHRONOLOGY

The history of environmental activities at PNS is discussed in Section 1.2.2. A list of important Site 10 historical events and relevant dates in site chronology is shown below. The identified events are illustrative, not comprehensive.

Event	Date
Filling of area was conducted and area apparently used for berthing and/or launching boats	Before 1826 to 1860s and 1900s to 1915
Other industrial uses of area apparently began	1910s to 1920s
Building 238 built and lead-acid battery recharging operations began within the building	1955

Event	Date
Lead-battery acid wastes were discharged directly to the river (through an industrial waste outfall that is part of Site 5)	1955 to 1974
Lead-battery acid wastes discharged to underground storage tank south of Building 238	1974 to 1984
Leak in underground tank discovered and use of tank discontinued	1984
Underground tank and surrounding contaminated soil removed	1986
RFI sampling conducted	1991
Additional sampling of soil and groundwater to determine nature and extent of contamination conducted at Site 10	1998, 2001, and 2006

The offshore area of Site 10 is part of the Dry Dock AOC that was investigated as part of the EERA and is part of the more recent interim offshore sampling at monitoring station MS-12. Sampling locations at MS-12 are in a depositional area west of Site 10 and south of Building 178 (TtNUS, November 2004a). Sediment sampling locations (AS12 locations) included as part the Additional Scrutiny Investigation (TtNUS, August 2005a) are in the MS-12 sampling area and in the Berths 4 and 5 area. The offshore area is discussed as part of OU4 in Section 5.0.

2.2 BACKGROUND INFORMATION

Site 10 is a small peninsula located in the CIA near the southern shore of PNS (see Figure 1-2). Site 10 is currently and has historically been located within an industrial area. The site is located on fill material that was placed prior to the 1920s. Building 238, located on Site 10, consists of office space; some minor battery recharging work is still performed but that process does not generate chemical waste. A map of the site layout is presented as Figure 2-1.

The grounds surrounding Building 238 and spanning Site 10 are covered by asphalt. A loading dock is located on the southern and eastern side of the building. The site is bounded by the Piscataqua River on the east and south. The southern portion of the western site boundary is formed by the Piscataqua River; however, the remainder of the western boundary is formed by an adjacent building (Building 303). The northern boundary consists of additional operational buildings. The Site 10 shoreline along the Piscataqua River from the west to the southeast is bounded by a quay wall of granite blocks. Berths 4 and 5 are located south and east of Building 238, respectively. Barges are commonly docked at the berths. A crawl space with an earthen floor exists beneath a portion of Building 238 and the loading dock. The ground elevation of the earthen floor is approximately 5 to 6 feet below the ground elevation outside the building and loading dock.

Building 238 was constructed in 1955. Lead-acid battery recharging operations were conducted within the building. Sulfuric acid used for the recharging was stored in large tanks inside Building 238. Large lead-

acid storage batteries were drained inside Building 238, and until 1974, the acidic discharges drained directly to the offshore through an industrial waste outfall (Site 5) (TtNUS, June 2006b; Weston, June 1983). In 1974, the acidic discharges were directed into a lead-acid drain pipeline to an underground storage tank. The drain line exited the building in the crawl space and then dropped vertically into the earthen floor of the crawl space. The acidic discharge flowed through the drain line through the floor of the building to a steel underground storage tank (Battery Acid Tank No. 24) of 9,680-gallon capacity. A leak was discovered in the tank in 1984, and the tank and surrounding contaminated soil were removed in 1986 (TtNUS, June 2006b). The location of the tank and excavation area are shown on Figure 2-1.

Soil and/or groundwater at Site 10 was investigated in 1991 as part of the RFI (McLaren/Hart, July 1992), in 1998 as part of the Site 10 Field Investigation (TtNUS, March 2000), and in 2001 as part of the Site 10 Additional Investigation (TtNUS, March 2003a). The investigations showed the fill material was rocky and ranged in thickness from 10 feet to 40 feet (particularly nearer to the shoreline). Gravel, bricks, and other building materials were also found in the fill material. Groundwater at the site is tidally influenced and is saline or brackish.

Based on evaluation of the data for Site 10, it was determined that lead was the primary contaminant of concern, and in addition to soils in the area of the tank leak, soils in the crawl space by the drain line had high concentrations of lead [greater than 10,000 milligram per kilogram (mg/kg)]. Groundwater concentrations did not indicate that groundwater was a medium of concern for human health exposure or for offshore impact. It was determined that additional information on the nature and extent of lead in soil in the areas with high concentrations of lead and on lead concentrations in groundwater were necessary before preparing the RI Report. The Site 10 Data Gap Investigation Quality Assurance Project Plan (QAPP) was finalized in 2006 (TtNUS, June 2006b), and the investigation was conducted In July and August 2006. The Navy is currently preparing the RI Report.

2.3 REMEDIAL ACTIONS

A final remedy has not been selected or implemented for OU1. This section discusses the current CERCLA status of the site and associated schedule.

2.3.1 Remedy Selection

Offshore discharge of lead-battery acid was discontinued in 1974, and discharge of lead-battery acid to the underground storage tank was discontinued in 1984. Residual lead contamination (at concentrations greater than risk-based screening levels) is present in the soil at Site 10. Low-levels of lead (less than risk-based screening levels) were found in groundwater at Site 10. An RI is currently being performed to determine the risks associated with site contamination. Based on the FY07 schedule for OU1 (Navy,

July 2006), the FS for OU1 will be prepared in 2008. A remedy for Site 10 contamination will be selected after the FS is finalized.

2.3.2 Remedy Implementation

A final remedy has not yet been chosen for OU1. Based on the FY07 RI/FS schedule for OU1 (Navy, July 2006), the ROD for OU1 is scheduled to be signed in 2009 and remedy implementation is scheduled to begin in 2010. Therefore, it is expected that a decision document will be signed for OU1 prior to the Second Five-Year Review, and additional information regarding the remedy would be provided at that time.

2.4 FIVE-YEAR REVIEW PROCESS

This section provides a summary of the five-year review process and the actions taken to complete this review.

2.4.1 Document and Data Review

The Site 10 Additional Investigation Report (TtNUS, March 2003a) and Site 10 Data Gap Investigation QAPP (TtNUS, June 2006b) were the primary documents reviewed for this five-year review. The Site 10 Additional Investigation Report indicated that lead in soil is the primary concern and that lead levels exceed acceptable risk levels for current and potential future site uses. As part of the Data Gap Investigation, additional investigation of lead-contaminated soil under Building 238 (in the crawl space) and by the tank was recommended to evaluate the nature and extent of lead, particularly by site source areas. Lead concentrations in site groundwater were less than acceptable risk levels; however, additional groundwater sampling for lead was included in the Data Gap Investigation to address regulatory concerns regarding potential groundwater migration at the site to the offshore. The fieldwork for the Data Gap Investigation was conducted in July (soil sampling) and August (groundwater sampling) 2006.

2.4.2 ARAR and Site-Specific Action Level Changes

A remedy has not been selected and a ROD has not been signed for OU1; therefore, ARARs and site-specific action levels have not been identified for OU1.

2.4.3 Site Inspection

Site 10 was visually inspected on August 29, 2006. Weather conditions during the inspection were cool (60 degrees Fahrenheit), drizzling, and overcast at high tide. TtNUS personnel conducted the inspection and were escorted by Shipyard personnel because Site 10 is in a controlled industrial area. No

conditions presenting an immediate threat or unacceptable risk were observed. Minor maintenance items were noted on the inspection log in Appendix A. The Shipyard has no plans to change the current use of the site, although the Shipyard is planning to eventually remove the large water tank (Building 303) on the western side of Building 238 when the electronic test facility is moved. The removal of this tank is not expected to affect Site 10 conditions or uses.

Photographs of the crawl space at Site 10 were taken by PNS personnel during the July 2006 fieldwork. A photograph of the crawl space is provided in Appendix B.

2.5 TECHNICAL ASSESSMENT

A final remedy has not been selected for OU1; therefore, conclusions cannot be made at this time to support the determination that a remedy for OU1 is protective of human health and the environment. The 2006 field investigation and the 2006 site inspection do not indicate any imminent threats to human health or the environment. The site is in a controlled industrial area with restricted access, and contaminated soil is covered by asphalt or Building 238. The area is designated on the Shipyard land use control map as an IRP site. As discussed in Section 1.1, Shipyard policy restricts digging and excavation activities without a permit from the PNS Environmental Division and groundwater is not used at PNS.

2.6 ISSUES

A final remedy has not been implemented at OU1; therefore, deficiencies cannot be determined at this time. Minor maintenance items noted during the first five-year review site inspection are listed in Appendix A.

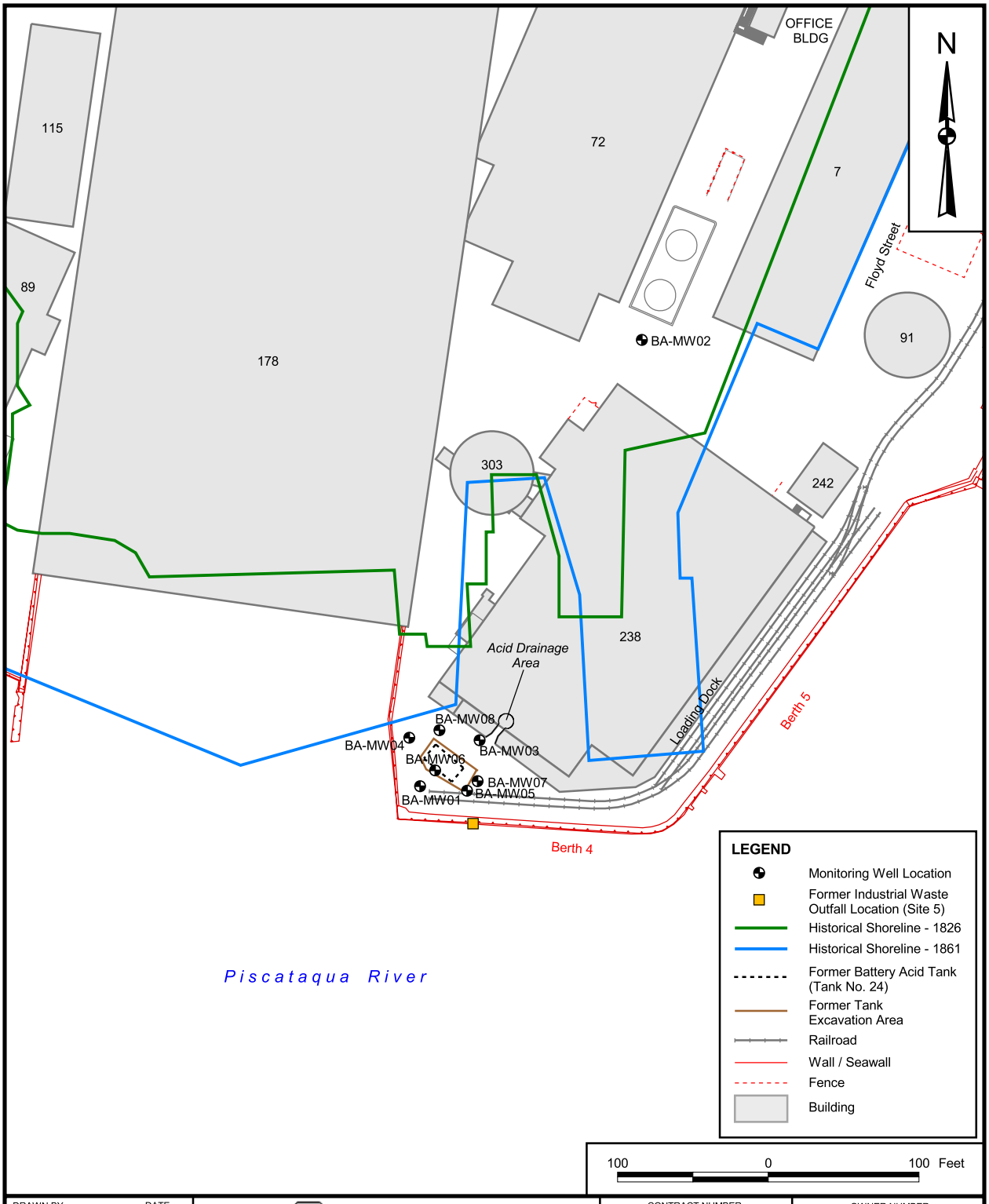
2.7 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

It is recommended that the RI/FS be completed to determine the appropriate remedial action for Site 10 that is protective of human health and the environment. An appropriate decision document will be prepared after the RI/FS is completed to document the selected remedial alternative for Site 10 and to document NFA for Site 21. The Navy/PNS should address the minor maintenance items (see Appendix A) and continue to enforce the Shipyard dig policy. Any planned and approved digging or excavation in the area should be conducted following the appropriate health and safety protocols for a hazardous waste site, and any excavated material should be managed appropriately.

2.8 PROTECTIVENESS STATEMENT

A remedy for OU1 has not yet been selected. The results of investigations do not indicate any imminent threats to human health or the environment under current land use scenarios. Current site conditions and

Shipyard policies provide for protection of human health and the environment until a final remedy is selected.



DRAWN BY	DATE	Tetra Tech NUS, Inc.	CONTRACT NUMBER	OWNER NUMBER
A. JANOCHA	3/30/04		1291	CTO 022
CHECKED BY	DATE	SITE 10 LAYOUT FIVE-YEAR REVIEW REPORT PORTSMOUTH NAVAL SHIPYARD KITTERY, MAINE	APPROVED BY	DATE
D. COHEN	4/12/07			
COST/SCHEDULE-AREA			APPROVED BY	DATE
SCALE			DRAWING NO.	REV
AS NOTED			FIGURE 2 - 1	0

P:/GIS/PORTSMOUTH_NSY/APR/SITE10.APR SITE LAYOUT - FIVE YEAR REPORT 4/12/07 SP

3.0 OPERABLE UNIT 2

OU2 consists of Site 6 – DRMO Storage Yard, Site 29 – Former Teepee Incinerator Site, and DRMO Impact Area – Quarters S, N, and 68. An RI/FS is currently being conducted for OU2. Although OU2 is still under investigation under CERCLA, a five-year review is being conducted because hazardous substances, pollutants, or contaminants remain on site in excess of levels that allow for unlimited use and unrestricted exposure. No decision documents have been prepared for OU2.

3.1 HISTORY AND SITE CHRONOLOGY

The history of environmental activities at PNS is discussed in Section 1.2.2. A list of important OU2 historical events and relevant dates in site chronology is shown below. The identified events are illustrative, not comprehensive.

Event	Date
OU2 area filled with material excavated from Henderson's Point	1902 to 1905
DRMO activities began (stone crusher and scrap metal yard)	1920
Additional filling and disposal at OU2 (in waste disposal area)	1920 to 1975/1979
Seawall constructed	1940s
Coal and coke storage facility located at Site 6 (Building 172)	1942 to 1957
Sandblast grit (unused) storage located at Site 6 (Building 172)	1957 to 1960
Teepee Incinerator (Building 290) operated	1965 to 1975
Building 298 used as industrial waste treatment facility	1975 to 1980s
Hose handling facility located at Site 29 (Building 310)	1980 to present
Pesticide handling conducted at Building 314	1982 to 1995
Open storage of batteries at DRMO discontinued	1983
Environmental sampling began at OU2 (as part of FCS)	1984
RFI and RFI Data Gap investigation conducted at Site 6 (including what is now Site 29)	1989 to 1992 and 1995
DRMO capped as an interim corrective measure	1993
Clean closure of industrial waste treatment facility (Building 298)	1997
Portion of Site 6 separated into a new site (Site 29) and field investigation at Site 29 conducted	1998
Emergency Removal Action (shoreline stabilization) at Site 6	1999
Excavation for utility trench at Building 298 conducted	2002
Draft FS prepared for OU2	2004
Soil washing treatability study conducted	2005
Emergency Removal Action (shoreline stabilization) conducted at Site 29	2005 and 2006

The offshore area of OU2 is part of the DRMO AOC that was investigated as part of the EERA and is part of the more recent interim offshore sampling at monitoring station MS-11. Sampling locations at MS-11 are in a depositional area east of OU2 (east of the seawall at Site 29) and along the OU2 shoreline (mussel sampling locations) (TtNUS, November 2004a). Samples of eroding material along the shore of OU2 and a catch basin sample (AS11 locations) were included as part of the Additional Scrutiny Investigation (TtNUS, August 2005a). The offshore area is discussed as part of OU4 in Section 5.0.

3.2 BACKGROUND

OU2 is located in the south-central portion of PNS as shown on Figure 1-2. The OU2 layout is shown on Figure 3-1. Since the area was filled, Sites 6 and 29 within OU2 have been industrial and commercial areas. The DRMO Impact Area, included in OU2 because this area was thought to be impacted by particulate deposition from DRMO activities, has been a residential (military) area since before 1900.

The current DRMO area is the fenced area south of Quarters S and N and west of Building 298. The DRMO is responsible for the reuse, transfer, donation, sale, or disposal of excess and surplus DoD property in New England. DRMO operations are conducted in the paved portion of the fenced area; the area that was capped in 1993 is covered with grass and barricaded from use for any activities. The operations use temporary trailers and buildings; there are no permanent buildings located at the DRMO. Building 298 is used for office space, and Building 310 is the hose handling facility. There are no hazardous waste-related activities at the site, and hazardous chemicals are not used as part of any of the current site operations.

OU2 is located along the Piscataqua River. The OU2 shoreline is steeply sloped and the shoreline has shoreline erosion controls (riprap and a seawall). The shoreline controls that include riprap were placed along portions of the shoreline in 1999, 2005, and 2006 as part of emergency removal actions to provide shoreline protection along the OU2 shoreline. The OU2 shoreline is difficult and dangerous to access because of the strong river currents and the location at the base of a steep embankment. There is a small intertidal sediment area adjacent to OU2 to the east.

After Site 6 and the majority of Site 29 were filled in the early 1900s, the area was used for DRMO operations (from approximately 1920). Over the time the area was used as a DRMO, materials reportedly stored at the DRMO included lead and nickel-cadmium battery elements, motors, typewriters, paper products, and scrap metal. The major hazardous materials of concern were the lead battery cells and plates that were stockpiled on uncovered pallets. Nickel-cadmium batteries were also stored in the same manner. Historically, DRMO operations primarily appear to have occurred in the current fenced area of the DRMO, but operations could have occurred in areas directly adjacent to the DRMO. Operations, such as open storage of batteries and other materials, that could cause contaminants to be leached or otherwise released by pathways such as infiltration or runoff was terminated in approximately 1983. In

1993, interim corrective measures were conducted for a portion of the DRMO and included the capping and paving of sections of the area, installation of storm water controls, and installation of a new concrete curb (McLaren/Hart, April 1993).

The main activities that occurred in the Site 29 area are related to open burning, waste disposal, and industrial incineration. Filling of the remaining portion of OU2 may have begun in the 1920s. This area was apparently filled with paper, wood, rubbish, and ash, and is referred to as the waste disposal area. The ash is reportedly from open burning of trash that was conducted in the waste disposal area from approximately 1918 until 1965, when the teepee incinerator was built. Ash from the teepee incinerator was also disposed in the waste disposal area. Onsite disposal reportedly ended in 1975 when trash was being taken off site for disposal. Also, construction drawings of Building 298 from 1973 and of Building 310 from 1980 and Shipyard maps from the mid- to late 1970s support that disposal in the waste disposal area ended between 1975 and 1979 (between when Building 298 and Building 310 were constructed). Materials identified in soil borings located in the waste disposal area are generally consistent with the background information; waste materials observed in the borings include ash, cinders, wire, glass, wood, and metal pieces. Asbestos was also found during the excavation of the Building 310 foundation, which is located over the waste disposal area.

The teepee incinerator was built in 1965 and used to burn waste material until 1975. The teepee incinerator (Building 290) was used primarily for disposal of wood, paper, and rubbish, with occasional burning of cans of paint and solvents. Ash from the incinerator was deposited south of the incinerator until 1971 when the residue began to be landfilled in the JILF (at OU3, located approximately 1,000 feet northeast of OU2) and the Kittery municipal landfill. The incinerator ceased operations in 1975. The incinerator was apparently demolished soon after operations ended.

Building 298 was built in 1975 and was used as an industrial waste treatment facility until the 1980s. Industrial waste waters were treated in the facility and the treated effluent from the facility was discharged to the Shipyard's sanitary sewer system (and then the Kittery Municipal Treatment Plan). Sludge generated in the treatment process was disposed by a private contractor. Spill prevention and control methods were in place during operation of the facility and there were no releases that would affect soil or water outside the building. Clean closure under RCRA was documented in May 1997 and accepted by the MEDEP in November 1997. The building is currently used as office space. In 2002, a utility trench was excavated to place new utilities to service the offices. The excavated soil was disposed as hazardous material, the trench was backfilled with clean fill material, and the trench is considered a clean area within the OU2 boundary. Building 310 was built around 1980 and is used as a hose handling facility.

Environmental sampling began at OU2 in 1984 as part of the FCS (LEA, June 1986). OU2 has been included in various investigations since then including the RFI (McLaren/Hart, July 1992), RFI Data Gap Investigation (Halliburton NUS, November 1995), groundwater monitoring (TtNUS, August 1999), Site 29 field investigation (TtNUS, March 2000), 1999 removal action at Site 6 (FWENC, June 2001), Building 298 trenching (TtNUS, November 2002), and OU2 soil washing treatability study (TtNUS, January 2006a). The investigations showed that Site 6 and much of Site 29 (in the area filled in the early 1900s as part of Henderson's Point excavation), consists of angular rock fragments overlain by general fill material composed of sand and gravel with minor amount of wood and metal debris and cinders. In the remaining fill area of OU2, sand, gravel, and silt overlie waste fill that includes cinders, ash, plastic, glass, wire, and other waste materials. Fill thicknesses generally range from approximately 6 feet to 23 feet; however, the maximum fill thickness is approximately 40 feet (along the shoreline in the waste disposal area). The groundwater at OU2 is tidally influenced and is generally brackish or saline.

The Sites 6 and 29 data indicate that the main contaminants in soil are metals (particularly lead), polycyclic aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs) and in groundwater are metals. Except for possibly just north of the DRMO fenceline, the DRMO Impact Area does not appear to have been impacted by operations at Sites 6 or 29. OU2 has little natural areas that would be a habitat for onshore ecological receptors. The human health risk assessment (TtNUS, November 2000) indicated unacceptable risks for current and future potential receptors exposed to Site 6 or Site 29 soils; risks were acceptable for exposure to groundwater and soils in the DRMO Impact Area. Contaminant fate and transport modeling conducted for OU2 (TtNUS, December 1999) indicated that migration of groundwater to the offshore was not anticipated to impact the offshore. A draft FS was prepared for OU2 in 2004 (TtNUS, November 2004b) to identify and evaluate potential remedial options. Based on regulatory comments, the Navy determined that additional investigation to better define the extent of soil contamination at OU2 was necessary to refine potential remedial options in the FS. Additional groundwater data are also needed to address regulatory concerns regarding groundwater migration to the offshore. The Navy is currently preparing a QAPP for the additional investigation at OU2 (including the area adjacent to the north of the DRMO fenceline). After conducting the investigation, the Navy will prepare a supplemental RI and revised draft FS.

Sampling activities as part of the Additional Scrutiny Investigation for OU4 (discussed further in Section 5.0) included samples of soil eroding along the top of the Site 29 shoreline (TtNUS, August 2005a). The data showed that the erosion was likely the cause of the elevated metals (copper, lead, nickel) observed in offshore sediments (TtNUS, February 2006). Shoreline controls were placed in the eroding areas in November 2005 and June 2006 as part of emergency removal actions (TtEC, October 2005 and September 2006). As part of the June 2006 activities, surficial debris (including metal pieces and wires)

was removed in the eastern portion of Site 29 and the area was covered with gravel. Figures showing as-built conditions for the shoreline controls are provided in Appendix A.

3.3 REMEDIAL ACTIONS

A final remedy has not been selected or implemented for OU2. This section discusses the current CERCLA status for OU2 and the associated schedule.

3.3.1 Remedy Selection

The main sources of contamination at the DRMO have been discontinued, and the areas with higher contamination levels have been capped or covered with asphalt. The wastes in the waste disposal area are covered with topsoil/vegetation or buildings. Incineration and waste disposal activities were discontinued in the 1970s. Interim measures (capping and asphalt) were conducted at Site 6 in 1993. Emergency removal actions to stabilize portions of the OU2 shoreline were conducted in 1999, 2005, and 2006. A draft FS for OU2 (TtNUS, November 2004b) was prepared to identify and evaluate remedial options for contaminated soil at OU2 to protect onshore human receptors and offshore ecological receptors. Groundwater was not identified as a medium of concern based on risk evaluation. Based on regulatory comments on the draft FS, the Navy determined that additional investigation was necessary before completing the FS. A supplemental RI will be performed and a revised draft FS will be prepared. Based on the FY07 schedule for OU2 (Navy, July 2006), the FS will be revised in 2008. Remedies for OU2 will be selected after the FS is finalized.

3.3.2 Remedy Implementation

A final remedy has not yet been chosen for OU2. Based on the FY07 RI/FS schedule for OU2 (Navy, July 2006), the ROD for OU2 is scheduled to be signed in 2009 and remedy implementation is scheduled to begin in 2010. Therefore, it is expected that a decision document will be signed for OU1 prior to the Second Five-Year Review, and additional information regarding the remedy would be provided at that time.

3.4 FIVE-YEAR REVIEW PROCESS

This section provides a summary of the five-year review process and the actions taken to complete this review.

3.4.1 Document and Data Review

The draft OU2 FS (TtNUS, November 2004b), Removal Action Work Plan for Site 29 Shoreline Stabilization (TtEC, October 2005), and Closeout Report for the Site 29 Removal of Waste Debris (TtEC, September 2006) were the primary documents reviewed as part of the five-year review for OU2. The draft OU2 FS compiled information from the various investigations conducted at or near OU2 before November 2004. During preparation of the FS, erosion along the OU2 shoreline was noted. Additional Scrutiny sampling of the eroding material was conducted in May 2005, and results were presented in the data package for the sampling (TtNUS, February 2006). The investigation results showed that there were visual signs of soil erosion that would indicate contaminated soil is potentially being released to the offshore area, there was metal debris in the eroding soil areas, and elevated levels of metals (copper, lead, and nickel) were found in the soil samples from the eroding areas. The soil adjacent to the offshore monitoring station sampling location (MS-11, location 3) in the sediment depositional area at the eastern end of the seawall had the greatest metals concentrations, which were greater than the metals concentrations in sediment. The Navy stabilized in the eroding portions of the shoreline in 2005 and 2006 and removed surficial debris from Site 29 during the 2006 work.

3.4.2 ARAR and Site-Specific Action Level Changes

A remedy has not been selected and a ROD has not been signed for OU2; therefore, ARARs and site-specific action levels have not been identified for OU2.

3.4.3 Site Inspection

Site 29 was visually inspected on August 29, 2006. Weather conditions during the inspection were cool (60 degrees Fahrenheit), damp, and overcast at high tide. Site 6 was inspected on September 25, 2006. Weather conditions during the inspection were cool (60 degrees Fahrenheit), and cloudy. The OU2 shoreline was viewed at low and high tides on January 16, 2007. Weather conditions were cold. The inspections were performed by TtNUS personnel escorted by Shipyard personnel. No conditions presenting an immediate threat or unacceptable risk were observed. Minor monitoring well maintenance items were noted on the inspection log in Appendix A. Asphalt in the DRMO area was not in good condition; however, no areas of exposed soil were observed. This area is within the fence around the DRMO which is secured and locked. Access to the DRMO is restricted to personnel working at the DRMO. Foot traffic in this area is minimal; most personnel working in the DRMO use motorized equipment such as fork lifts, etc.

The recently constructed shoreline controls at Site 29 were observed, and it appears that the previously exposed shoreline material is covered and well protected from erosion. The Shipyard recently installed a

paper shredder facility in Building 298 at Site 29. A portion of the facility (dumpster) is outside on the southern side of the building. The Shipyard has no other plans to change the current use of Site 29. The Shipyard is planning to eventually remove the DRMO operations from the Site 6 area; however, a schedule has not been determined.

Photographs of the shoreline controls were taken by PNS personnel. The photographs are provided in Appendix B.

3.5 TECHNICAL ASSESSMENT

A final remedy has not been selected for OU2; therefore, conclusions cannot be made at this time to support the determination that a remedy at OU2 is protective of human health and the environment. An Interim action was conducted in 1983 to address soil contamination at Site 6 before a final remedy is selected. Time-critical removal actions were conducted in 1999, 2005, and 2006 to address shoreline erosion concerns along the OU2 shoreline. Surficial debris in the wooded area on the eastern side of Site 29 was removed during the 2006 removal action, and the area was covered with gravel. The August and September 2006 site inspections do not indicate any imminent threats to human health or the environment. During the preparation of the OU2 FS, it was determined that additional investigation is necessary to develop and evaluate remedial options for OU2. The Navy is preparing a work plan for the additional investigation; subsequent to the investigation, the OU2 FS will be updated and finalized. The majority of contaminated materials at OU2 are covered by asphalt, cap, or buildings. Other areas are vegetated, but there are no areas of exposed contaminated materials; contaminated materials are in the subsurface in these areas. The area is designated on Shipyard land use maps as IRP Sites 6 and 29. As discussed in Section 1.1, Shipyard policy restricts digging and excavation activities without a permit from the PNS Environmental Division and groundwater is not used at PNS.

3.6 ISSUES

A final remedy has not been implemented at OU2; therefore, deficiencies cannot be determined at this time. Minor monitoring well maintenance items were noted on the inspection log in Appendix A. The asphalt at Site 6 (in the DRMO) was in disrepair; however, no areas of exposed soil were observed. This area is within the fence of the DRMO and access to the DRMO, is restricted to personnel working at the DRMO.

3.7 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

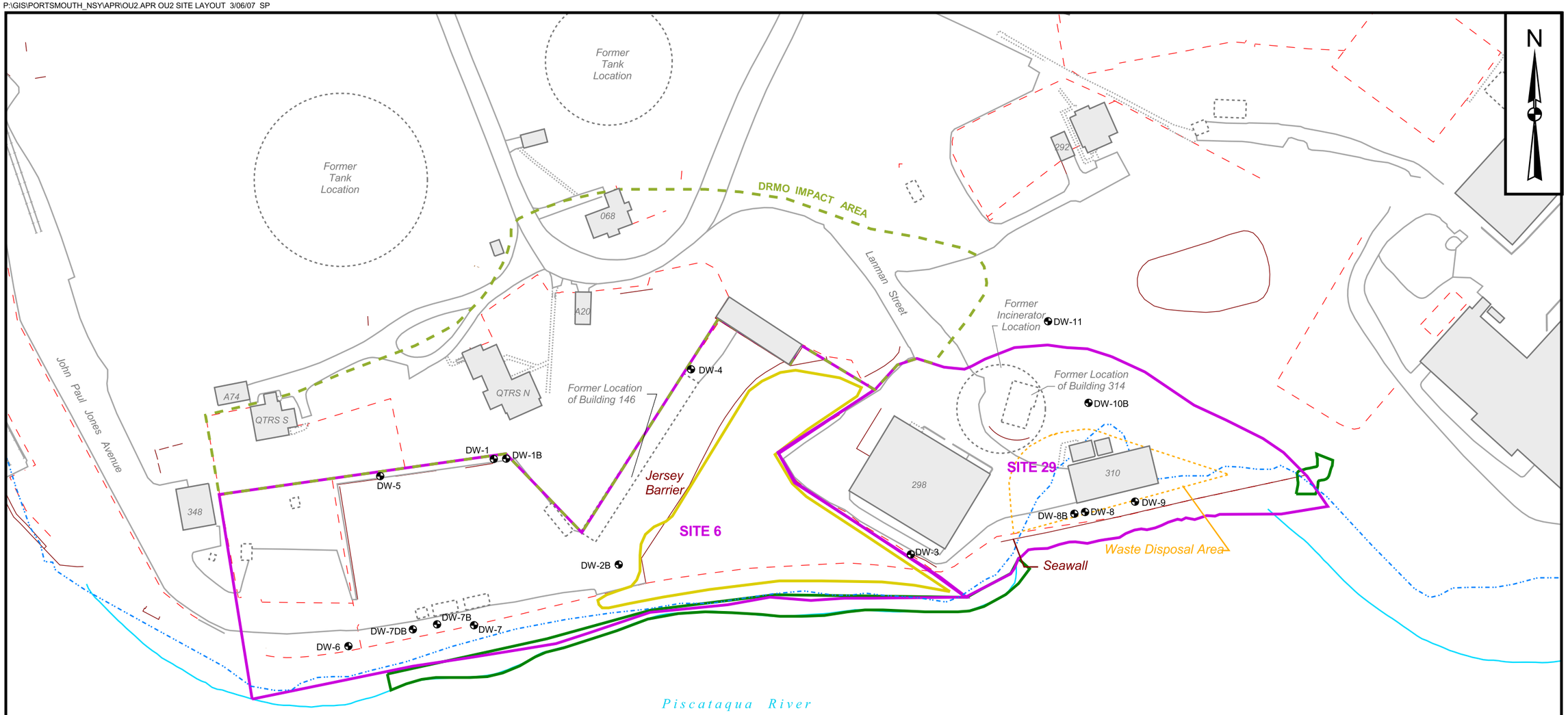
It is recommended that the RI/FS be completed to determine the appropriate remedial action for OU2 that is protective of human health and the environment. An appropriate decision document will be prepared

after the RI/FS is completed to document the selected remedial alternative for OU2. The Navy/PNS should address the maintenance items (see Appendix A) and continue to enforce the Shipyard dig policy. Any planned and approved digging or excavation in the area should be conducted following the appropriate health and safety protocols for a hazardous waste site, and any excavated material should be managed appropriately.

3.8 PROTECTIVENESS STATEMENT

A remedy at OU2 has not yet been selected. The results of investigations and removal/interim actions for OU2 do not indicate any imminent threats to human health or the environment under current land use scenarios. The primary use of OU2 is industrial and commercial, the future planned land use is anticipated to remain the same, and much of the area is capped or paved. Current site conditions and Shipyard policies provide for protection of human health and the environment until a final remedy is selected.

P:\GIS\PORTSMOUTH_NSY\APR\OU2.APR OU2 SITE LAYOUT 3/06/07 SP



Legend

- Monitoring Well Location
- Approximate Boundary of DRMO Impact Area
- Approximate Site Boundary
- Shoreline Erosion Controls
- Clay/Concrete Cap
- Building/Structure
- Former Building/Tank
- Fence
- Wall/Jersey Barrier
- Shoreline
- Historical Shoreline - 1910
- Road
- Railroad
- Sidewalk

Notes
1) Building 146 was removed in 2003/2004

100 0 100 Feet

DRAWN BY S. PAXTON DATE 10/25/06	Tetra Tech NUS, Inc.	CONTRACT NUMBER 1291	OWNER NUMBER CTO 022
CHECKED BY D. COHEN DATE 3/06/07	OU2 LAYOUT MAP FIVE-YEAR REVIEW REPORT PORTSMOUTH NAVAL SHIPYARD KITTERY, MAINE	APPROVED BY — DATE —	
COST/SCHEDULE-AREA		APPROVED BY — DATE —	
SCALE AS NOTED		DRAWING NO. FIGURE 3 - 1	REV 0

4.0 OPERABLE UNIT 3

OU3 consists of Site 8 - JILF, Site 9 - Former Mercury Burial Sites (MBI and MBII), and Site 11 - Former Waste Oil Tanks Nos. 6 & 7. This five-year review of OU3 is required by statute because hazardous substances, pollutants, or contaminants remain on site that do not allow for unlimited use and unrestricted exposure. The selected remedy in the ROD for OU3 was to install a hazardous waste landfill cover and to implement institutional controls, erosion controls, and monitoring (Navy, August 2001c). In addition, a 2003 Explanation of Significant Difference (ESD) for the ROD (Navy, September 2003) described excavation and consolidation of material within the limits of the JILF, which was completed in 2002, and construction of the wetlands within the excavated area, which was completed in 2003. Cap construction was completed in September 2004. A second ESD was issued in 2005 (Navy, October 2005) to recombine management of groundwater migration (formerly OU6) with the source control remedy (OU3). The OM&M program for OU3 was initiated in July 2006. Rounds 1 and 2 sampling and inspection activities were conducted in July and December 2006, respectively; however, the results were not available for inclusion in this five-year review. Round 1 maintenance activities were conducted in October 2006 as discussed in Section 4.4.3.

The JILF Impact Area, Former CDC, was previously included as part of Site 8; however, based on the OU3 ROD (Navy, August 2001c), this area was separated from Site 8 and further investigated separately. Based on the results of an investigation in 2003, it was determined that no further action is necessary for this area (TtNUS, April 2004). Therefore, this area is not discussed as part of the five-year review for OU3.

4.1 HISTORY AND SITE CHRONOLOGY

The history of environmental activities at PNS is discussed in Section 1.2.2. A list of important OU3 historical events and relevant dates in the site chronology is shown below. The identified events are illustrative, not comprehensive.

Event	Date
Use of underground storage tanks at Site 11 to store waste oil before offsite disposal began	1943
Landfilling of tidal flats east of Seavey Island and west - southwest of Jamaica Island began	1945
Poured concrete blocks and precast concrete pipes containing mercury-contaminated wastes buried in two locations (MBI and MBII) at the JILF	Between 1973 and 1975
Dredged sediment from the Dry Dock area disposed at the JILF and landfilling of the area discontinued	1978
IAS identifies the JILF and MBI and MBII as sites	1983

Event	Date
Environmental investigations began at OU3 (as part of the FCS)	1984
Use of tanks at Site 11 discontinued and tanks and surrounding soil removed	1989
RFI and RFI Data Gap investigations conducted	1989 to 1992 and 1994
Pipe and blocks (three) removed from MBI and disposed off site	1994 and 1997
Geophysical survey of OU3 conducted	1998
Blocks (eight) removed from MBII and disposed off site	2000
Revised OU3 Risk Assessment and FS for OU3 prepared	2000
Test pitting investigation conducted based on results of geophysical survey; 40 drums containing non-hazardous material located and removed	2000
ROD for OU3 signed	2001
Phase I remedial design completed, evaluation of consolidation for MBII area and Jamaica Cove area conducted, and Phase II remedial design completed	2002
Significant construction of remedy started	2002
Changes to OU3 ROD document in ESD documents	2003 and 2005
Remedy construction completed	2004
Remedial action construction report completed	2006
Post-remedial OM&M plan finalized without the Land Use Control Remedial Action Plan (see Section 4.4.1.)	2006
OU3 Round 1 post-remedial groundwater and landfill gas monitoring and inspection conducted	July 2006
OU3 Round 1 post-remedial maintenance activities conducted	October 2006
OU3 Round 2 post-remedial groundwater and landfill gas monitoring and inspection conducted	December 2006

The offshore area of OU3 is part of the Jamaica Cove and Clark Cove AOCs that were investigated as part of the EERA and are part of the more recent interim offshore sampling at monitoring stations MS-5 through MS-9. Sampling locations are within the intertidal and subtidal areas of Jamaica and Clark Coves (TtNUS, November 2004a). Sediment sampling locations (AS05 and AS09 locations) are included as part of the Additional Scrutiny Investigation (TtNUS, August 2005a). The offshore monitoring results are discussed as part of OU4 (Section 5.0).

4.2 BACKGROUND

OU3 is located in the eastern portion of PNS as shown on Figure 1-2. The current OU3 layout is shown on Figure 4-1. The current OU3 area is approximately 22 acres and is used for parking, occupational uses, and recreational uses. Wetlands are located adjacent to the northern end of OU3, by Jamaica Cove. The hazardous waste storage facility (Building 357) is located to the northeast, and waste material extends under a portion of the paved area to the west of the building. Clark Cove is to the east of the landfill. The solid waste storage facility (Building 337) is located to the south. The Automotive Hobby Shop and hospital are located to the west. Waste material in the saturated zone extends under a portion

of the paved area at the Automotive Hobby Shop. The current features reflect post-remedial construction conditions.

Site 8 is the landfill (JILF) and Sites 9 and 11 were located within the JILF boundary. The Navy used the JILF, which previously consisted of tidal mudflats, as a disposal area from 1945 to 1978 for general refuse, trash, construction rubble, dredged sediment, and various industrial wastes. The boundary of OU3 is defined by the boundary of the landfill. Prior to the OU3 remedy, the landfill was 25 acres; however, landfill material from 3 acres adjacent to Jamaica Cove were excavated as part of the remedy and this area was removed from the landfill footprint. Mercury burial vaults (MBI and MBII) were placed in two locations within the landfill in the 1970s and then removed (intact) and disposed off site in the 1990s/early 2000. There is no indication that mercury from the vaults has contaminated surrounding soil or groundwater. The waste oil tanks at Site 11 were used from 1943 to 1989. The tanks were removed intact along with surrounding soil in 1989. Soil contamination remaining in the vicinity of Site 11 appears to be landfill material mixed with petroleum materials that may have originated from spills during filling of the tanks formerly at Site 11.

Environmental sampling began at OU3 in 1984 as part of the FCS (LEA, June 1986). OU3 has been included in various investigations including the RFI, RFI Data Gap investigation, groundwater monitoring and seep and sediment sampling in the intertidal area in 1996 and 1997, geophysical survey, and test pitting investigation. Removal actions were also conducted to remove the vaults at MBI and MBII. As discussed in the OU3 ROD (Navy, August 2001c), OU3 is characterized as containing a large volume of low-level hazardous materials. There is no indication of residual contamination from Site 9 (mercury), and soil contamination remaining in the vicinity of Site 11 appears to be landfill material mixed with petroleum materials that may have originated from spills during filling of tanks formerly located at Site 11. Soil and groundwater data for Sites 8, 9, and 11 show similar chemical contamination throughout the area of the landfill. A variety of organic and inorganic constituents were detected in soil and groundwater and include volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), PCBs, pesticides, metals, and petroleum hydrocarbons. During the 2000 test pitting at the JILF (in February/March), dioxin analysis of selected subsurface soil samples was conducted and low levels of dioxins were detected. The contamination distribution at the three sites is consistent with the heterogeneous nature of the materials that were landfilled at the JILF (i.e., a range of concentrations of a variety of chemicals was detected in the JILF suggesting a heterogeneous mixture of wastes in the landfill).

The risk assessment for OU3 showed that remedial action was necessary and the FS was prepared in 2000. The ROD for OU3 was signed in 2001. The United States Army Corps of Engineers (US Army) performed the Remedial Design for OU3 in 2002 and 2003. Tetra Tech EC, Inc. (TtEC) performed the remedial action for OU3 in 2002 through 2004.

4.3 REMEDIAL ACTIONS

The selected remedial alternative as documented in the OU3 ROD (Navy, August 2001c) was a hazardous waste landfill cover, institutional controls, erosion controls and monitoring. The ROD was revised based on ESD documents in 2003 (Navy, September 2003) and 2005 (Navy, October 2005).

4.3.1 Remedy Selection

The following are the Remedial Action Objectives (RAOs), as provided in the OU3 ROD, that address exposure to materials within the JILF boundary (OU3) based on risks to potential receptors (human and ecological):

1. Prevent human exposure through ingestion, dust inhalation, and dermal contact to contaminated soils and/or waste within the landfill at unacceptable levels.

2. Prevent human exposure through ingestion of contaminated groundwater at unacceptable levels.

3. Prevent erosion of contaminated soils and/or waste on the edge of the landfill to the Piscataqua River or the Back Channel.

4. Provide for JILF's current and future uses (organized and unorganized sports, equipment storage, and parking) while providing sufficient protection of human health and the environment.

The following RAO was added to the OU3 remedy as part of the 2005 ESD document based on the addition of management of migration:

- Ensure that the migration of groundwater contaminants does not adversely impact the offshore environment.

The selected remedy for source control for the JILF (OU3) includes the following components:

- A multiple layer cover over the landfill surface to prevent receptors on the surface from coming into contact with contaminated soil and/or waste and to minimize infiltration of water to the landfill material. Portions of the JILF that have buildings and structures were not covered by the hazardous waste landfill cover.

- Institutional controls to restrict land and fresh water groundwater uses within the JILF boundary to prevent unacceptable human exposure to site contaminants. Institutional controls will also be used to prevent unrestricted disturbance of the hazardous waste landfill cover, shoreline erosion controls, and buildings and structures within the boundary of the JILF.

- Shoreline erosion controls, including rip-rap and/or wetlands created along the shoreline, to minimize the potential for washing away of soil and/or waste materials from the edge of the JILF.

- Monitoring of site media to assess the effectiveness of the remedy over the long term.

- Routine inspections and maintenance of the cover, shoreline erosion controls, and institutional controls to ensure continued effectiveness.

- Five-year site reviews to confirm that RAOs are being achieved and that the remedy remains protective.

The selected remedy addressed source control for OU3 (i.e., soil and groundwater within the boundary of the JILF). However, based on the ESD signed in October 2005, management of groundwater migration (formerly OU6) is included in the remedy for OU3 (Navy, October 2005). Therefore, components of the remedy (monitoring and five-year site review, in particular) also address management of migration.

As part of the ROD, the Navy agreed to re-evaluate the feasibility of consolidating portions of the landfill, the Jamaica Cove area, and the area surrounding the former MBII into the remaining portions of the landfill. Removal of waste material from both areas and consolidation in the remaining landfill area would reduce the extent of the hazardous waste landfill cover and reduce the quantity of waste in contact with groundwater. Based on the evaluation, it was decided that waste would be removed from the Jamaica Cove area but not from the MBII area. Removal of waste material in the vicinity of Jamaica Cove provided the additional benefit of removing landfill material from a tidally influenced area and provided area for the construction of wetlands. Removal of waste material in the former MBII area was considered so that the Navy could locate the discharge from two freshwater ponds that is believed to enter the landfill in this area, allowing the discharge to be directed away from the landfill, reducing the amount of groundwater flowing into this portion of the landfill. This discharge point was rerouted without waste removal to discharge into a surface drainage channel adjacent to the final landfill cover. The ESD documents the revisions to the ROD for: (1) excavation of contaminated soil/waste from an approximately 2.6-acre area bounded by Parker Avenue, Stephenson Road, and Jamaica Cove; (2) consolidation of the excavated material within the limits of the JILF south of Parker Avenue; and (3) construction of wetlands within the excavated area. In addition, it was determined that the waste in

the area of the Automotive Hobby Shop (see Figure 4-1) was removed to the groundwater table, backfilled with clean material, and paved with asphalt. This area was not included under the landfill cover. Following excavation, a geotextile was placed beneath the clean fill to delineate the boundary, which would assist during any future excavation in this area.

The selected remedy for OU3 addresses the current and future potential threats to human health and the environment by providing a cover to prevent human exposure to landfill materials, by implementing institutional controls to prevent use of site groundwater for drinking and to prevent land use that is not compatible with the cover, by providing shoreline erosion controls to prevent erosion of landfill material from the edge of the landfill, and by monitoring site media to assess the effectiveness of the remedy and to determine the need for additional action, if warranted, based on the monitoring results. Institutional controls are being used to prevent unrestricted disturbance of the hazardous waste landfill cover, shoreline erosion controls, and buildings and structures within the boundary of the JILF. Routine inspections and maintenance of the cover, erosion controls, and institutional controls are being conducted to ensure that the remedy remains effective over the long term. The inspection and maintenance activities also include verification activities to determine whether the buildings and structures with the JILF boundary are still in place.

4.3.2 Remedy Implementation

The US Army prepared the OU3 Phase I Remedial Design (June 2002a; June 2002b; and June 2002c), and Phase II Remedial Design (US Army, November 2002). In Phase I, the portion of the landfill adjacent to Jamaica Cove was excavated and consolidated within other portions of the landfill. Within the excavated area, a salt marsh wetland was established and shoreline rock protection was constructed to minimize the effects of wave action in Jamaica Cove. The Phase I design was completed in June 2002.

The Phase II design was completed in November 2002 and included the design of the remaining portions of the remedy. The Phase II remedial action includes the hazardous waste landfill cover, shoreline protection for Clark Cove, parking lots, surface drainage and erosion controls, recreational facilities (softball field and running track), and various ancillary items (e.g., lights, fencing, etc.)

TtEC was the Navy's environmental construction contractor for this project. Phase I of the project began on June 24, 2002, and the consolidation activities were completed in September 2002. The wetlands planting (salt marsh plants) was completed in spring 2003. Phase II of the remedial action started in the spring of 2003 and was completed in September 2004.

The landfill cover includes both a vegetated and a paved cover system. The vegetated cover system consists of the following components (from top to bottom):

- 6-inch-thick layer of topsoil
- 18-inch-thick (minimum) layer of select fill varied to accommodate drainage layer slope, (maximum thickness was 42-inches)
- Geosynthetic drainage layer
- Geomembrane
- Geosynthetic clay liner (GCL)
- Low permeability soil layer
- Gas collection layer

The top two layers (topsoil and select fill) are incorporated into the cover system to protect the underlying low permeability layers from physical damage, freeze/thaw cycles, and ultraviolet light. The topsoil is specifically included to ensure that a good stand of grass is established to limit erosion of the cover. The select fill will also provide an additional depth of soil to allow for grass growth.

The geosynthetic drainage layer is included to remove any water that infiltrates through the overlying layers. The removal of water will reduce the head on the underlying low permeability layers, and this will increase the stability of the cap system. Also, in the event of a small defect in the low permeability layers, a reduced head will also reduce any leakage through the cover system.

The geomembrane is the primary layer that will limit infiltration through the cap system. The GCL is included to stop any water that might get through the geomembrane because of a defect. The low permeability soil would also retard the downward migration of any water that might get though the geomembrane and GCL. The gas collection layer will collect any gases produced under the low permeability layers and convey the gas to collection strips and then finally to vents to the atmosphere.

The paved cover system design consists of the following components (from top to bottom):

- Pavement (asphalt or Portland cement concrete)
- Aggregate base
- Geosynthetic drainage layer
- Geomembrane
- GCL
- Low permeability soil layer
- Gas collection layer

As in the vegetated cover system, the top two layers provide protection of the underlying low permeability layers by physically separating those layers from physical hazards. The paved cover system also

provides the added utility of allowing vehicular traffic. Depending on the final use and anticipated vehicle traffic, three different pavement sections were used as part of the OU3 remedy.

Shoreline protection was designed and installed along the areas of Clark Cove and Jamaica Cove where OU3 comes in contact with these water bodies. The shoreline protection consists of rip-rap underlain by sand and geotextile. The shoreline protection will protect the landfill from erosion due to flooding and/or wave action.

The surface water controls constructed as part of the remedy consist of a network of ditches, chutes, pipes, and culverts. These features are included in the remedy to remove surface water from the landfill cover system and to minimize erosion.

The final design also included various recreational facilities that allow reuse of the site following construction.

4.3.3 System Operations/Operation and Maintenance

4.3.3.1 Monitoring Program

The field sampling and analysis plan for groundwater and landfill gas is included in the OU3 Post-Remedial OM&M Plan (TtNUS, June 2006a). The sampling locations are shown on Figure 4-2. The groundwater sampling rationale is as follows:

- Based on groundwater discharge zones, downgradient monitoring wells will be sampled at three locations along Clark Cove and two locations along the new Jamaica Cove boundary. Upgradient monitoring wells will be sampled for each groundwater discharge zone.

- Based on the saturated fill thickness at low tide, one well within the saturated zone will be sampled at each location. A one-time tidal study will be conducted to determine the appropriate sampling times.

- Based on regulatory concerns related to groundwater flow in the vicinity of and concentrations of organics detected at the JW-13 well cluster, the Navy will include the bedrock well (JW-13B) in the first four rounds of groundwater monitoring. The well will be included for organic analysis, and if the concentrations of organic chemicals exceed action levels and are greater than the concentrations in JW-13D, the well will be retained in the monitoring program.

The items related to sampling monitoring wells, including sampling methods, sampling frequency, etc., are listed below. The groundwater samples will be collected using low-flow sampling procedures.

- Groundwater samples for the first four rounds will be collected twice per year, in April and September. Subsequently, the Navy will evaluate sampling frequency. Initially, five upgradient wells (JW-7, JW-8, JW-9, HW-2, and HW3) and six downgradient wells (JW-13B, JW-13D, JW-20, JW-21, JW-22, and JW-23) will be monitored.

- The groundwater samples for the first four rounds will be analyzed for organics (VOCs, SVOCs, pesticide/PCBs) and metals (total and filtered). Groundwater samples for subsequent rounds will be analyzed for PAHs, inorganics, and other organic compounds detected in groundwater at concentrations exceeding screening levels.

- Well stabilization parameters during sampling activities, salinity measurements, and total suspended solids will be measured for all wells in the monitoring program for all rounds.

- Water level measurements will also be taken at all wells.

- Additional wells, JW-19 and JW-24, will be used to refine the groundwater contours and hydraulic gradient; therefore, water level measurements will be taken at these two additional wells.

The groundwater data will be compared to screening criteria to determine whether contaminant concentrations in groundwater could adversely impact offshore media.

As part of Round 1, a one-time tidal study was conducted before initiation of sampling as part of the OU3 post-remedial program. The results of the tidal study were used to determine the tidal lag and appropriate sampling times as well as the timing for well development. Groundwater sampling is targeted around low tidal levels for tidally influenced groundwater monitoring well locations, whereas landfill gas measurements are targeted during rising tidal levels for gas probes. The tidal study was conducted in the monitoring wells and a stilling well (installed at a suitable location in the river) to determine the magnitude of tidal effects, response times, and appropriate sampling times for the tidally influenced monitoring wells. The results of this study were used to determine the appropriate time for landfill gas measurements and to assist in determining the appropriate timing of the one-time well development.

Landfill gas will be sampled and analyzed (real-time) for methane from seven gas probes (G1 through G7), shown on Figure 4-2. Landfill gas field measurements will be taken from gas sampling ports using a direct-reading instrument. Sampling will occur while the water level is rising at the location of the gas monitoring probe during the time estimated from the post-remedial tidal study. The results of the landfill

gas sampling will be used to determine whether landfill gas could adversely impact sampling activities or people in nearby buildings.

4.3.3.2 Inspection

Inspection items are discussed in the O&M Manual, which is included in the OU3 Post-Remedial OM&M Plan (TtNUS, June 2006a) as Appendix D. Inspection items include grass-covered areas, erosion-control features, fencing, drainage, monitoring wells and gas vents, as well as inspection of settlement and slope stability and verification of land use controls. Findings of the inspections will be documented on the inspection checklist provided in the manual.

The remedial design and remedial action for OU3 include many features that allow for reuse of the site. The O&M Manual only covers the O&M of components of the remedy that are included as part of the ROD. Therefore O&M of components such as the running track, softball field and fences, paving areas, and lighting are not included in the O&M Manual. For instance, maintenance of the softball scoreboard is not covered by the O&M Manual; however, because the scoreboard footer penetrates the geomembrane layer of the cap, the scoreboard will be inspected to determine whether the footer has moved, which in turn could affect the integrity of the geomembrane (i.e., a noticeable settling or lean of the scoreboard would trigger performance of an evaluation).

Inspection of the remedy at OU3 will be performed at a minimum semi-annually for the first 2 years, except for inspection of the wetland vegetation, which will be performed annually for the first 5 years. The preferred season for one of the inspection events is spring because the winter thaw and spring precipitation may have the most effect on the remedy. After the first 2-year period, site conditions will be evaluated, and the Navy may propose to reduce inspections to an annual frequency. In addition, unscheduled episodic inspections may be required because of unforeseen events (such as damaging weather).

An episodic inspection of OU3 was performed in February 2006 to inspect for winter storm damage. Inspection items, as identified in the O&M Manual, included the vegetated cover system, paved cover system, storm water drainage system, gas management system, wetland vegetation, groundwater monitoring wells, shoreline protection, fencing and miscellaneous features, and settlement survey monuments. The landfill cap was inspected for erosion and differential settling. The function of the drainage layer of the cover was monitored by inspection for ponding water on the surface of the cover system or areas of saturation within the vegetated cap. The paved cover system was inspected for the general condition of the pavement, cracks in the pavement, holes in or penetration of the pavement, bulges, differential settling, and for any exposed cap components. The gas management system was inspected to ensure that the system continues to function properly. The inspection included checking for

physical damage to the vents and vent screens, settlement in the area surrounding the gas vents, leaning gas vents, and obstructions within the gas vent piping. Gas probes were checked for physical damage or blockage of the orifices, presence of the lid on the probe casing, and operation of the gas probe sample valve. Monitoring wells were inspected for rusted locks, damage to the well casing/riser caused by subsidence or vandalism, and blockage of the well opening caused by rocks or other debris. Survey monuments were not inspected. Overall, the landfill surface was noted to be in very good condition. The Round 1 inspection was conducted in July 2006. Based on the results of the inspection, maintenance activities were conducted in October 2006. The Round 1 inspection and maintenance activities are discussed in Section 4.4.1.

Jamaica Cove will be monitored annually for Years 1 through 5 of the OM&M program. As part of the monitoring, a qualitative evaluation of vegetation (e.g., species present, percent coverage, evidence of invasive species, presence of algae mats, etc.) and animal life present in the constructed Jamaica Cove wetland will be conducted.

Clark Cove will be monitored annually from Years 1 through 5 of the OM&M Program. Monitoring will be limited to a wetlands functions and values assessment in accordance with the US Army Highway Methodology utilizing the adjacent mudflat at Jamaica Island as a reference wetland.

4.3.3.3 Maintenance

Maintenance items are discussed in the O&M Manual, which is included in the OU3 Post-Remedial OM&M Plan (TtNUS, June 2006a) as Appendix D. The vegetative cover of the landfill cap will be mowed at least once a year in the early fall to prevent the overgrowth of open areas by deep-rooted and woody plants in the areas overlying the impermeable cap. The vegetative cover at OU3 will also require regular maintenance to repair soil erosion resulting from rain, snow, wind, and other natural factors. Holes created by burrowing animals will be identified for possible damage to the drainage layer and geomembrane. Any damaged geosynthetic drainage layer or geomembrane will be replaced in accordance with the project specifications, and the hole will be filled and compacted with the appropriate soil material. Any necessary repairs to the geomembrane or GCL will be performed by a qualified installer.

As long as the paved surfaces are not allowing erosion of the underlying cap surfaces and are not indicative of potential problems with the underlying cap components, the pavements should not require repairs to fulfill the requirements of the ROD. Any repairs to the pavement will be conducted in accordance with project specifications.

Maintenance of the storm water drainage system will include removing accumulated sediment and vegetative growth in ditches and debris accumulated on the trash racks. If ponding is observed in areas of the storm drainage system, further evaluation will be conducted and recommendations will be made to promote positive drainage. Any damage to the storm water control structures due to subsidence or erosion will be repaired as soon as possible.

Maintenance of the gas vents and probes will be performed as determined during the site inspections. Any monitoring wells noted during the inspections as being damaged will be repaired or replaced, as necessary. Shoreline stone revetments erosion will be repaired, if necessary, with placement of appropriate stone, granular material, or soil. Settlement survey monument concrete surfaces will be repaired as needed for cracks, chips, spalling, etc., and survey markers will be cleaned by removing any accumulated dirt or debris from engraved letters.

No maintenance or repair of the Jamaica Cove wetland will be conducted under CERCLA.

It is anticipated that the Clark Cove wetland (i.e., mudflat) will naturally maintain itself without active intervention. However, maintenance activities may be required to assure continuation of the Clark Cove wetland so that the wetland meets 85 percent of its functions and values prior to excavation in the wetland area.

Any observed movement of the fencing or light poles will be noted in the inspection checklist and will be evaluated for further investigation or repair as necessary. For instance, a leaning ballfield fence post may not require maintenance because the fence posts do not penetrate the liner. However, if the movement is significant for any structure that penetrates the liner, the area of movement or settlement will be removed to observe the integrity of the foundation and its connection to the geomembrane.

Based on the Round 1 inspection of OU3, maintenance activities were conducted in October 2006. The Round 1 inspection and maintenance activities are discussed in Section 4.4.1.

4.4 FIVE-YEAR REVIEW PROCESS

This section provides a summary of the five-year review process and the actions taken to complete this review.

4.4.1 Document and Data Review

The primary documents reviewed for the first five-year review are the ROD for OU3 (Navy, August 2001c), September 2003 ESD (Navy, September 2003), October 2005 ESD (Navy, October 2005), and

OM&M Plan (TtNUS, June 2006a). Remedial design documents (US Army, June 2002 and November 2002) and remedial action completion report (TtEC, May 2006) were also reviewed.

OU3 post-remedial OM&M was initiated in 2006. The tidal study was performed in March 2006. The groundwater and landfill gas sampling and the O&M inspection of OU3 for Round 1 were performed in July 2006, and wetlands inspection and OU3 maintenance activities for Round 1 were conducted in October 2006.

Landfill gas was not detected during Round 1 sampling of the gas probes. Several minor maintenance items were noted during the Round 1 inspection. The wetlands evaluation for Jamaica Cove and Clark Cove did not indicate any concerns. Maintenance activities conducted in October 2006 included the following:

- Removal of the stone check dam at the upgradient end of the vegetated portion of Ditch 5 to reduce the ponding of water at the base of Channel Chute 2.
- Removal of cattails within the channel.
- Removal of trash and debris from all culvert trash racks.
- Repairs at monitoring wells JW-7, JW-7B, JW-13DB, and JW-20.
- Filling of three rodent burrows.
- Placement of bird screens in all exposed gas vents.

The results of the tidal study and Round 1 activities will be provided in the OU3 Post-Remedial OM&M Round 1 Data Package.

The Land Use Control Plan, which will be included as Appendix E of the OU3 Post-Remedial OM&M Plan, has not been finalized, and all verification activities were not conducted as part of the Round 1 inspection. Therefore, additional activities to verify existing and proposed land use controls were conducted as part of the Five-Year site inspection as discussed in Section 4.4.3.

4.4.2 ARAR and Site-Specific Action Level Changes

The remedial action implemented for soil at the JILF includes a hazardous waste landfill cover, institutional controls, erosion controls, and monitoring. ARARs and TBCs were reviewed to determine whether there have been changes since the ROD, ESDs, and OM&M Plan were issued. ARAR tables from the OU3 ROD and ESDs are provided in Appendix A. Because the cover and erosion controls have been constructed, the only changes in ARARs and TBCs that could affect the remedy at this time are related to the OM&M components of the remedy. The post-remedial OM&M plan for OU3 was finalized in

June 2006, and it outlines the activities to be conducted as part of the OM&M program. The ARARs and TBCs used to develop the screening criteria for the monitoring program are the following chemical-specific ARARs and TBCs for OU3:

- Clean Water Act, Section 304 (a), National Recommended Water Quality Criteria
- Maine Surface Water Toxics Control Program, Chapter 530.5, Statewide Water Quality Criteria.
- USEPA health advisories for drinking water, risk RfDs, and CSFs.
- State of Maine Guidance Manual for Human Health Risk Assessments at Hazardous Substance Sites (June 1994)

Other ARARs and TBCs used to develop the OM&M program for OU3 are as follows:

- 40 CFR, Subpart F, Releases from Solid Waste Management Units (264.95 and 264.97)
- 40 CFR, Subpart N, Closure and Post-Closure Care (264.310)
- Maine Hazardous Waste Management Rules, Chapter 854
- RCRA Subtitle C, Subpart F, 264.101 Corrective Action for Solid Waste Management Units
- Maine Solid Waste Management Regulations, Chapter 405
- Maine Solid Waste Management Regulations, Chapter 401

The ARARs and TBCs were used to develop the OM&M program as discussed in Section 1.6.2 of the Post-Remedial OM&M Plan for OU3 (TtNUS, June 2006a). The water quality criteria are updated periodically, and any updates that affect the monitoring program will be taken into account as part of evaluation of the groundwater monitoring data. The human health action levels for the OU3 OM&M groundwater monitoring program were calculated using RfDs and CSFs in accordance with current risk guidance. The risk guidance, RfDs, and CSFs are updated periodically, and any updates that affect the monitoring program will be taken into account as part of the evaluation of the groundwater monitoring data. Table 4-1 provides the most current criteria for use in evaluating groundwater monitoring data. The table includes the criteria updated based on changes to risk guidance, RfDs, and CSFs; there were no changes to water quality criteria since the OU3 OM&M Plan was prepared.

4.4.3 Site Inspection

OU3 was visually inspected on August 30, 2006. Weather conditions during the inspection were warm (70 to 78 degrees Fahrenheit), cloudy to sunny, at low tide. The inspection was performed by TtNUS and Shipyard personnel. The site inspection checklist completed during the inspection is provided in Appendix A. TtNUS also visited OU3 on September 26, 2006 and additional observations based on the

September visit were noted on the inspection checklist. PNS took photographs of site features in January 2007, and the photographs are included in Appendix B.

The site inspection included visual observations of the current condition of the hazardous waste landfill cover and shoreline erosion controls at OU3. During the site inspection, the team found that the land use for the site has remained unchanged since the remedial action. The Shipyard continues to use the area for parking and recreation. In general, the site inspection found that the landfill cover and erosion controls were working as intended, and that overall, the site was in very good condition. Signs were observed during the inspection at the entrances to the site, warning that personnel should not dig at the site. Items were identified during the site inspection that should be addressed. One major concern was that OU3 cap internal pipe outlets could not be located as shown on final construction drawings. Changes to the design of these outlets should be checked to assure proper functioning of the landfill cover. The other items were minor maintenance items. These items are noted in the site inspection checklist provided in Appendix A. The items and their potential long-term impacts on the cap system include the following:

- Minor amounts of vegetation are growing in the rock lining in Ditch 5, some cattails are growing in the vegetated portion of Ditch 5, and minor amounts of debris are present at two of the trash racks of the culvert inlets. Vegetation and/or debris in the ditches could reduce channel flow and if significant, could results in overtopping of the channel.

- Various types of trailers (boat, camper, etc.) are being stored on the asphalt in the parking area. Improper storage or use on the asphalt could result in damage to the asphalt, because holes/penetrations could allow surface water to enter the cap drainage layer.

- A few monitoring wells require maintenance. Although there were no severely damaged monitoring wells, if any wells become severely damaged these wells could provide a direct conduit to the groundwater aquifer beneath the site.

- The gas vents do not have bird screens. The screens prevent habitation of animals in the vents and prevent unwanted material (e.g., trash) from being deposited in them. Also, an adequate vertical distance between the ground surface and gas vent openings should be maintained.

In addition, drawings specifically for site inspections are needed to aid in locating and identifying landfill features.

The Navy conducted some of the maintenance activities in October 2006, including removal of vegetation and debris, repair of monitoring wells, and placement of bird screens in the gas vents. The vertical

distance between the ground surface and vent openings was evaluated in October 2006 and determined to be adequate. The Navy observes the parking area regularly to ensure that storage of trailers is being conducted appropriately. The schedule for conducting the remaining maintenance activities is provided in Appendix A.

4.5 TECHNICAL ASSESSMENT

The following conclusions support the determination that the remedy for OU3 is currently protective of human health and the environment.

Question 1. Is the remedy functioning as intended by the decision documents?

- ***Remedial Action Performance:*** A hazardous waste landfill cover was installed at the JILF and is currently effective in limiting direct exposure to contaminated soil and/or waste materials. The cover also reduces infiltration of water through contaminated soil and/or waste materials. Shoreline erosion controls are minimizing the potential for washing away of soil and/or waste materials from the edge of the JILF (Clark Cove area). Contaminated soil and waste materials were excavated from the area adjacent to Jamaica Cove, and wetlands were created in the excavated area; therefore, erosion from the JILF in this area is no longer a concern. A groundwater and landfill gas monitoring program is being conducted to evaluate the performance of the remedy regarding minimizing contaminant migration and to ensure that groundwater contaminants are not at concentrations that could adversely impact the offshore environment. The data from the first round of sampling were not available for this five-year review.

- ***System Operations/O&M/Costs:*** Installation of the hazardous waste landfill cover was completed in 2004. An O&M Manual was developed in 2006, and an O&M program was initiated in July 2006. The cap system is functioning as intended, and maintenance is being performed to maintain proper long-term performance of the landfill cover and shoreline erosion protection.

  Monitoring of groundwater and landfill gas began in July 2006; however, the data are still being evaluated and a data package is being prepared. Therefore costs are not available. The projected annual monitoring costs in the ROD are listed below. The ROD costs were projected prior to the development of the monitoring plan, and assumed annual sampling and analysis for 16 groundwater samples for VOCs, SVOCs, and metals and eight groundwater samples for pesticides; 10 filtered and unfiltered surface water samples for SVOCs, metals, pesticides, and PCBs; and 30 samples of sediment for metals PAHs, pesticides, PCBs, and limited dioxins; and validation and reporting. The difference in projected and actual costs will be evaluated as part of the next five-year review.

Source	Year	Cost of Monitoring
Projected Annual Cost in ROD	1 - 5 6 - 30 Every 5 Years	$88,865 $86,865 $12,000

O&M of the cap system began in July 2006; however, the results are still being evaluated and a data package is being prepared. Therefore costs are not available for Round 1. The projected annual maintenance costs in the ROD are listed below. The ROD costs were projected prior to the development of the O&M plan and assumed inspection and replacement of 25 percent of wetland plants, soil cap maintenance, and asphalt cap patching during Year 1; soil cap maintenance and asphalt cap patching during Years 2 through 4 and Years 6 through 9; soil cap maintenance and asphalt cap patching, crack repair, and clean and seal pavement during Years 5, 15, and 25; and soil cap maintenance and repaving the asphalt cap (1½ inches thick) during Years 10, 20, and 30. The difference in projected and actual costs will be evaluated as part of the next five-year review.

Source	Year	Cost of O&M
Projected Annual Cost in ROD	1 2-4 and 6-9 5, 15, and 25 10, 20, and 30	$62,800 $7,800 $64,700 $169,840

- ***Opportunities for Optimization:*** The OM&M Plan describes opportunities for optimization that will be possible after the first four rounds of data have been collected and evaluated. To date, two rounds of sampling have occurred; however, the results were not available for this five-year review. Round 3 is planned for spring 2007, and Round 4 of monitoring is planned for summer/fall 2007; therefore, the following opportunities for optimization will be available prior to the second 5-year review:

  - Based on regulatory concerns related to groundwater flow in the vicinity of and concentrations of organics detected at the JW-13 well cluster, the Navy will include the bedrock well (JW-13B) in the first four rounds of groundwater monitoring. The well will be included for organic analysis, and if the concentrations of organic chemicals do not exceed action levels and are not greater than the concentrations in JW-13D, the well will not be retained in the monitoring program.

  - The Navy will evaluate the first four rounds of data and, if warranted, may make a recommendation for reducing the sampling frequency and/or selecting a sampling season. In addition, the Navy will evaluate whether modification to the monitoring program (frequency, analytes, etc.) is necessary at a minimum of every 5 years from the start of the monitoring program and will make the appropriate recommendations to the regulators. Modifications to the monitoring program will be made in consultation with the regulators.

- The groundwater samples for the first four rounds will be analyzed for organics (VOCs, SVOCs, pesticide/PCBs) and metals (total and filtered). Groundwater samples for subsequent rounds will be analyzed for PAHs, inorganics, and other organic compounds detected in groundwater at concentrations exceeding the screening level.

- During the first four rounds of landfill gas monitoring, methane gas readings will be taken at the beginning, middle, and end of rising water levels (for wells in the vicinity of the probes). If the differences in the readings are not significant, the Navy will recommend a reduction in the number of readings to be taken from one or more probes.

In addition, the following item would optimize OU3 site O&M:

- Drawings with adequately labeled site features, including gas vents, monitoring wells, settlement monuments, gas probes, drainage layer outlets, ditches, channel chutes, culverts and drain pipes.

- ***Early Indicators of Potential Remedy Failure:*** Minor deficiencies were noted during the O&M inspections of the cap system. The deficiencies do not compromise the protectiveness of the remedy, and it is unlikely that they would contribute to remedy failure in the future. OM&M activities will be used to determine any concerns related to groundwater migration and/or gas generation at OU3.

- ***Implementation of Institutional Controls and Other Measures:*** A Land Use Control Plan is being prepared and addresses the actions to provide land use controls. Verification of land use controls is a component of the O&M inspections. The specific inspection items as part of the O&M inspections will be provided in the Land Use Control Plan. However, as part of the five-year review site inspection, verification activities were conducted. As discussed in Section 1.0, TtNUS inspection personnel verified with Shipyard environmental personnel that there were no significant changes to the Shipyard dig policy. As part of the OU3 inspection, Shipyard environmental personnel indicated that there has been no unauthorized disturbance of the cap, and the inspection of OU3 verified this. The only authorized disturbance was for the placement around the landfill of signs indicating that no disturbance of the cap is allowed. Groundwater is not used at OU3; the only wells are groundwater monitoring wells.

Question 2. Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?

- ***Changes in Exposure Pathways:*** There have been no changes at the site that would have resulted in new exposure pathways to human or ecological receptors. Based on the remedial construction activities, there are no longer seeps in the intertidal area, and most of the mid-to high tide intertidal area sediments are covered by the shoreline erosion controls. Therefore, less exposure to seeps and sediments in the intertidal area are expected.

- ***Changes in Land Use:*** There have been no changes in land use at the site that would have resulted in new exposure pathways to human or ecological receptors.

- ***New Contaminants and/or Contaminant Sources:*** There have been no new contaminants or contaminant sources at the site.

- ***Remedy Byproducts:*** There are no byproducts from the remedy.

- ***Changes in Standards, Newly Promulgated Standards, and TBCs***: ARARs and TBCs considered during preparation of the ROD and ESDs were reviewed to determine changes since the remedial design and OM&M Plan were issued. There have been no changes to currently relevant ARARs. Monitoring action levels presented in the OU3 OM&M plan were updated based on changes in ARARs and TBCs and are presented on Table 4-1. The main change to the monitoring criteria are based on updates to risk guidance, RfDs, and CSFs, which affected several of the human health action levels.

- ***Changes in Toxicity and Other Contaminant Characteristics:*** There have been no changes in human health toxicity criteria that would impact the monitoring criteria, except as discussed in the previous bullet.

- ***Expected Progress Towards Meeting RAOs:*** The RAOs for OU3 are being met by installing and maintaining the hazardous waste landfill cover, and shoreline erosion controls and by conducting groundwater and landfill gas monitoring and O&M activities.

- ***Changes in Risk Assessment Methods:*** Except for groundwater monitoring, the remedy components are not chemical specific, and changes in risk assessment methodology would not impact the protectiveness of the remedy. Groundwater monitoring action levels for human health are risk based and take into account the current risk assessment methods and criteria.

Question 3. Has any other information come to light that could call into question the protectiveness of the remedy?

No additional information has been identified that would call into question the protectiveness of the remedy.

4.6 ISSUES

OU3 cap internal pipe outlets could not be located as shown on construction drawings. Changes to the design of these outlets should be checked to assure proper functioning of the landfill cover. A few minor O&M items were noted during the five-year review site inspection that should be resolved. The items are presented in Sections 4.4.3 and listed in Appendix A. Many of the activities were conducted in October 2006. A schedule for conducting the remaining activities is provided in Appendix A.

4.7 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

Based on the results of the site inspection and review, the following recommendations are made for OU3:

- Continue OM&M of the site and address the O&M items noted in Section 4.4.3 (see Appendix A)
- Finalize the Land Use Control Plan

4.8 PROTECTIVENESS STATEMENT

The remedy at OU3 is currently protective of human health and the environment. The source of contamination is contained. The hazardous waste landfill cover minimizes infiltration and subsequent contaminant migration and prevents direct contact with soil. A landfill gas monitoring and O&M program is being implemented to verify that the cap is performing as designed, and the results of the program suggest that the cap is performing as planned. Groundwater monitoring is being implemented to address migration of groundwater. Continued implementation of land use controls and OM&M will maintain the effectiveness of the remedy into the future.

TABLE 4-1

UPDATED AQUEOUS SCREENING LEVEL SUMMARY FOR OU3 POST-REMEDIAL MONITORING PROGRAM
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Parameter	Ecological Screening Levels			Human Health Screening Levels[8]	
	Acute Values (µg/L)	Chronic Values (µg/L)	Source	Screening Level (µg/L)	Carcinogen (C) or Noncarcinogen (N)
Volatiles					
1,1,1-TRICHLOROETHANE	3,120(3)	312(5)	Buchman, 1999	17000	N
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	NA	NA	NA	1300000	N
1,1,2,2-TETRACHLOROETHANE	902(3)	90.2(5)	Buchman, 1999	21	C
1,1,2-TRICHLOROETHANE	1,800(1)(3)	940(1)(4)	Buchman, 1999	82	C
1,1-DICHLOROETHANE	NA	NA	NA	17000*	N
1,1-DICHLOROETHENE	450(1)	25(1)	Suter and Tsao, 1996	3400	N
1,2,4-TRICHLOROBENZENE	16(3)	12.9(4)	Buchman, 1999	160	N
1,2-DIBROMO-3-CHLOROPROPANE	NA	NA	NA	3	C
1,2-DIBROMOETHANE	NA	NA	NA	2.9*	C
1,2-DICHLOROETHANE	11,300(3)	1,130(5)	Buchman, 1999	62	C
1,2-DICHLOROBENZENE	197(3)	12.9(4)	Buchman, 1999	2400	N
1,2-DICHLOROPROPANE	1,030(4)	304(4)	Buchman, 1999	65	C
1,3-DICHLOROBENZENE	NA	NA	NA	63*	N
1,4-DICHLOROBENZENE	197(3)	12.9(4)	Buchman, 1999	60	C
2-BUTANONE	240,000(1)	14,000(1)	Suter and Tsao, 1996	77000	N
2-HEXANONE	1,800(1)	99(1)	Suter and Tsao, 1996	NA	NA
4-METHYL-2-PENTANONE	2,200(1)	170(1)	Suter and Tsao, 1996	NA	N
ACETONE	28,000(1)	1,500(1)	Suter and Tsao, 1996	120000	N
BENZENE	510(3)	70(4)	Buchman, 1999	60	C
BROMODICHLOROMETHANE	1,200(3)	640(4)	Buchman, 1999	82	C
BROMOFORM	NA	NA	NA	700	C
BROMOMETHANE	NA	NA	NA	160	N
CARBON DISULFIDE	17(1)	0.92(1)	Suter and Tsao, 1996	5600	N
CARBON TETRACHLORIDE	5,000(3)	500(5)	Buchman, 1999	21	C
CHLOROBENZENE	16(3)	12.9(4)	Buchman, 1999	780	N
CHLOROETHANE	NA	NA	NA	1700	C
CHLOROFORM	2,890(1)(3)	124(1)(4)	Buchman, 1999	840	C
CHLOROMETHANE	NA	NA	NA	NA	C
CIS-1,2-DICHLOROETHENE	22,400(3)	2,240(5)	Buchman, 1999	700	N
CIS-1,3-DICHLOROPROPENE	79(3)	7.9(5)	Buchman, 1999	44	C
CYCLOHEXANE	NA	NA	NA	NA	N
DIBROMOCHLOROMETHANE	1,200(3)	640(4)	Buchman, 1999	64	C
DICHLORODIFLUOROMETHANE	1,200(3)	640(4)	Buchman, 1999	15000	N
ETHYLBENZENE	43(3)	4.3(5)	Buchman, 1999	2700	C

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Parameter	Ecological Screening Levels			Human Health Screening Levels[8]	
	Acute Values (µg/L)	Chronic Values (µg/L)	Source	Screening Level (µg/L)	Carcinogen (C) or Noncarcinogen (N)
ISOPROPYLBENZENE	NA	NA	NA	1700	N
METHYL ACETATE	NA	NA	NA	130000	N
METHYLCYCLOHEXANE	NA	NA	NA	NA	N
METHYLENE CHLORIDE	1,200(3)	640(4)	Buchman, 1999	790	C
METHYL TERT-BUTYL ETHER	NA	NA	NA	1600	C
STYRENE	NA	NA	NA	6500	N
TETRACHLOROETHENE	1,020(3)	45(4)	Buchman, 1999	3	C
TOLUENE	630(3)	500(4)	Buchman, 1999	3000*	N
TRANS-1,2-DICHLOROETHENE	22,400(3)	2,240(5)	Buchman, 1999	1600	N
TRANS-1,3-DICHLOROPROPENE	79(3)	7.9(5)	Buchman, 1999	55	C
TRICHLOROETHENE	200(3)	20(5)	Buchman, 1999	9	C
TRICHLOROFLUOROMETHANE	1,200(3)	640(4)	Buchman, 1999	18000	N
VINYL CHLORIDE	NA	NA	NA	4	C
TOTAL XYLENES	230(1)	13(1)	Suter and Tsao, 1996	5600	N
Semivolatiles					
ACENAPHTHENE	NA	40	USEPA, Jan. 1996	880	N
ACENAPHTHYLENE	30(3)	3(5)	Buchman, 1999	720(9)	NA
ANTHRACENE	30(3)	3(5)	Buchman, 1999	2400	N
BENZO(A)ANTHRACENE	30(3)	3(5)	Buchman, 1999	5**	C
BENZO(A)PYRENE	30(3)	3(5)	Buchman, 1999	0.5**	C
BENZO(B)FLUORANTHENE	30(3)	3(5)	Buchman, 1999	5**	C
BENZO(G,H,I)PERYLENE	30(3)	3(5)	Buchman, 1999	16(10)	NA
BENZO(K)FLUORANTHENE	30(3)	3(5)	Buchman, 1999	50**	C
BIS(2-CHLOROETHOXY)METHANE	1,200(3)	640(4)	Buchman, 1999	NA	NA
BIS(2-CHLOROETHYL)ETHER	NA	NA	NA	6	C
BIS(2-ETHYLHEXYL)PHTHALATE	400	360	Buchman, 1999	53	C
4-BROMOPHENYL PHENYL ETHER	NA	1.5(1)	Suter and Tsao, 1996	NA	NA
BUTYL BENZYL PHTHALATE	294.4(3)	0.34(4)	Buchman, 1999	2500	N
CARBAZOLE	NA	NA	NA	64	C
4-CHLORO-3-METHYLPHENOL	NA	NA	NA	NA	N
4-CHLOROANILINE	16(3)	12.9(4)	Buchman, 1999	380	N
2-CHLORONAPHTHALENE	0.75(3)	0.075(5)	Buchman, 1999	1200	N
2-CHLOROPHENOL	438(1)(3)	43.8(1)(5)	Buchman, 1999	390	N

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Parameter	Ecological Screening Levels			Human Health Screening Levels[8]	
	Acute Values (µg/L)	Chronic Values (µg/L)	Source	Screening Level (µg/L)	Carcinogen (C) or Noncarcinogen (N)
4-CHLOROPHENYL PHENYL ETHER	NA	NA	NA	NA	NA
CHRYSENE	30(3)	3(5)	Buchman, 1999	500**	C
DIBENZO(A,H)ANTHRACENE	30(3)	3(5)	Buchman, 1999	0.5**	C
DIBENZOFURAN	66(1)	3.7(1)	Suter and Tsao, 1996	NA*	N
3,3'-DICHLOROBENZIDINE	NA	NA	NA	5	C
DIETHYL PHTHALATE	294.4(3)	0.34(4)	Buchman, 1999	71000	N
DI-N-BUTYL PHTHALATE	294.4(3)	0.34(4)	Buchman, 1999	2500	N
DI-N-OCTYL PHTHALATE	294.4(3)	0.34(4)	Buchman, 1999	NA*	N
4,6-DINITRO-2-METHYLPHENOL	NA	NA	NA	10	N
2,4-DINITROPHENOL	485(3)	48.5(5)	Buchman, 1999	240	N
2,4-DINITROTOLUENE	59(3)	37(4)	Buchman, 1999	200	N
2,4-DICHLOROPHENOL	202(1)(3)	36.5(1)(4)	Buchman, 1999	130	N
DIMETHYL PHTHALATE	294.4(3)	0.34(4)	Buchman, 1999	NA*	N
2,4-DIMETHYLPHENOL	212(1)(3)	21.2(1)(5)	Buchman, 1999	1400	N
2,6-DINITROTOLUENE	59(3)(11)	37(4)(11)	Buchman, 1999	110	N
FLUORANTHENE	NA	11	USEPA, Jan. 1996	180	N
FLUORENE	30(3)	3(5)	Buchman, 1999	430	N
HEXACHLOROBENZENE	16(3)	12.9(4)	Buchman, 1999	5	C
HEXACHLOROBUTADIENE	3.2(3)	0.32(5)	Buchman, 1999	28	C
HEXACHLOROCYCLOPENTADIENE	0.7(3)	0.07(5)	Buchman, 1999	39	N
HEXACHLOROETHANE	94(3)	9.4(5)	Buchman, 1999	23	C
INDENO(1,2,3-CD)PYRENE	30(3)	3(5)	Buchman, 1999	5**	C
ISOPHORONE	1,290(3)	129(5)	Buchman, 1999	6100	C
2-METHYLNAPHTHALENE	30(3)	3(5)	Buchman, 1999	59*	NA
2-METHYLPHENOL	230(1)	13(1)	Suter and Tsao, 1996	4100	N
4-METHYLPHENOL	230(1)(12)	13(1)(12)	Suter and Tsao, 1996	410	N
NAPHTHALENE	235(3)	23.5(5)	Buchman, 1999	530	N
2-NITROANILINE	NA	NA	NA	NA*	N
3-NITROANILINE	NA	NA	NA	NA*	N
4-NITROANILINE	NA	NA	NA	NA*	N
NITROBENZENE	668(3)	66.8(5)	Buchman, 1999	46	N
2-NITROPHENOL	485(3)(13)	48.5(5)(13)	Buchman, 1999	NA	N

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Parameter	Ecological Screening Levels			Human Health Screening Levels[8]	
	Acute Values (µg/L)	Chronic Values (µg/L)	Source	Screening Level (µg/L)	Carcinogen (C) or Noncarcinogen (N)
4-NITROPHENOL	485(3)	48.5(5)	Buchman, 1999	NA	N
N-NITROSO-DI-N-PROPYLAMINE	NA	NA	NA	0.9	C
N-NITROSODIPHENYLAMINE	330,000(3)	33,000(5)	Buchman, 1999	530	C
2,2'-OXYBIS(1-CHLOROPROPANE)	NA	NA	NA	59	C
PENTACHLOROPHENOL	13	7.9	USEPA, Nov. 2002	67	C
PHENANTHRENE	NA	8.3	USEPA, Jan. 1996	240(10)	N
PHENOL	580(3)	58(5)	Buchman, 1999	30000	N
PYRENE	30(3)	3(5)	Buchman, 1999	110	N
2,4,5-TRICHLOROPHENOL	240	11	Buchman, 1999	12000	N
2,4,6-TRICHLOROPHENOL	NA	97(1)(4)	Buchman, 1999	120	C
Pesticides/PCBs					
ALDRIN	1.3	0.13(3)	USEPA, Nov. 2002	0.3	C
ALPHA-BHC	0.16(14)	0.016(3)	USEPA, Nov. 2002	0.2(14)	C
ALPHA-CHLORDANE	0.09	0.004	USEPA, Nov. 2002	2(15)	C
BETA-BHC	0.16(14)	0.016(3)	USEPA, Nov. 2002	0.7(14)	C
4,4'-DDE	0.13(6)	0.001(6)	USEPA, Nov. 2002	23	C
4,4'-DDD	0.13(6)	0.001(6)	USEPA, Nov. 2002	33	C
4,4'-DDT	0.13	0.001	USEPA, Nov. 2002	23	C
DELTA-BHC	0.16(14)	0.016(3)	USEPA, Nov. 2002	0.2(14,16)	C
DIELDRIN	0.71	0.0019	USEPA, Nov. 2002	0.09	C
ENDOSULFAN I	0.034	0.0087	USEPA, Nov. 2002	440(17)	N
ENDOSULFAN II	0.034(17)	0.0087(17)	USEPA, Nov. 2002	420(17)	N
ENDOSULFAN SULFATE	0.034(17)	0.0087(17)	USEPA, Nov. 2002	430(17)	N
ENDRIN	0.037	0.0023	USEPA, Nov. 2002	8	N
ENDRIN ALDEHYDE	0.037(18)	0.0023(18)	USEPA, Nov. 2002	16(18)	N
ENDRIN KETONE	0.037(18)	0.0023(18)	USEPA, Nov. 2002	5(18)	N
GAMMA-BHC (LINDANE)	0.16	0.016(3)	USEPA, Nov. 2002	2	C
GAMMA-CHLORDANE	0.09	0.004	USEPA, Nov. 2002	2(15)	C
HEPTACHLOR	0.053	0.0036	USEPA, Nov. 2002	0.4	C
HEPTACHLOR EPOXIDE	0.053	0.0036	USEPA, Nov. 2002	0.08	C
METHOXYCHLOR	NA	0.03	USEPA, Nov. 2002	48	N
TOXAPHENE	0.21	0.0002	USEPA, Nov. 2002	1	C

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	Ecological Screening Levels			Human Health Screening Levels[8]	
Parameter	Acute Values (µg/L)	Chronic Values (µg/L)	Source	Screening Level (µg/L)	Carcinogen (C) or Noncarcinogen (N)
AROCLOR-1016	NA	0.03(7)	USEPA, Nov. 2002	9.8	C
AROCLOR-1221	NA	0.03(7)	USEPA, Nov. 2002	0.21	C
AROCLOR-1232	NA	0.03(7)	USEPA, Nov. 2002	0.21	C
AROCLOR-1242	NA	0.03(7)	USEPA, Nov. 2002	0.03	C
AROCLOR-1248	NA	0.03(7)	USEPA, Nov. 2002	0.028	C
AROCLOR-1254	NA	0.03(7)	USEPA, Nov. 2002	2.8	C
AROCLOR-1260	NA	0.03(7)	USEPA, Nov. 2002	0.0029	C
Inorganics					
ALUMINUM	750(1)	87(1)	USEPA, Nov. 2002	NA*	N
ANTIMONY	1500	500	Buchman, 1999	36.6	N
ARSENIC	69(2)	36(2)	USEPA, Nov. 2002	4.9	C
BARIUM	50000	50000	USEPA, May 1996	13000*	N
BERYLLIUM	13(1)(3)	0.53(1)(4)	Buchman, 1999	22.6	N
CADMIUM	40(2)	8.8(2)	USEPA, Nov. 2002	27.0	N
CALCIUM	NA	NA	NA	NA	NA
CHROMIUM(21)	1,100(2)	50(2)	USEPA, Nov. 2002	56.9	N
COBALT	1,500(1)	23(1)	Suter and Tsao, 1996	NA*	N
COPPER	4.8(2)	3.1(2)	USEPA, Nov. 2002	5200	N
IRON	NA	1000(1)	USEPA, Nov. 2002	39000	N
LEAD	210(2)	8.1(2)	USEPA, Nov. 2002	15 (19)	NA
MAGNESIUM	NA	NA	NA	NA	NA
MANGANESE	2,300(1)	120(1)	Suter and Tsao, 1996	1120	N
MERCURY	1.8(2)	0.94(2)	USEPA, Nov. 2002	20 (20)	N
NICKEL	74(2)	8.2(2)	USEPA, Nov. 2002	2010	N
POTASSIUM	NA	NA	NA	NA	NA
SELENIUM	290(2)	71(2)	USEPA, Nov. 2002	650	N
SILVER	1.9(2)	0.19(3)	USEPA, Nov. 2002	319	N
SODIUM	NA	NA	NA	NA	NA
THALLIUM	213(3)	21.3(5)	Buchman, 1999	9.1	N
VANADIUM	280(1)	20(1)	Suter and Tsao, 1996	10.3	N
ZINC	90(2)	81(2)	USEPA, Nov. 2002	40200	N

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Parameter	Ecological Screening Levels			Human Health Screening Levels[8]	
	Acute Values (µg/L)	Chronic Values (µg/L)	Source	Screening Level (µg/L)	Carcinogen (C) or Noncarcinogen (N)

Notes:
Units: Surface water parameters are in ug/L for all chemicals
NA = Not applicable/not available

These screening levels will be used in conjunction with upgradient chemical concentrations (and dilution factors for the chronic value) to develop action levels.
* indicates the value has been updated based on changes in reference doses and cancer slope factors since the June 2006 OM&M Plan.
** indicates the value has been updated since the June 2006 OM&M Plan based on updates to USEPA guidance (March 2005a and b).

Footnotes:
1 - Value is based on freshwater criteria.
2 - Value is based on dissolved concentrations.
3 - Chronic value was calculated by multiplying acute value by 0.1. Acute value was calculated by multiplying the acute LOEL by 0.1 (to estimate an acute NOEL).
4 - Value was calculated by multiplying the chronic LOEL by 0.1 to estimate a chronic NOEL.
5 - Value was calculated by multiplying the acute LOEL by 0.01 to estimate a chronic NOEL.
6 - Value is based on DDT criteria.
7 - Value is the total PCBs.
8 - The screening levels presented on this table correspond to a cancer risk level of 1×10^{-6} or a hazard index of 0.1. See text of Technical Memorandum (TtNUS, December 2002), for further explanation of screening levels selected for several of the carcinogenic PAHs, TCDD, total PCBs, and DDT family of compounds. Values for chemicals not included in the technical memorandum were calculated following the methodology presented in the technical memorandum.
9 - The reference dose for acenaphthene was used as a surrogate reference dose for the calculation of the human health final screening level for acenaphthylene.
10 - The reference dose for pyrene was used as a surrogate reference dose for the calculation of the human health final screening level for benzo(g,h,i)perylene and phenanthrene.
11 - 2,4-dinitrotoluene was used as a surrogate for 2,6-dinitrotoluene.
12 - 2-methylphenol was used as a surrogate for 4-methylphenol.
13 - 4-nitrophenol was used as a surrogate for 2-nitrophenol.
14 - Gamma-BHC was used as a surrogate for alpha-BHC, beta-BHC, and delta-BHC.
15 - The reference dose for chlordane was used as a surrogate reference dose for the calculation of the final screening level for alpha- and gamma-chlordane.
16 - The reference dose for alpha-BHC was used as a surrogate reference dose for the calculation of the human health
17 - The reference dose for endosulfan was used as a surrogate reference dose for the calculation of the human health final screening level for endosulfan I, endosulfan II, and endosulfan sulfate. Additionally, the ecological water value for endosulfan I was used as a surrogate for endosulfan II, and endosulfan sulfate.
18 - The reference dose for endrin was used as a surrogate reference dose for the calculation of the human health final screening level for endrin aldehyde and endrin ketone. Additionally, the ecological water value for endrin was used as a surrogate for endrin aldehyde and endrin ketone.
19 - The screening levels for lead are not calculated risk-based concentrations. The concentration presented for water (15 ug/L) is an action level often used to select chemicals of potential concern using a residential land use scenario.
20 - Screening levels for mercury are derived using toxicity data for mercuric chloride.
21 - Chromium VI screening levels will be used to evaluate the groundwater data.

TABLE 4-1

UPDATED AQUEOUS SCREENING LEVEL SUMMARY FOR OU3 POST-REMEDIAL MONITORING PROGRAM
FIVE-YEAR REVIEW REPORT
PORTSMOUTH NAVAL SHIPYARD, KITTERY, MAINE
PAGE 7 OF 7

Parameter	Ecological Screening Levels			Human Health Screening Levels[8]	
	Acute Values (µg/L)	Chronic Values (µg/L)	Source	Screening Level (µg/L)	Carcinogen (C) or Noncarcinogen (N)

References:

Buchman, M. F., 1999. NOAA Screening Quick Reference Tables, NOAA HAZMAT Report 99-1, Seattle, WA, Coastal Protection and Restoration Division, National Oceanic and Atmospheric Administration. http://response.restoration.noaa.gov/cpr/sediment/squirt/squirt.html

Suter, G.W. II. and C.L. Tsao. 1996. Toxicological Benchmarks for Screening Potential Constituents of Concern for Effects on Aquatic Biota:1996 Revision. Oak Ridge National Laboratory. ES/ER/TM-96/R2.

USEPA (United States Environmental Protection Agency), January 1996. ECO Update, Ecotox Thresholds. United States Environmental Protection Agency. Office of Solid Waste and Emergency Response. Intermittent Bulletin, Volume 3, Number 2. EPA540/F-95/038.

USEPA, May 1996. Quality Criteria for Water - 1986. Office of Water, Regulations and Standards. EPA 440/5-86-001.

USEPA, November 2002. National Recommended Water Quality Criteria: 2002. Office of Water. EPA 822-R-02-047. (The 2002 criteria were used in the 2004 National Recommended Water Quality Criteria Table; Poster and Brochure, EPA-822-H-04-001 and EPA-822-F-04-010).

USEPA, March 2005a. Guidelines for Carcinogen Risk Assessment. EPA/630/P-03/001F.

USEPA, March 2005b. Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens, EPA/630/R-03/003F.

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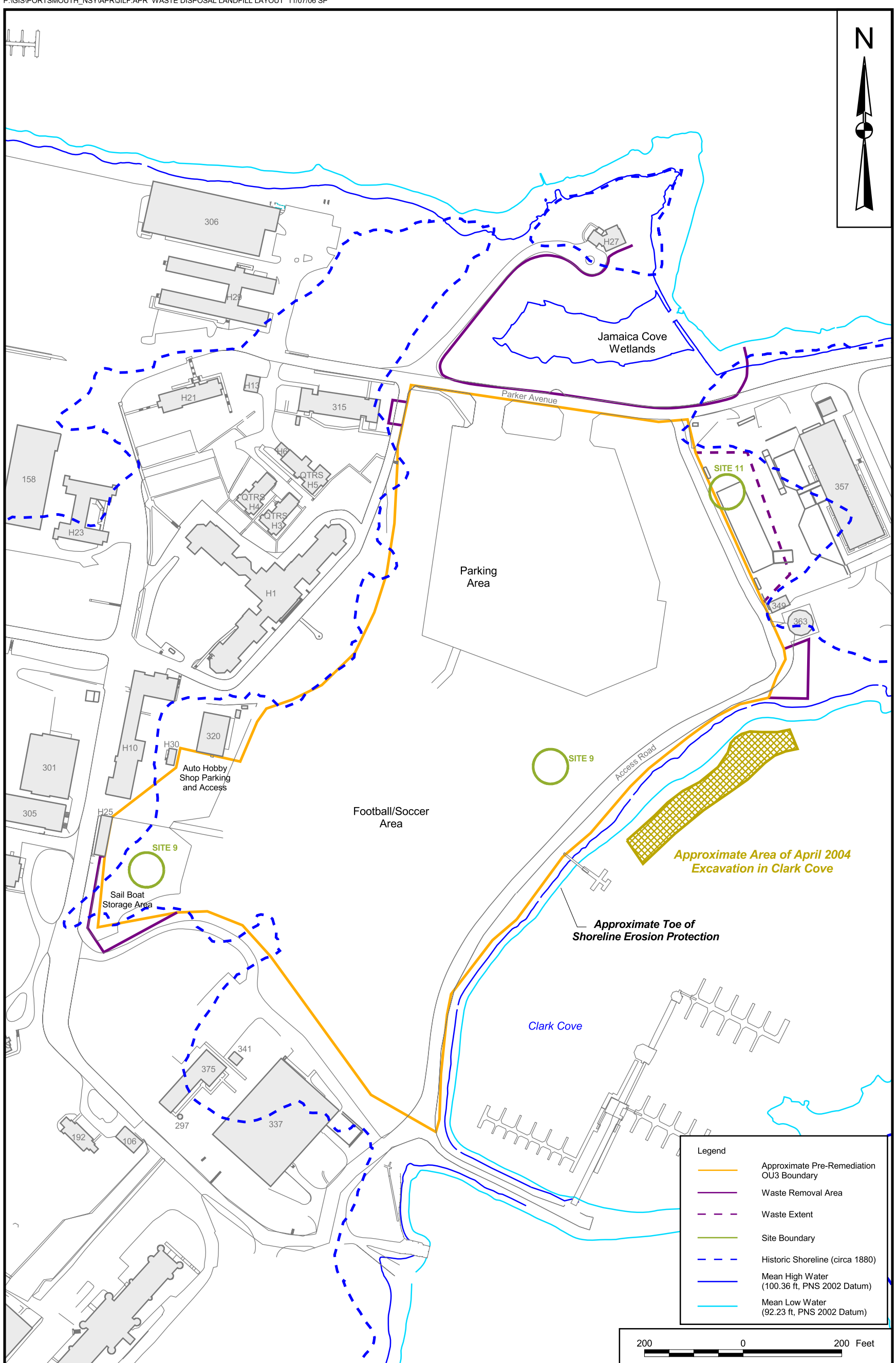
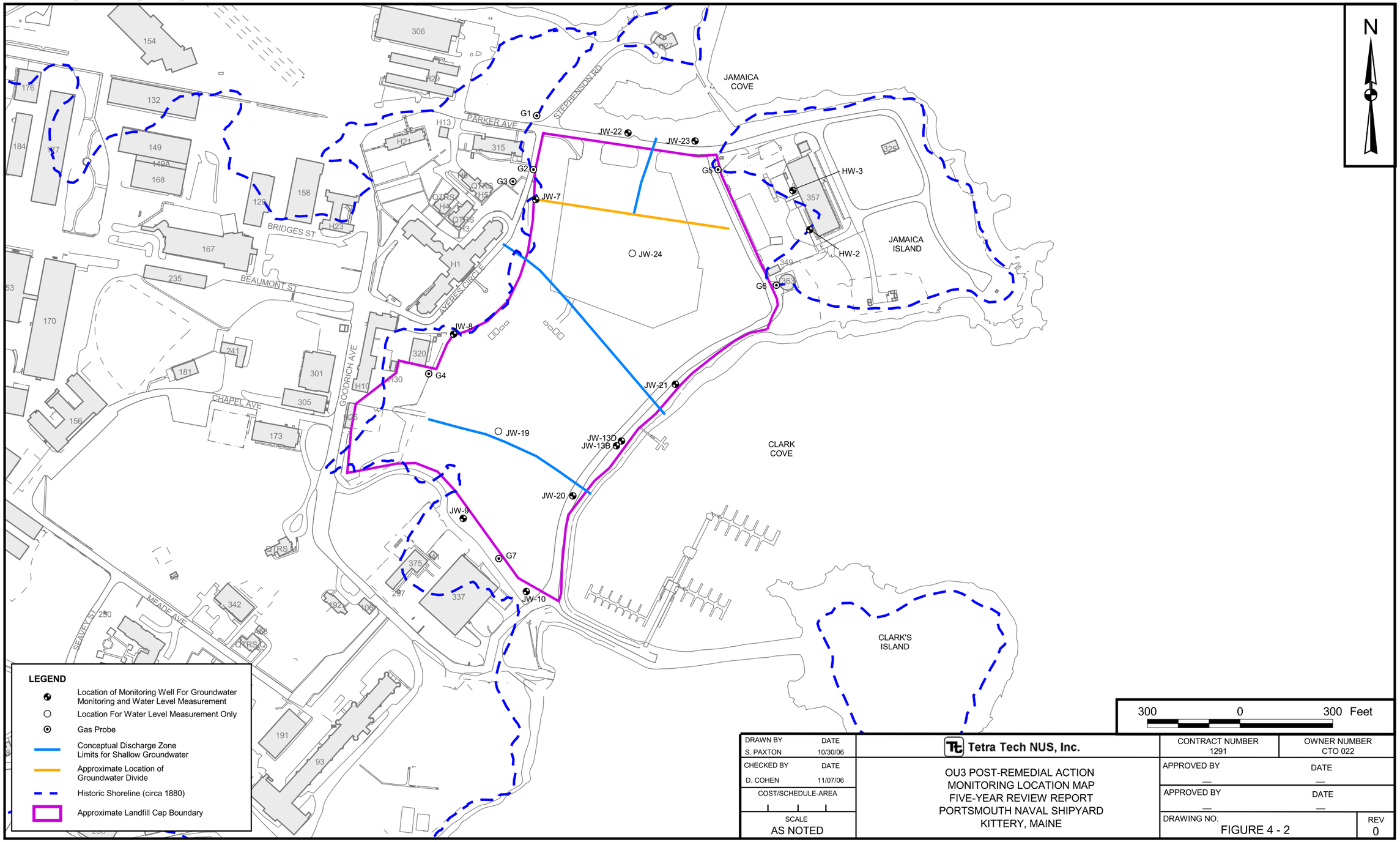
P:\GIS\PORTSMOUTH_NSY\APR\JILF.APR WASTE DISPOSAL LANDFILL LAYOUT 11/07/06 SP



DRAWN BY	DATE	Tetra Tech NUS, Inc.	CONTRACT NUMBER	OWNER NUMBER
A. JANOCHA	7/15/03		1291	CTO 022
CHECKED BY	DATE	OU3 LAYOUT MAP	APPROVED BY	DATE
D. COHEN	11/07/06	FIVE-YEAR REVIEW REPORT	—	—
COST/SCHEDULE-AREA		PORTSMOUTH NAVAL SHIPYARD	APPROVED BY	DATE
		PORTSMOUTH, MAINE	—	—
SCALE			DRAWING NO.	REV
AS NOTED			FIGURE 4 - 1	0

P:\GIS\PORTSMOUTH_NSY\APR\INTERIM_OFFSHORE_MONITORING.APR OU3 MONITORING STATION LOCATION LAYOUT 10/30/06 SP



DRAWN BY S. PAXTON	DATE 10/30/06	Tetra Tech NUS, Inc.	CONTRACT NUMBER 1291 / OWNER NUMBER CTO 022
CHECKED BY D. COHEN	DATE 11/07/06	OU3 POST-REMEDIAL ACTION MONITORING LOCATION MAP FIVE-YEAR REVIEW REPORT PORTSMOUTH NAVAL SHIPYARD KITTERY, MAINE	APPROVED BY — DATE —
COST/SCHEDULE-AREA			APPROVED BY — DATE —
SCALE AS NOTED			DRAWING NO. FIGURE 4 - 2 / REV 0

5.0 OPERABLE UNIT 4

OU4 consists of the areas offshore of PNS that were potentially affected by PNS onshore IRP sites and Site 5 – Former Industrial Waste Outfalls, a site that had offshore impacts but no onshore impacts. An interim remedy (monitoring) is being conducted for OU4 before an FS is prepared. A five-year review for OU4 is being conducted because hazardous substances, pollutants, or contaminants remain in offshore areas in excess of levels that allow for unlimited use and unrestricted exposure. The Interim ROD for OU4 (Navy, May 1999) requires the Navy to conduct monitoring in the offshore area of PNS in the interim period before a final remedy is selected and implemented for OU4. The Interim Offshore Monitoring Plan (TtNUS, October 1999) presents the monitoring program for the interim action. Monitoring began in 1999 and eight rounds of sampling have been conducted to date. An FS will be prepared for OU4 after the majority of remedial actions for the onshore sites have been initiated.

As discussed in Section 1.0, NFA under CERCLA was documented for Site 26; therefore, this site is no longer included in OU4 and is not discussed in the five-year review.

5.1 HISTORY AND SITE CHRONOLOGY

The history of environmental activities at PNS is discussed in Section 1.2.2. A list of important OU4 historical events and relevant dates in the site chronology is shown below. The identified events are illustrative, not comprehensive.

Event	Date
Outfalls in the Dry Dock area were used to discharge industrial wastes into the Piscataqua River	~1945 to 1975
Sanitary and storm sewer systems separated; industrial discharge through outfalls discontinued	Completed by 1975
Industrial waste outfalls first identified as a site and operations that previously discharged to the outfalls are identified (as part of the IAS)	1983
Environmental sampling began including the offshore (as part of Final Confirmation Study)	1984
Phase I and Phase II offshore sampling for the offshore human health and ecological risk assessments conducted	1991 to 1993
Final Human Health Risk Assessment Report for Offshore Media completed	1994
Interim ROD for OU4 signed, interim offshore monitoring plan completed, and first round of sampling conducted	1999
Offshore ecological risk assessment (EERA) document finalized	2000
PRGs for OU4 developed	2001
Baseline evaluation of first four rounds of interim offshore monitoring data completed	2002

Event	Date
Evaluation of first seven rounds of interim offshore monitoring data completed, and stations requiring additional scrutiny and/or additional monitoring (as part of Rounds 8 and 9) identified	2004
Work plan (QAPP) for the additional scrutiny investigation completed	2005
Round 8 and additional scrutiny investigations conducted	2005

Onshore OUs with sites that have potential offshore impacts are OU1 (Section 2.0), OU2 (Section 3.0), OU3 (Section 4.0), OU7 (Section 6.0), OU8 (Section 7.0), and OU9 (Section 8.0). Additional information on the onshore sites is provided in these sections.

5.2 BACKGROUND

OU4 is the offshore area of the Piscataqua River and the Back Channel around PNS. OU4 includes Site 5 and six AOCs as shown on Figure 1-2. As part of the Interim Offshore Monitoring Program, 14 interim offshore monitoring stations are located around PNS in the AOC areas, and four reference stations are located in the Great Bay Estuary as shown on Figures 5-1 and 5-2, respectively.

Site 5 – Former Industrial Waste Outfalls is a site that had offshore impacts but no onshore impacts. This site is located within the Dry Docks AOC, and any impacts that Site 5 may have had on the offshore are being addressed as part of the Dry Dock AOC. Site 5 consisted of numerous discharge points along the Piscataqua River in the berth area by the dry docks in the western end of PNS. The outfalls were used from approximately 1945 to 1975 to discharge liquid industrial wastes (primarily from acidic, alkaline, and metal-plating rinse baths) to the offshore before the sanitary and storm sewer systems were separated and offshore discharge of industrial wastes was discontinued. The wastewaters may have contained heavy metals (mercury, lead, cadmium, chromium, copper, and zinc), oils and grease, and PCBs. Lead sediment from decommissioned batteries (as part of operations at Site 10) was also reportedly included in the discharges to the river before 1975 (Weston, 1983). Maintenance dredging is conducted periodically in the berth areas. The most recent dredging occurred between January 2002 and April 2002, between Interim Offshore Monitoring Program Rounds 5 and 6 (TtNUS, November 2004a).

The AOCs were identified in the EERA sampling as nearshore habitats adjacent to PNS that may have been affected by onshore IRP sites. A conceptual model developed as part of the risk assessment was used to identify six AOCs, Clark Cove, Sullivan Point, DRMO Storage Yard, Dry Docks, Back Channel, and Jamaica Cove. Various studies were conducted as part of the Phase I and Phase II EERA investigations. Phase I and Phase II data and conclusions were synthesized to assess potential risks to the estuarine environment in the vicinity of PNS. The risk determinations for surface water and sediment exposure for each AOC and the COPCs for each AOC were identified. The ecological risks associated

with surface water were negligible to low, and the ecological risks associated with sediment were low to intermediate. COPCs included metals, PAHs, and PCBs.

The Human Health Risk Assessment for Offshore Media (McLaren/Hart, May 1994) and the Phase I/Phase II Offshore Data Comparative Analysis (TtNUS, October 1998) provide the details on the assessment of human health risks for OU4. Based on the assessment and as provided in the Interim ROD for OU4, human health risks for exposure to sediment and surface were acceptable; risks for consumption of seafood exceeded regulatory guidelines. However, the human health risk assessment could not differentiate whether the chemicals that cause the risk were from PNS sources or from other sources within the lower Piscataqua River. Also, because risks are similar to or lower than other areas of the coastal waters of Maine, it would not be feasible to address human health risk until an overall effort is made (by all contributors) to reduce contamination in the lower Piscataqua River (Navy, May 1999).

The Navy determined that interim monitoring was warranted for OU4 to provide current data on the offshore areas to determine whether onshore remedial actions, natural processes, and/or other sources have affected the chemical concentrations in OU4. Therefore, an Interim ROD for OU4 was signed in May 1999 that requires the Navy to conduct interim offshore monitoring for OU4 (Navy, May 1999).

The monitoring program initially included sediment, mussel, and juvenile lobster sampling and analysis. The first round of interim offshore monitoring samples was collected in 1999. The data from Rounds 1 and 2 were used to develop PRGs for OU4 (TtNUS, November 2001). The PRGs are being used as Interim Remediation Goals (IRGs) for making decisions as part of the interim offshore monitoring program. The data from Rounds 1 through 4 were evaluated to determine whether changes were needed to the interim offshore monitoring program. The major changes to the interim offshore monitoring program based on the Rounds 1 through 4 data were to discontinue select analyses (acid volatile sulfides and simultaneously extract metals) for sediment, discontinue juvenile lobster sampling, and conduct subsequent sampling (starting with Round 5) during late summer. Data from Rounds 1 through 7 were evaluated to determine whether additional sampling (as part of Rounds 8 and 9) and/or additional scrutiny were needed for select monitoring stations. The conclusions of the Rounds 1 through 7 data evaluation are summarized in Table 5-1. Based on the Rounds 1 through 7 data evaluation, recommendations were also made to only sample sediment during Rounds 8 and 9 (mussel samples will not be collected) and to discontinue alkylated PAH analysis of samples.

To address the additional scrutiny needs, a QAPP for the additional scrutiny activities was prepared in 2005 (TtNUS August 2005a), the sampling was conducted in 2005, and the data package was submitted in 2006 (TtNUS, February 2006). The Navy is preparing the report of the results for the additional scrutiny investigation. Figures 5-3 and 5-4 show the sampling locations for additional scrutiny.

Round 8 sampling was conducted in 2005, and the data package was submitted in 2006 (TtNUS, January 2006b). Round 9 will be conducted in 2007, and Round 10 will be conducted in 2008.

A description and current status of each monitoring station are as follows:

- **MS-01**: This monitoring station is located in the Back Channel AOC, offshore of Site 34 (OU9) where a Site Screening Investigation was conducted in 2003 (TtNUS, August 2004). Additional scrutiny investigation was conducted at MS-01. As discussed in Section 8.0, a non-time-critical removal action is planned for source material at Site 34.

- **MS-02 and MS-10**: These monitoring stations are located in the Back Channel and Sullivan Point AOCs, respectively. They are not located offshore of any known IRP sites.

- **MS-03 and MS-04**: These monitoring stations are located in the Back Channel AOC, offshore of Site 32 (OU7). Foundry slag associated with Site 32 has been identified in the intertidal areas of MS-03 and MS-04 and is likely the source of the metals at those stations. As discussed in Section 6.0, in June 2006, a time-critical removal action was conducted to provide shoreline erosion controls where significant erosion was occurring. As part of the removal action, surficial debris (including slag) was removed from the shoreline and shoreline controls were placed along the entire Site 32 shoreline, in the mid- to high tide area. Additional scrutiny was recommended for these monitoring stations and activities for additional scrutiny will be identified and conducted as part of the Phase II RI field work for Site 32.

- **MS-05, MS-06, MS-07, MS-08, and MS-09**: MS-05 and MS-06 are located in the Jamaica Cove AOC and MS-07, MS-08, and MS-09 are located in the Clark Cove AOC. Stations MS-05, MS-08, and MS-09 are offshore of OU3, and MS-06 and MS-07 are in the offshore area adjacent to OU3. As discussed in Section 4.0, remedial action was conducted at OU3, which included excavation of wastes from OU3 adjacent to Jamaica Cove (and subsequent wetlands construction in the excavated area), excavation of wastes from the offshore area within MS-08, and placement of shoreline controls along the entire OU3 shoreline. The construction activities apparently affected sediment concentrations in the offshore area within MS-05, MS-08, and MS-09. Additional scrutiny was recommended for these monitoring stations to determine the extent of sediment impact for MS-05 and MS-09 and to restart the trend line for all three stations (as part of Round 8 sampling). MS-06 and MS-07 do not appear to have been impacted by OU3.

- **MS-11**: This monitoring station is located in the DRMO Storage Yard AOC and is located offshore of OU2. As discussed in Section 3.0, erosion of metals-contaminated soil along a portion of the OU2 shoreline (by Site 6) was identified in 1999, and a time-critical removal action was conducted to prevent further erosion of contaminants by placing shoreline erosion controls along a portion of the OU2 shoreline. Additional erosion was noted in areas of the OU2 shoreline where erosion controls were not in place, and a time-critical removal action was conducted in 2005 and 2006 to provide shoreline erosion controls in the remaining portion of the OU2 shoreline (along portions of the Site 29 shoreline). The entire OU2 shoreline now has some type of shoreline erosion controls. Sediment is present at only one location at MS-11; the sediment concentrations at the other two locations (if sediment was present) are estimated using mussel data from those locations. The elevated concentrations of metals (copper, lead, and nickel) in MS-11 sediment are likely from erosion from OU2.

- **MS-12**: This station is located in the Dry Dock AOC, offshore of Site 10 (OU1). As discussed in Section 2.0, there was one industrial waste outfall (Site 5) that discharged in the offshore area of Site 10 (apparently from Site 10 operations and other operations nearby). Lead-contaminated soil is present at Site 10 that is from a previous CERCLA release at the site; however, groundwater data from Site 10 do not indicate that the site is a current source to the offshore. PAHs are not chemicals associated with the Site 10 source. Metals (including lead) and PAHs were reportedly included in discharges from Site 5; however, these discharges were discontinued by 1975. Therefore, there do not appear to be any current IRP sources to MS-12. The elevated levels of lead and/or PAHs at MS-12 may be caused by a combination of sources that may or may not be related to PNS, including potential migration or transport from IRP sites, discharges from barges/boats, storm water outfalls located in the vicinity of the shipyard, and dock-side activities, to name a few.

- **MS-13 and MS-14**: These stations are located in the Dry Dock AOC, to monitoring sediment potentially impacted by Site 31 (OU8). Industrial waste outfalls (Site 5) had discharge points in this area. These discharges were discontinued by 1975. The area by MS-13 was dredged between January and April 2002 (between Rounds 5 and 6). Potential sources of PAHs that may or may not be related to PNS include potential migration or transport from IRP sites, discharges from barges/boats, storm water outfalls located in the vicinity of the shipyard, and dock-side activities, to name a few.

5.3 REMEDIAL ACTIONS

A final remedy has not been selected or implemented for OU4; however, an interim remedy was selected as documented in the Interim ROD for OU4 (Navy, May 1999). The Interim ROD requires the Navy to conduct monitoring in the offshore area of PNS in the interim period before a final remedy is selected and

implemented for OU4. The Navy determined that interim monitoring was warranted for OU4 to provide current data on the offshore areas to determine whether onshore remedial actions, natural process, and/or other sources have affected the chemical concentrations in OU4. This section discusses the interim remedy and the current status and schedule for OU4.

5.3.1 Remedy Selection

During the interim remedy, environmental conditions in the offshore AOCs will be determined by comparing the concentrations of chemicals of concern (COCs) in site media to IRGs for OU4. The IRGs are concentration-based levels that were to be developed to meet the following interim RAOs:

- Protect pelagic, epibenthic, eelgrass, and salt marsh communities by identification of exposure to COCs at unacceptable levels in the estuarine waters of the PNS offshore AOCs.

- Protect epibenthic, benthic, eelgrass, and salt marsh communities by identification of exposure to COCs at unacceptable levels in the sediment of the PNS offshore AOCs.

The COCs identified for OU4 at the time of the Interim ROD included metals, PCBs, and PAHs. The COCs and pesticides and dioxins/furans (at select locations) are analyzed as part of the monitoring program. Based on the PRG development for OU4, IRGs were identified for the COCs that accounted for the majority of risk (limiting COCs), which include several metals and PAHs.

The Interim ROD consists of offshore monitoring of environmental media (e.g., sediment) in the areas offshore of PNS that were potentially affected by onshore IRP sites. Offshore environmental media are being monitored to determine whether, over the course of interim monitoring, current and future concentrations of COCs (metals, PCBs, and PAHs) in the offshore AOCs are at acceptable levels (IRGs). In addition, interim monitoring will be used to meet the following objectives: (1) provide information on the current condition of the offshore areas; (2) provide information to support the identification and selection of any removal action, any additional interim action, or a final remedy; (3) be consistent with any final remedial action; and (4) provide a basis for any monitoring that may be incorporated as part of the final remedy. The Interim ROD states that the interim offshore monitoring will be conducted in accordance with a monitoring plan that is to specify the media, location, analytes, procedures, and frequency of sampling. Interim action decisions that will be made based on the environmental data collected, including IRGs, are to be specified in the final interim offshore monitoring plan (Navy, May 1999).

5.3.2 Remedy Implementation

In May 1999, an Interim ROD for OU4 (Navy, May 1999) was signed requiring the Navy to conduct monitoring in the offshore area of PNS in the interim period before completion of the offshore FS and implementation of the final remedy for OU4. The Interim Offshore Monitoring Plan (TtNUS, October 1999) was prepared as required by the Interim ROD to present the monitoring program that is being conducted as the interim action. Eight rounds of sampling have been conducted to date. Data collected as a part of the monitoring program provides the information necessary to determine whether the RAOs for this interim period are being met. These interim RAOs were developed so that the protection of ecological offshore communities can be ensured by the identification of exposure to COCs at concentrations greater than acceptable levels.

The Interim Offshore Monitoring Plan (TtNUS, October 1999) provides the methodology for the development of these acceptable exposure levels. These levels provide a basis of comparison for the overall chemical trends of the COCs during the interim period and are referred to as IRGs. The IRGs were developed for the chemicals potentially causing the most offshore impact, which are referred to as the limiting COCs. The IRGs were developed using the sediment-based PRGs developed for OU4 (TtNUS, November 2001) for the following chemicals:

Parameter	IRG (dry weight)
Copper	486 mg/kg
Nickel	124 mg/kg
Acenaphthylene	210 µg/kg
Anthracene	1,236 µg/kg
Fluorene	500 µg/kg
High molecular weight (HMW) PAHs	13,057 µg/kg

Although pesticides were not identified as COCs for OU4, PRGs were developed for endosulfan II (3.95 µg/kg), trans-nonachlor (3.99 µg/kg), and 4,4'-DDT (66.4 µg/kg). The PRGs developed for pesticides are not used as IRGs because pesticides were not identified as COCs for OU4; however, the PRGs are considered when evaluating pesticide data. Lead was not identified as a limiting COC so a PRG was not developed. Lead is a primary COC for several onshore sites; therefore, the ER-M value (Long et al., 1995) was used for screening sediment lead data.

The interim offshore monitoring program is presented in the Interim Offshore Monitoring Plan (TtNUS, October 1999), and modifications to the program based on the Interim Offshore Monitoring Program Baseline Report (TtNUS, July 2002) were implemented after Round 5. In summary, the sampling investigation consists of collecting samples at 14 monitoring stations (MS-01 through MS-14) adjacent to

PNS and four reference stations (RS-01 through RS-04) in the Piscataqua River. Figures 5-1 and 5-2 present the overall layout of the monitoring and reference stations, respectively.

At each monitoring station, three sediment samples (with the exception of MS-11), one to three mussel samples, and one juvenile lobster sample (Rounds 1 through 5 only) were collected during each monitoring event. Only one sediment sample is collected at MS-11 because sediment is not present at two of the three MS-11 sampling locations. Four sediment samples, two mussel samples, and one juvenile lobster sample (Rounds 1 through 5 only) were collected at each reference station.

For all stations and reference stations, sediment and mussel samples were collected during Rounds 1 through 7. Lobster samples were collected during Rounds 1 through 5, and sediment porewater samples were collected during Round 2. Sediment only was collected at MS-5, MS-8, MS-9, MS-10, MS-13, MS-14, and the four reference stations in Round 8 (in accordance with the recommendations of the Round 1 through 7 report). The first eight rounds of sampling were conducted between September 1999 and August 2005 as follows:

- Round 1 - September 7 through 11, 1999
- Round 2 - May 2 through 7 and May 23, 2000
- Round 3 - August 27 through 30, 2000
- Round 4 - May 5 through 9, 2001
- Round 5 - August 18 through 22, 2001
- Round 6 - August 10 through 15, 2002
- Round 7 - August 9 through 13, 2003
- Round 8 - August 20 through 23, 2005

The data from the first four rounds were evaluated and documented in the Baseline Interim Offshore Monitoring Program Report (TtNUS, July 2002). The main objective of the evaluation of the baseline data was to provide the Navy's recommendation for the appropriate sampling season for further monitoring rounds. In addition, the Baseline Report provided a comparison to IRGs, evaluation of the need for continued juvenile lobster sampling, risk evaluation of dioxin data, and the results of other evaluations conducted with the Rounds 1 through 4 data. The major changes to the interim offshore monitoring program based on the Rounds 1 through 4 data were to discontinue select analyses (acid volatile sulfides and simultaneously extract metals) for sediment, discontinue juvenile lobster sampling, and conduct subsequent sampling (starting with Round 5) during late summer (TtNUS, November 2004a).

The data from the first seven rounds were evaluated and documented in the Rounds 1 through 7 Interim Offshore Monitoring Program Report (TtNUS, November 2004a). The main objectives of the Rounds 1

through 7 Report were to determine the appropriate frequency of monitoring for each monitoring station for the next 5 years and to determine whether additional scrutiny was recommended at any monitoring station. The evaluation also included recommendations for other modifications to the monitoring program including not collecting mussel samples during Rounds 8 or 9 and discontinuing alkylated PAH analysis. Table 5-1 presents a summary of the recommendations for sampling frequency/need for additional scrutiny at each monitoring station, as presented in the Rounds 1 through 7 Report (TtNUS, November 2004a).

A QAPP for the Additional Scrutiny Investigation was prepared in 2005 (TtNUS, August 2005a), the investigation was conducted in 2005, and the data were presented in a data package (TtNUS, February 2006). The data are being evaluated and a report of the results is being prepared. The Round 8 samples were collected in August 2005, and the data were presented in a data package (TtNUS, January 2006b). The data will be evaluated after Rounds 9 and 10 are collected as part of the Rounds 1 through 10 data evaluation.

Based on the FY07 schedule for OU4 (Navy, July 2006), Rounds 9 and 10 sampling will be conducted in late summer 2007 and 2008, respectively. The FS is scheduled to be conducted in 2012 and a ROD signed in 2013.

5.4 FIVE-YEAR REVIEW PROCESS

This section provides a summary of the five-year review process and the actions taken to complete this review.

5.4.1 Document and Data Review

The Interim ROD for OU4 (Navy, May 1999), Rounds 1 through 7 Interim Offshore Monitoring Program Report (TtNUS, November 2004a), and the Additional Scrutiny QAPP (TtNUS, August 2005a) were the primary documents reviewed for this five-year review.

As discussed in Section 5.3.2, the main objective of the evaluation of the baseline data was to provide the Navy's recommendation for the appropriate sampling season for further monitoring rounds. Trend analysis was conducted with Rounds 1 to 7 data in comparison to IRGs. The evaluation was conducted to determine whether sampling more frequently than every 5 years is recommended [i.e., to determine whether biennial sampling (Rounds 8 and 9) prior to the five-year sampling event (Round 10) is recommended] and to determine whether additional scrutiny is needed at the monitoring stations. Concentrations of select chemicals of environmental significance were plotted over time to determine whether temporal concentrations trends are changing and how they compare with IRGs. Additional

scrutiny means additional evaluation of monitoring station data, the evaluation of other data, or collection of additional data (TtNUS, November 2004a). Table 5-1 provides a summary of the results of the evaluation.

The Additional Scrutiny QAPP (TtNUS, August 2005a) presented a plan for additional scrutiny at monitoring stations MS-01, MS-05, MS-09, MS-11, and MS-12. The objective of the additional scrutiny is to assess existing data and to collect and assess additional data where concentration trend lines for chemicals are greater than IRGs and are projected to continue to exceed IRGs for the next 5 years or are increasing and projected to exceed IRGs within the next 5 years. The additional scrutiny needed at monitoring stations MS-03 and MS-04 for PAHs will be evaluated as part of the planning for the Site 32 Phase 2 RI. Additional scrutiny sampling was conducted in August 2005, and the Navy is preparing a report of the results.

Round 8 data were collected in August 2005, and the data package was submitted. In accordance with the monitoring program, the data will be evaluated as part of the next interim offshore monitoring review (after Round 10 data are collected).

5.4.2 ARAR and Site-Specific Action Level Changes

A final remedy has not been selected and a final ROD has not been signed for OU4; however, the interim remedial action designated by the Interim ROD is monitoring in the offshore area of PNS in the interim period before a final remedy is selected. ARARs and TBCs tables from the OU4 interim ROD are provided in Appendix A. ARARs and TBCs were reviewed to determine whether there have been changes since the Interim ROD and Interim Offshore Monitoring Plan were issued. The chemical-specific ARARs and TBCs for OU4 are as follows:

- National Recommended Water Quality Criteria (Relevant and Appropriate ARAR) and Maine Surface Water Toxics Control Program Statewide Water Quality Criteria (Relevant and Appropriate ARAR).

- FDA Action Levels and USEPA Proposed Sediment Quality (TBCs).

- NOAA ER-L and ER-M concentrations (Long et al., 1995) and NOAA National Status and Trends Program Mussel Watch Data (TBCs)

Of the above-listed ARARs and TBCs, only the water quality criteria and ER-L and ER-M concentrations were used to develop PRGs for OU4 (TtNUS, November 2001). The PRGs are used as part of the interim offshore monitoring program as discussed in the Interim Offshore Monitoring Plan (TtNUS,

October 1999) and related documents. There have been minor changes in water quality criteria (2002) since the development of the PRGs and the changes would not significantly affect the PRG calculations because water quality criteria did not have a significant affect on the PRG development. The ER-L and ER-M concentrations have not changed.

5.4.3 Site Inspection

The areas offshore of the IRP sites were visually inspected as part of the onshore inspections. The inspection was performed by TtNUS personnel. Observations regarding the shorelines were made as part of the onshore site inspections. There were no obvious changes to the offshore area (since the OU3 remedial construction activities and preparation of the Rounds 1 through 7 report in 2004) besides the shoreline erosion controls that were placed at OU2 and OU7. PNS personnel took photographs of the shoreline erosion controls, and these photographs are provided in Appendix B.

5.5 TECHNICAL ASSESSMENT

The following conclusions support the determination that the interim remedy for OU4 will be protective of human health and the environment upon completion.

Question 1. Is the remedy functioning as intended by the decision documents?

Remedial Action Performance: The interim offshore monitoring program for OU4 provides data for OU4 until a final remedy is selected. The data are used to determine whether, over the course of interim monitoring, current and future concentrations of COCs (metals, PCBs, and PAHs) in the offshore areas are at acceptable levels (IRGs). In addition, interim monitoring provides information on the current condition of the offshore areas and information to support the identification and selection of any removal action (e.g., OU2 and OU7 shoreline stabilization).

- ***System Operations/O&M/Cost:*** Data have been collected under the Interim Monitoring Program from September 1999 to August 2005.

  Actual costs for the monitoring program were generally between $100,000 to $500,000 per sampling event (including data package preparation), and reporting costs (PRG Report, Baseline Report, and Rounds 1 through 7 Report) were between $30,000 to $90,000 (see table below). The costs include those associated with sampling, analysis, validation, and reporting for the monitoring and document preparation and technical meetings for the reports. The major costs associated with the monitoring was the analytical costs, which ranged from $230,000 to $420,000 for Rounds 1 through 4 and $160,000 to $220,000 for Rounds 5 through 7. Round 8 analytical costs were much lower because

there were less samples and analytical parameters than Rounds 1 through 7. Round 9 costs are expected to be similar to the Round 8 costs, and Round 10 costs are expected to be similar to the Round 7 costs.

Item	Cost of Monitoring
Projected Annual Cost in Interim ROD	$100,000 to $500,000 annually
Round 1 (1999)	$440,000
Round 2 (2000) (including samples for PRG development)	$530,000
Round 3 (2000)	$320,000
Round 4 (2001)	$330,000
PRG Report (2001)	$30,000
Round 5 (2001)	$330,000
Baseline Report (2002)	$60,000
Round 6 (2002)	$270,000
Round 7 (2003)	$250,000
Round 1 through 7 Report (2004)	$90,000
Round 8 (2005)	$100,000

- ***Opportunities for Optimization:*** As part of the Baseline Report and the Rounds 1 through 7 Report, the Navy evaluated the data in accordance with the Interim Offshore Monitoring Plan and recommended modifications to the monitoring program. After Round 4, monitoring frequency was decreased from twice a year (spring and summer) to once a year (summer). Juvenile lobster sampling and analysis was discontinued after Round 5, mussel sampling was not included in Round 8 and Round 9, and select analytes were removed from the sampling program after Rounds 5 and 7 (as discussed in Section 5.3.2). As provided in Table 5-1, select stations for select analytes will be included in Rounds 8 and 9. Other modifications to the interim offshore monitoring program will be considered as part of the Rounds 1 through 10 data evaluation (after Round 10 samples are collected).

- ***Early Indicators of Potential Issues:*** There are no indicators of potential issues with the interim remedy.

- ***Implementation of Institutional Controls and Other Measures:*** There are no institutional controls or other measures associated with the interim remedy.

- ***Changes in Risk Assessment Methods:*** As discussed in Section 5.4.2, there have been no major changes in that would affect the interim offshore monitoring program.

Question 2. Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?

- ***Changes in Exposure Pathways:*** There have been no changes that would have resulted in new exposure pathways to human or ecological receptors.

- ***Changes in Land Use:*** There have been no changes in land use onshore that would result in an adverse impact to the offshore. As part of the OU3 remedy, wetlands were constructed in Jamaica Cove.

- ***New Contaminants and/or Contaminant Sources:*** There have been no new contaminants or contaminant sources identified.

- ***Remedy Byproducts:*** There are no remedy byproducts for the interim remedy.

- ***Changes in Standards, Newly Promulgated Standards, and TBCs:*** As discussed in Section 5.4.2, there have been no changes to ARARs that affect the IRGs or interim remedy.

- ***Changes in Toxicity and Other Contaminant Characteristics:*** There have been no changes in the estuarine ecological criteria that impact the IRGs.

- ***Expected Progress Towards Meeting RAOs:*** The RAOs for OU4 are being met by conducting offshore monitoring until a final remedy is selected and implemented.

- ***Changes in Risk Assessment Methods:*** There have been no major changes in estuarine ecological risk assessment methodology since the signing of the Interim ROD that impact the protectiveness of the remedy.

Question 3. Has any other information come to light that could call into question the protectiveness of the remedy?

The final remedy has not yet been determined. The final remedy will be determined based on evaluation of data collected during the interim remedy. There has been no new information that calls into question the protectiveness of the interim remedy.

5.6 ISSUES

A final remedy has not been implemented at OU4; therefore, deficiencies in the remedial action cannot be determined at this time. No issues were identified for OU4.

5.7 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

It is recommended that Rounds 9 and 10 of the Interim Offshore Monitoring Program be collected and evaluated as part of the Rounds 1 through 10 evaluation. It is recommended that the Additional Scrutiny Report be completed.

5.8 PROTECTIVENESS STATEMENT

The selected interim remedy is protective of human health and the environment in the short term and is intended to provide adequate means to take protective measures until the final ROD is signed. The interim remedy complies with federal and State ARARs for this limited-scope action and is cost effective. This action is interim and is not intended to use permanent solutions and alternative treatment (or resource recovery) technologies. Because this action does not constitute the final remedy for OU4, the statutory preference for remedies that use treatment as a principal element to reduce the toxicity, mobility, or volume of contaminated media is not addressed here but will be addressed by the final remedy. There have been no principal threat wastes identified at OU4. Subsequent actions are planned to address the potential threats posed by the conditions at OU4. Because this is an interim action, review of site conditions and implementation of this interim remedy will be ongoing as the Navy continues to develop final remedial alternatives for OU4.

A final remedy at OU4 has not yet been selected. The results of the Rounds 1 through 7 Interim Offshore Monitoring Report, additional scrutiny sampling, and Round 8 monitoring do not indicate any imminent threats to human health or the environment under current land use scenarios. The onshore remedy for OU3 will reduce the infiltration of precipitation through the unsaturated zone of the landfill material and is expected to reduce the potential for contaminant migration to the offshore. Landfill material was excavated from a 3-acre area of the landfill adjacent to Jamaica Cove, further reducing the potential for contaminant migration to the offshore. Onshore removal actions have been conducted to reduce erosion along the shoreline at OU2 and OU7. A removal action is planned to remove source material (soil and ash) at OU9. These actions will reduce the current and potential future impact from the onshore sites.

TABLE 5-1

OVERALL RECOMMENDATIONS FOR SAMPLING FREQUENCY AND ADDITIONAL SCRUTINY AT EACH MONITORING/REFERENCE STATION FIVE-YEAR REVIEW REPORT PORTSMOUTH NAVAL SHIPYARD, KITTERY, MAINE

Monitoring Station	Recommendation for Sampling Frequency			Recommendation of Need for Additional Scrutiny
	Round 8 (Aug 2005)	Round 9 (Aug 2007)	Round 10 (Aug 2008)	
MS-1			Full Suite[1]	Yes
MS-2			Full Suite	No
MS-3			Full Suite	Yes[2]
MS-4			Full Suite	Yes[2]
MS-5	Full Suite	Full Suite	Full Suite	Yes
MS-6			Full Suite	No
MS-7			Full Suite + Dioxins/Furans	No
MS-8	Full Suite + Dioxins/Furans	Full Suite + Dioxins/Furans	Full Suite + Dioxins/Furans	Yes
MS-9	Full Suite + Dioxins/Furans	Full Suite + Dioxins/Furans	Full Suite + Dioxins/Furans	Yes
MS-10	PAHs	PAHs	Full Suite + Dioxins/Furans	No
MS-11			Full Suite + Dioxins/Furans	Yes
MS-12			Full Suite + Dioxins/Furans	Yes
MS-13	PAHs	PAHs	Full Suite	No
MS-14	PAHs	PAHs	Full Suite	No
Reference Stations	PAHs, PCBs Dioxins/Furans, TOC	PAHs, PCBs Dioxins/Furans, TOC	Full Suite + Dioxins/Furans	No

Footnotes:

1 - Full Suite includes: PAHs, pesticides, PCBs, metals, grain size, and TOC.

2 - Additional scrutiny was conducted for these stations as part of the Site 32 RI for copper and nickel. PAHs will be evaluated in the planning for the Phase 2 RI for Site 32 to determine any additional scrutiny required for these chemicals.

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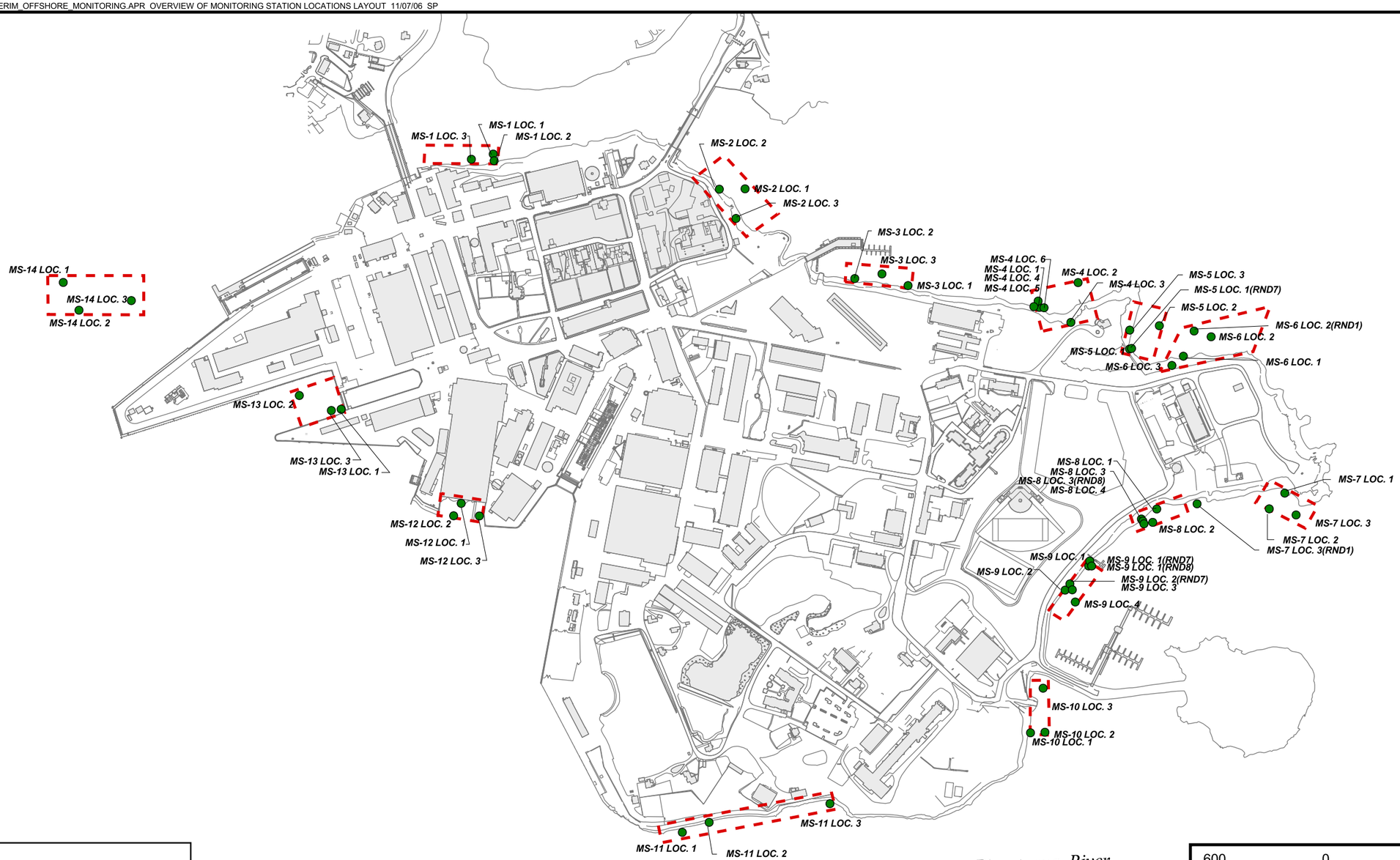
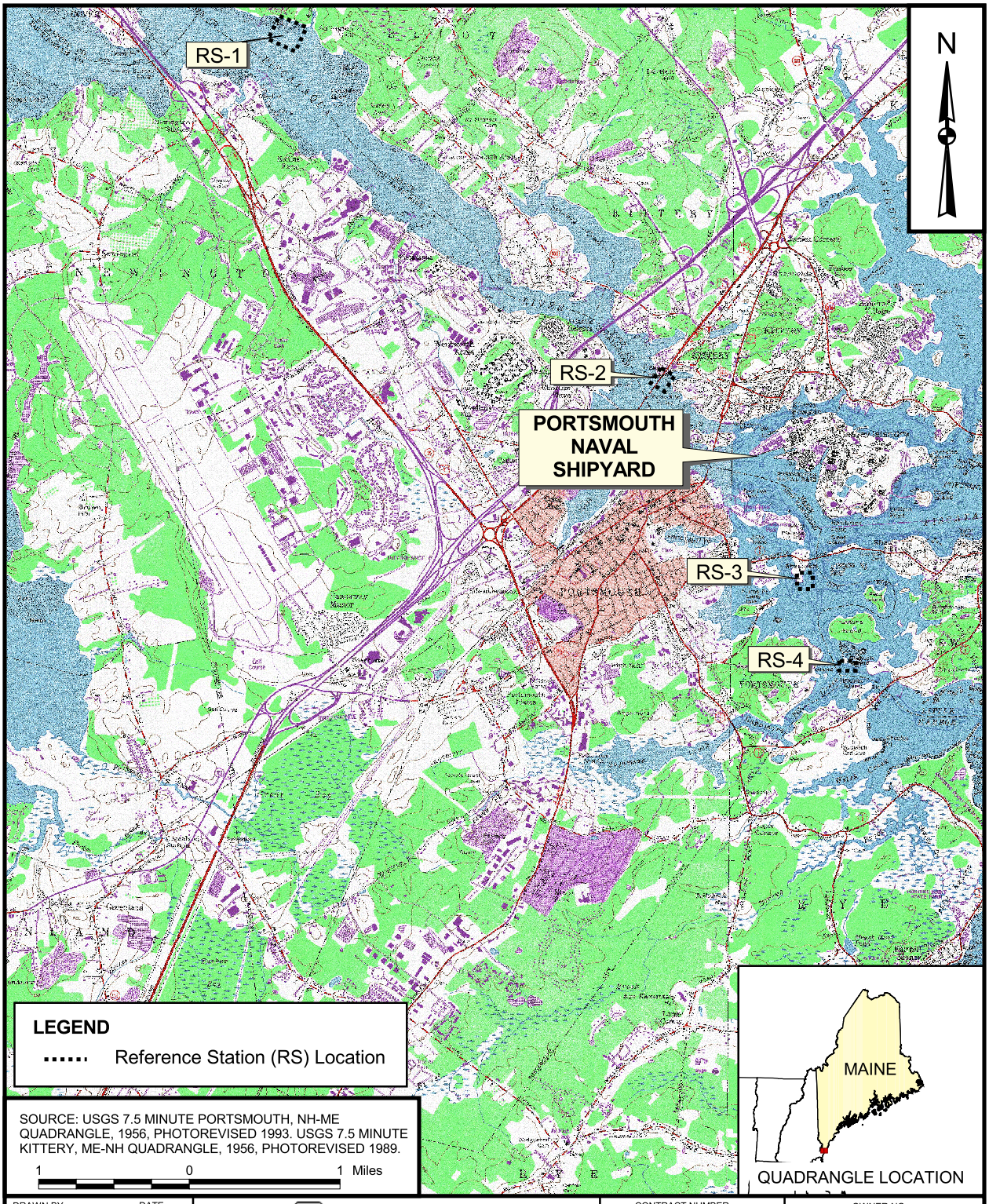


LEGEND

- Sampling Location Within Monitoring Station (MS)
- Monitoring Station Location

Note: This figure shows all sample locations within each monitoring station collected as part of interim offshore monitoring.

DRAWN BY J. LAMEY	DATE 4/20/04	Tetra Tech NUS, Inc.	CONTRACT NUMBER 1291	OWNER NUMBER CTO 022
CHECKED BY D. COHEN	DATE 11/07/06	OVERVIEW OF INTERIM OFFSHORE MONITORING STATION LOCATIONS FIVE-YEAR REVIEW REPORT PORTSMOUTH NAVAL SHIPYARD KITTERY, MAINE	APPROVED BY —	DATE —
COST/SCHEDULE-AREA			APPROVED BY —	DATE —
SCALE AS NOTED			DRAWING NO. FIGURE 5 - 1	REV 0



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CHECKED BY D. COHEN — DATE 11/07/06	OVERVIEW OF REFERENCE STATION LOCATIONS FOR THE INTERIM OFFSHORE MONITORING PROGRAM FIVE-YEAR REVIEW REPORT PORTSMOUTH NAVAL SHIPYARD KITTERY, MAINE	APPROVED BY — DATE —	
COST/SCHEDULE-AREA		APPROVED BY — DATE —	
SCALE AS NOTED		DRAWING NO. FIGURE 5 - 2	REV 0

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P:\GIS\PORTSMOUTH_NSY\APR\ADD_SCR_INVESTIGATION.APR ADDITIONAL SCRUTINY LOCS LAYOUT - FIVE YEAR REPORT 11/07/06 SP

DRAWN BY C. FOSTER	DATE 01/05/06	Tetra Tech NUS, Inc.	CONTRACT NUMBER 1291	OWNER NUMBER CTO 022
CHECKED BY D. COHEN	DATE 11/07/06	OVERVIEW OF ADDITIONAL SCRUTINY SOIL, SEDIMENT, AND CATCH BASIN SAMPLE LOCATIONS FIVE-YEAR REVIEW REPORT PORTSMOUTH NAVAL SHIPYARD KITTERY, MAINE	APPROVED BY	DATE
COST/SCHEDULE-AREA			APPROVED BY	DATE
SCALE AS NOTED			DRAWING NO. FIGURE 5 - 3	REV 0

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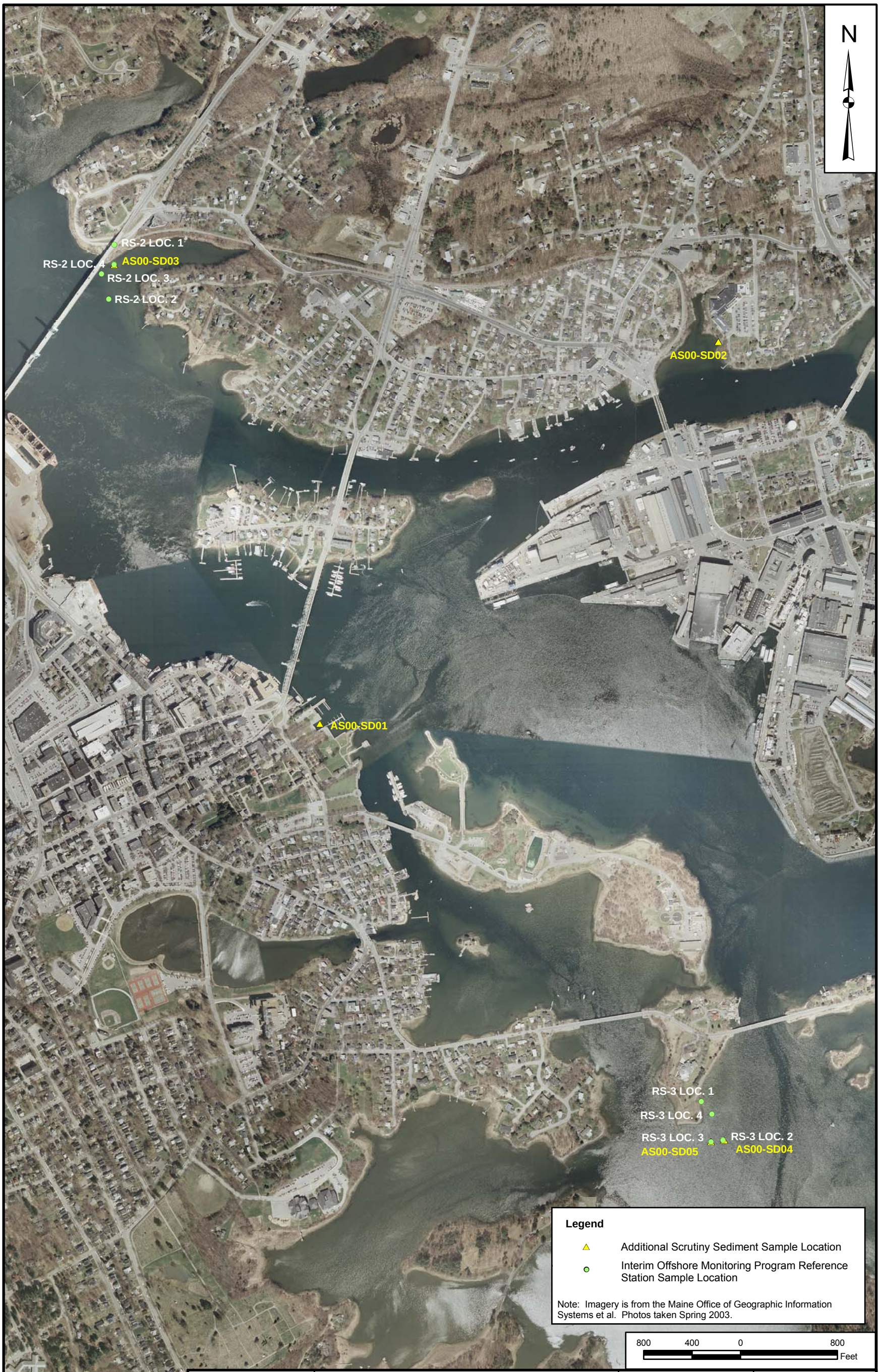


DRAWN BY C. FOSTER	DATE 12/30/05	Tetra Tech NUS, Inc.	CONTRACT NUMBER 1292	OWNER NUMBER CTO 023
CHECKED BY D. COHEN	DATE 11/07/06	LOCATIONS OF ADDITIONAL SCRUTINY SEDIMENT SAMPLES AT REFERENCE STATIONS FIVE-YEAR REVIEW REPORT PORTSMOUTH NAVAL SHIPYARD KITTERY, MAINE	APPROVED BY	DATE
REVISED BY	DATE		APPROVED BY	DATE
SCALE AS NOTED			FIGURE NO. FIGURE 5 - 4	REV 0

6.0 OPERABLE UNIT 7

OU7 contains Site 32 – Topeka Pier Site. An RI is currently being conducted for OU7. Although OU7 is still under investigation under CERCLA, a five-year review is being conducted because hazardous substances, pollutants, or contaminants remain on site in excess of levels that allow for unlimited use and unrestricted exposure. No decision documents have been prepared for this OU7.

6.1 HISTORY AND SITE CHRONOLOGY

The history of environmental activities at PNS is discussed in Section 1.2.2. A list of important OU7 historical events and relevant dates in site chronology is shown below. The identified events are illustrative, not comprehensive.

Event	Date
Filling of area conducted	1900 to 1945
Lumber storage began (in southeastern corner of Site 32)	1910
Various buildings constructed related to lumber yard [to support World War (WW) I]	1920
Many of current buildings built (to support WWII)	1941 to 1945
Wastes from buildings discharged to river; discontinued when sanitary sewer system installed	1940s to 1970s
Building 306 constructed as a transducer repair facility	1980
Excavation work uncovered debris in area and Site 32 identified as site screening area	1994 to 1995
Site screening investigation and geophysical survey conducted	1998
Phase I of RI field work conducted	2003
Parking area repaved	2003/2004
Site 32 Phase I RI Data Package	January 2004
Emergency removal action (shoreline stabilization) conducted	June 2006

The offshore area of OU7 is part of the Back Channel AOC that was investigated as part of the EERA and is part of the more recent interim offshore sampling at monitoring stations MS-03 and MS-04. Sampling locations within each monitoring station are located in the intertidal and subtidal area along the OU7 shoreline (TtNUS, November 2004a). The offshore area is discussed as part of OU4 in Section 5.0.

6.2 BACKGROUND

Site 32 (OU7) encompasses approximately 17 acres of filled land from just west of Building 162 to east of Building H29 and from the Back Channel south to Building 129 and is located on the northern shore of PNS as shown on Figure 1-2. The current land use includes office parking (about 35 percent of the site

area), equipment storage, vehicle and rail car maintenance, transducer repair, boat launch, and temporary housing/Hospital Corps (Building H23, in the southeastern corner, is used to house transient Navy personnel). OU7 is located along the Back Channel of the Piscataqua River. The pier and offshore areas are used for docking of boats. Figure 6-1 shows the layout of the area.

Filling began in 1900 when excavated material from the construction of Dry Dock No. 2 was used to connect Dennett's and Seavey Islands. A new pier, Topeka Pier, was constructed in the Back Channel of the Piscataqua River to dock the prison ship USS Topeka. Storing and milling of lumber in the area began by 1910, and a timber basin was established at the southeastern corner of the site. The area to the west of the timber basin was used to store coal, wood, and scrap iron. Building 98 was constructed to store combustibles including paints and oils. By the early 1920s, a sawmill (Building 129), a lumber storehouse with timber racks (Building 132), and an additional lumber storehouse (Building 149) were built west of the timber basin to accommodate the increased demand for lumber during WWI. Filling continued until 1945.

From 1941 to 1945, many buildings were constructed on the land created by filling activities at Topeka Pier including a transportation and equipment storage building (Building 154), a net storage building that was converted to a garage in 1947 (Building 158), an electrical sub-station (Building 162), a torpedo overhaul and storage building (Building 176), several storehouses (Buildings 177, 197, and 112), a barracks for the Hospital Corps/temporary housing (Building H23), and an office building (Building H29). Building 154 was used primarily for garage space and diesel locomotive engine repair. Building 158 was used primarily for automotive repair. Buildings 112 and 197 were demolished in 1970. Building 306 was constructed in 1980 as a transducer repair facility.

In 1994 and 1995, excavation work performed along Goodrich Avenue and near Building H23 by the Shipyard uncovered debris including large dry cell batteries, graphite electrodes, brick, wood, metal pipe and wire, glass, asbestos cloth, and crucibles used in foundry operations. Subsequently the area was identified as a site screening area. Environmental sampling at OU7 included groundwater monitoring (at one well cluster) and seep and sediment sampling in the intertidal area in 1996 and 1997, a Site Screening Investigation in 1998 (TtNUS, May 2000), a Multi-Sensor Towed-Array Detection System (MTADS) geophysical survey in 1998 (Naval Research Laboratory, December 2001), and Phase I of the RI in 2003 (TtNUS, January 2004 and June 2004).

Fill material included rock, earth, sediment (from excavation at Dry Dock No. 2), cinders, and other waste and scrap material that could not be destroyed by incineration. The site surface is mostly paved or covered by buildings, with some small areas of grass landscaping. Based on the various investigations, depths to the bottom of fill ranged from 8.5 to 18 feet below ground surface (bgs) across the site. The fill

generally consists of silt and silty clay with traces of fine grained sand, rock fill, metal fragments and shavings, brick, wood, sandblast grit, pottery, glass, and coal and cinders. Fill is underlain by natural marine and glaciomarine silt and clay except in the southernmost borings where fill is underlain by glacial till. Groundwater was encountered at approximately 4 to 9 feet bgs. Groundwater is tidally influenced and flows toward the Back Channel. The majority of the groundwater at the site is saline or brackish.

The MTADS survey to identify magnetic and electromagnetic anomalies was conducted on the approximately one-fourth to one-third of the site that was accessible. The portions of the site not surveyed were inaccessible because of equipment, fenced laydown areas, railroad tracks, and other structures. Site features (e.g., utilities) appeared to be the source of the anomalies for all but one location. A soil boring was installed as part of the Phase I RI within the area of the anomaly. Metals wastes were found in this boring at a depth of 4 to 8 feet bgs; no drums were found.

In April 2002, the Navy conducted a storm sewer video camera survey to determine the condition of the storm sewer system that flows through Site 32. The survey indicated that a majority of the sewers were in poor condition with debris, dislocated joints, etc. and that groundwater infiltration was occurring at several locations that could be accessed by the video camera. The storm sewers have outfalls in the Site 32 intertidal area. Most of these outfalls (OF-60, OF-61, and OF-63) are tidally influenced, and it is likely that the outfalls are points where groundwater from the site is being transported to the Back Channel. Therefore, the Navy considers the storm sewer outfalls as potential groundwater transport pathways in the RI for Site 32.

PAHs, PCBs, and metals are the main contaminants detected in soil at OU7; metals are the main contaminants detected in groundwater. Only metals were detected in outfall and surface water samples; however, the concentrations were less than risk-based screening levels. Based on the evaluation of Site 32 data, the Navy recommended a second phase of sampling to collect additional groundwater data for metals, soil sampling to further investigate high chemical concentrations detected at two locations, and exploratory borings to define the extent of petroleum contamination at one location. A QAPP will be prepared for the second phase of sampling.

During Phase I sampling, the presence of foundry slag and copper and nickel concentrations in sediment in the intertidal area of Site 32 were further investigated. The slag mapping indicated that the slag is generally in the mid- to high tide portion of the intertidal area; therefore, the sediment sampling focused on this area (where finer sediments ware present). The sediment data show that the concentrations of copper and nickel in the sampling grids located further away from the shoreline were less than their respective ecological screening levels. Samples that showed exceedances of ecological screening levels were located in the mid tide area and were bounded by samples to the east, west, and north.

In June 2006, the Navy conducted an emergency removal action to address shoreline erosion along the shoreline north of Building 306. Based on the presence of debris, including foundry slag, the Navy removed surface debris and placed shoreline controls along the entire Site 32 shoreline (approximately 1,200 linear feet) (TtEC, September 2006). The approximate location of the controls is shown on Figure 6-1. Figures showing as-built conditions for the shoreline controls are provided in Appendix A.

6.3 REMEDIAL ACTIONS

A final remedy has not been selected or implemented for OU7. This section discusses the current CERCLA status for OU7 and the associated schedule.

6.3.1 Remedy Selection

Fill material from the 1900s to 1945 containing various types and levels of contaminants is the main concern for OU7. Most samples of subsurface fill had moderate to low concentrations of a variety of chemicals; however, there are some areas with higher concentrations. The OU7 area is mostly covered by asphalt (roadways and parking areas) and buildings. Surficial soil (underlying the asphalt) generally had much lower concentrations of contaminants. Because of concerns about erosion along a portion of the OU7 shoreline, an emergency removal action was conducted to stabilize the shoreline. Surface debris along the shoreline was removed and shoreline controls were placed along the entire shoreline (above mid-tide elevation). Based on the results of Phase I of the RI, additional sampling and analysis are necessary before preparing the RI Report. The FY07 schedule for OU7 (Navy, July 2006) shows that planning for Phase II sampling will be conducted in 2007 and the investigation will be conducted in 2008. The subsequent schedule for the RI Report will be determined as part of the QAPP preparation for Phase II sampling.

6.3.2 Remedy Implementation

A final remedy has not yet been chosen for OU7. A schedule for the FS, ROD, and remedy implementation will be developed after the Phase II sampling is completed.

6.4 FIVE-YEAR REVIEW PROCESS

This section provides a summary of the five-year review process and the actions taken to complete this review.

6.4.1 Document and Data Review

The Site Screening Investigation Report (TtNUS, May 2000), Phase I RI QAPP (TtNUS, March 2003b), Phase I RI Data Package (TtNUS, January 2004), Technical Memorandum of Recommendations for Phase II of the RI (TtNUS, June 2004), and Closeout Report for Site 29 Removal of Waste Debris and Site 32 Shoreline Stabilization (TtEC, September 2006) were the primary documents reviewed as part of the five-year review for OU7. Based on the findings of the Phase I RI at Site 32, additional investigation is necessary at the site to complete the RI. As part of the shoreline stabilization, surficial debris along the shoreline was removed and shoreline controls placed in the mid- to high tide area along the entire Site 32 shoreline.

6.4.2 ARAR and Site-Specific Action Level Changes

A remedy has not been selected and a ROD has not been signed for OU7; therefore, ARARs and site-specific action levels have not been identified for OU7.

6.4.3 Site Inspection

Site 32 was visually inspected on August 30, 2006. Weather conditions during the inspection were warm (70 to 78 degrees Fahrenheit) and cloudy to sunny at mid-tide. The shoreline was also observed on September 26, 2006 and January 2007 at low tide. The inspection was performed by TtNUS personnel. No conditions presenting an immediate threat or unacceptable risk were observed. During the inspection, it was noted that monitoring well TP-MW07 had no cap or concrete pad and was covered with soil and vegetation. Additional monitoring well maintenance items were noted on the inspection log in Appendix A. The recently constructed riprapped slope was observed, and it appears that the previously exposed shoreline material is covered and well protected from erosion. The shoreline controls extend to approximately mid- tide elevation. No debris was observed along the shoreline below the elevation of the shoreline controls. The outfalls were reconstructed so that the pipe outlets were uncovered and not blocked by rocks.

The Shipyard has no plans to change the current use of the site, although the Shipyard is planning to construct a new transducer building to the east of Building 306.

Photographs of the shoreline controls were taken by PNS personnel and are provided in Appendix B.

6.5 TECHNICAL ASSESSMENT

A final remedy has not been selected for OU7; therefore, conclusions cannot be made at this time to support the determination that a remedy is protective of human health and the environment. Investigations did not indicate any imminent threats to human health or the environment. A time-critical removal action was conducted in 2006 to address shoreline erosion along a portion of the OU7 shoreline. The majority of the OU7 area is covered with asphalt and buildings, and as part of removal action, the surficial debris in the OU7 inertial area was removed and shoreline controls placed along the mid- to high tide portion of the intertidal area. Therefore, waste materials are not exposed at OU7. The OU7 area is designated on Shipyard land use maps as IRP Site 32. As discussed in Section 1.1, Shipyard policy restricts digging and excavation activities without a permit from the PNS Environmental Division and groundwater is not used at PNS.

6.6 ISSUES

A final remedy has not been implemented at Site 32; therefore, deficiencies cannot be determined at this time. Minor items were noted on the inspection log in Appendix A.

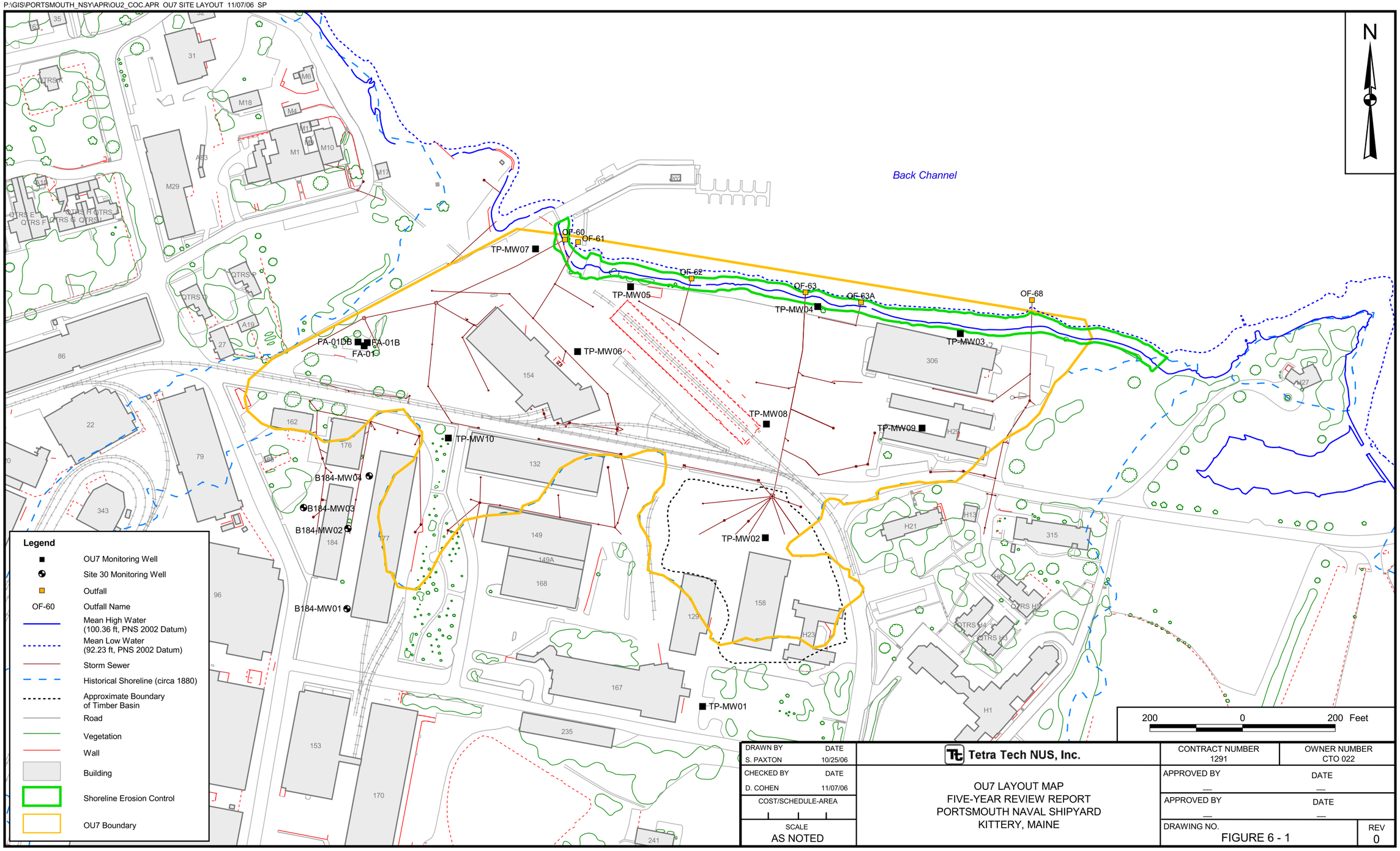
6.7 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

It is recommended that the RI/FS be completed to determine the appropriate remedial action for OU7 that is protective of human health and the environment. An appropriate decision document will be prepared after the RI/FS is completed to document the selected remedial alternative for OU7. The Navy/PNS should address the maintenance items (see Appendix A) and continue to enforce the Shipyard dig policy. Any planned and approved digging or excavation in the area should be conducted following the appropriate health and safety protocols for a hazardous waste site, and any excavated material should be managed appropriately.

6.8 PROTECTIVENESS STATEMENT

A remedy at OU7 has not yet been selected. The results of the investigations and removal action for OU7 do not indicate any imminent threats to human health or the environment under current land use scenarios. The current use for OU7 is industrial and commercial, the future planned land use is anticipated to remain the same, and the fill material is covered with asphalt or buildings. Current site conditions and Shipyard policies provide for protection of human health and the environmental until a final remedy is selected.

P:\GIS\PORTSMOUTH_NSY\APR\OU2_COC.APR OU7 SITE LAYOUT 11/07/06 SP



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S. PAXTON	10/25/06			
CHECKED BY	DATE	OU7 LAYOUT MAP FIVE-YEAR REVIEW REPORT PORTSMOUTH NAVAL SHIPYARD KITTERY, MAINE	APPROVED BY —	DATE —
D. COHEN	11/07/06		APPROVED BY —	DATE —
COST/SCHEDULE-AREA			DRAWING NO. FIGURE 6 - 1	REV 0
SCALE AS NOTED				

7.0 OPERABLE UNIT 8

OU8 contains Site 31 – West Timber Basin. An RI will be conducted for this site. Although OU8 is still under investigation under CERCLA, a five-year review is being conducted for OU8 because hazardous substances, pollutants, or contaminants remain on site in excess of levels that allow for unlimited use and unrestricted exposure. No decision documents have been prepared for OU8.

7.1 HISTORY AND SITE CHRONOLOGY

The history of environmental activities at PNS is discussed in Section 1.2.2. A list of important OU8 historical events and relevant dates in the site chronology is shown below. The identified events are illustrative, not comprehensive.

Event	Date
Wood storage and seasoning for shipbuilding conducted in the West Timber Basin	Early 1900s to 1913
Filling of the West Timber Basin began	1916
Quay wall installed to enclose the basin	1917
Metal washing plant (Building 110) constructed	1920s
Filling of basin continued	1920 to 1940
Buildings 110, 51, and 83 razed, pickling tanks adjacent to Building 110 removed, and train tracks constructed	1940
Building 92 extended over a portion of the timber basin	1940
Plate yard with pickling tanks and washing aprons active	1940 to 1960
Pickling tanks removed after use of plate yard discontinued	Unknown (after 1960)
Site screening investigation	1998
Removal of surface features and initial construction activities associated with expansion of Building 174	September to December 2006

The offshore area near OU8 is included in the Dry Dock AOC that was investigated as part of the EERA and is included in the more recent interim offshore sampling at monitoring stations MS-13 and MS-14. Sampling locations at MS-13 are located adjacent to Dry Dock No. 1 to the east and at MS-14 are located east of Dry Dock No. 3 (TtNUS, November 2004a). The offshore area is discussed as part of OU4 in Section 5.0.

7.2 BACKGROUND

OU8 is located in the CIA, in the northeastern portion of PNS as shown on Figure 1-2. The OU8 layout is shown on Figure 7-1. OU8 is an industrial area and is surrounded by buildings or dry docks. The main site features were associated with the former plate yard, which was a fenced area with railroad spurs.

Equipment and temporary facilities were within the fence of the former plate yard. Building 157, formerly the plate yard office, was vacant until removal in 2006. Building 92 located east of the former plate yard is the Structural Shop.

The historical site layout including the location of the timber basin is shown on Figure 7-2. During the early 1900s, wood for shipbuilding was stored and seasoned in the West Timber Basin. In 1900, filling of the West Timber Basin was proposed to provide additional pier and working space to accommodate the increased docking and repair of battleships at PNS. Additionally, storage racks and pickling tanks were proposed for erection in the area for use in steel plate cleaning and recovering. By 1913, wet storage of wood had ceased at the West Timber Basin, and following approval of the proposal in 1916, the timber basin began to be filled. A metal washing plant (Building 110) for the recovery of metals from the ash and skimmings of the brass foundries on the Shipyard was erected on the northern side of the site. Reportedly, some to all of the by-product from the plant was discarded into the timber basin. In addition, by-products from smelting and pigging (the process of pouring melted iron from a form into a mold) operations at the Shipyard were deposited into the timber basin. In 1917, a quay wall enclosed the basin, and between 1920 and 1940, the basin continued to be filled. The fill included rock, soil, cinders, and other waste and scrap material.

In 1940, Building 92 had been extended into the West Timber Basin, and a new plate yard with four new pickling tanks, two washing aprons, and a potassium nitrate storage building (Building 157) was constructed near the quay wall. Also in 1940, the metal washing plant was razed along with Buildings 51 (acetylene plant and former pitch plant) and 83 (latrine). The Building 110 pickling tanks were removed, and train tracks traversed the area. The plate yard was active for 20 years (until 1960), serving as the primary steel storage yard and pickling location. The pickling tanks for the plate yard were removed from the site at an unknown time. Filling of the area west of the timber basin was conducted from approximately 1940 to 1948.

Environmental sampling at OU8 was conducted as part of the Site Screening Investigation in 1998 (TtNUS, May 2000). The investigation was conducted to determine the presence or absence of contamination and to determine whether further investigation under CERCLA was needed for the site. Soil and groundwater sampling locations targeted areas where contamination would be more likely to be found.

The investigation showed that fill material consists mostly of sand, silt, and rock fragments. Trace amounts of brick and other debris were also found in the subsurface fill material. The fill varies in thickness from 8.5 to 17.5 feet. A wedge of coal, cinders, and ash (approximately 8 feet thick, starting around 2 to 4 feet bgs) exists in the northern part of the site, tapering to the south to less than 1 foot thick.

The groundwater at OU8 appears to be tidally influenced and ranges from saline/brackish along the perimeter of the site to fresh/mildly brackish further in land. The main chemicals detected in site soils were PAHs and metals. Low levels of PAHs detected intermittently throughout the site suggest that these levels may be attributable to ongoing industrial activities at the site. Consistent with the presence of waste-like materials in the subsurface, higher levels of PAHs and metals were detected in the subsurface. Although maximum concentrations of various metals in surface soil exceeded residential risk-based screening levels, the concentrations appear to be generally similar to or less than facility background soil concentrations. For subsurface soil, three metals (arsenic, iron, and lead) had maximum concentrations exceeding industrial and residential risk-based screening levels. These three metals also had maximum concentrations in total groundwater (unfiltered) exceeding drinking water criteria and/or risk-based screening levels (although no clear correlation could be made as to those metals that exceed soil screening criteria and those that exceed groundwater criteria at individual sample locations) (TtNUS, May 2000).

Based on the results of the investigation, the site was recommended for further investigation as part of an RI. Soil (and fill material) at OU8 is covered by asphalt or buildings, OU8 is located in a controlled industrial area, and groundwater is not used for drinking. Therefore, site media do not pose an imminent concern. During preparation of schedules for the OUs at PNS, it was determined that OU8 had a lower priority than the other onshore OUs. Therefore, the start of the RI currently is planned for 2012 based on the FY07 schedule for OU8 (Navy, July 2006).

7.3 REMEDIAL ACTIONS

A final remedy has not been selected or implemented for OU8. This section discusses the current CERCLA status of OU8 and the associated schedule.

7.3.1 Remedy Selection

Soil (and fill material) at OU8 is covered by asphalt or buildings, OU8 is located in a controlled industrial area, and groundwater is not used for drinking. Investigation (as part of the site screening) of areas mostly likely to show contamination showed contamination that requires further investigation as part of an RI to determine whether remedial action is necessary for OU8. Based on the FY07 schedule for OU8 (Navy, July 2006), the RI is scheduled to begin in 2012. The need for remedial action for OU8 will be determined based on the results of the risk assessment conducted as part of the RI.

7.3.2 Remedy Implementation

A final remedy has not yet been chosen for OU8. The need for remedial action at OU8, and therefore an FS and ROD schedule, will be determined based on the results of the RI (scheduled to begin in 2012). Review of the status of OU8 will be conducted as part of the Second Five-Year Review.

7.4 FIVE-YEAR REVIEW PROCESS

This section provides a summary of the five-year review process and the actions taken to complete this review.

7.4.1 Document and Data Review

The Site Screening Report for Site 31 (TtNUS, May 2000) is the primary document reviewed as part of the five-year review. Based on the findings of the initial site screening investigation conducted at Site 31, additional investigation (as part of an RI) is necessary at the site.

7.4.2 ARAR and Site-Specific Action Level Changes

A remedy has not been selected and a ROD has not been signed for OU8; therefore, ARARs and site-specific action levels have not been identified for OU8.

7.4.3 Site Inspection

Site 31 (OU8) was visually inspected on August 29, 2006. Weather conditions during the inspection were cool (60 degrees Fahrenheit), drizzling, and overcast at high tide. TtNUS personnel conducted the inspection and were escorted by Shipyard personnel. No conditions presenting an immediate threat or unacceptable risk were observed. Items noted for the site are included in the inspection log in Appendix A. Two of the four onsite monitoring wells were located; the remaining two wells were in an inaccessible area (within the fenced former plate yard). According to Shipyard personnel, the Shipyard removed the structures within the former plate yard and paved the area as part of the Building 174 expansion project.

The upgradient monitoring well installed as part of the investigation of Site 31 was inspected on August 30, 2006. This well is located outside the CIA, near the CIA exit gate. The well appeared to be in good condition.

Photographs of Site 31 were not taken because site features only include industrial buildings and asphalt.

7.5 TECHNICAL ASSESSMENT

A final remedy has not been selected for OU8; therefore, conclusions cannot be made at this time to support the determination that the remedy at OU8 is protective of human health and the environment. Soil (and fill material) at OU8 is covered by asphalt or buildings, OU8 is located in a controlled industrial area, and groundwater is not used for drinking. The site screening investigation does not indicate any imminent threats to human health or the environment. Also, it was determined that OU8 has a lower priority than the other onshore OUs at PNS, and the RI is not planned to begin until 2012. The area is designated on Shipyard land use maps as IRP Site 31. As discussed in Section 1.1, Shipyard policy restricts digging and excavation activities without a permit from the PNS Environmental Division and groundwater is not used at PNS.

7.6 ISSUES

A final remedy has not been implemented at OU8; therefore, deficiencies cannot be determined at this time. At the time of the August 2006 inspection, there was concern that the planned construction in the vicinity of the former plate yard could impact Site 31 monitoring wells. It was later determined that the wells were outside the area of construction and the wells were not impacted.

7.7 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

It is recommended that the RI be completed to determine whether remedial action is necessary for OU8 to protect human health and the environment. The Navy/PNS should continue to enforce the Shipyard dig policy. Any planned and approved digging or excavation in the area should be conducted following the appropriate health and safety protocols for a hazardous waste site, and any excavated material should be managed appropriately

7.8 PROTECTIVENESS STATEMENT

A remedy at OU8 has not yet been selected. The results of investigation of Site 31 do not indicate any imminent threats to human health or the environment under current land use scenarios. The current and future planned use for Site 31 is industrial, the site is in a controlled industrial area, and the area is covered with asphalt or buildings. Current site conditions and Shipyard policies provide for protection of human health and the environment until a final remedy is selected.

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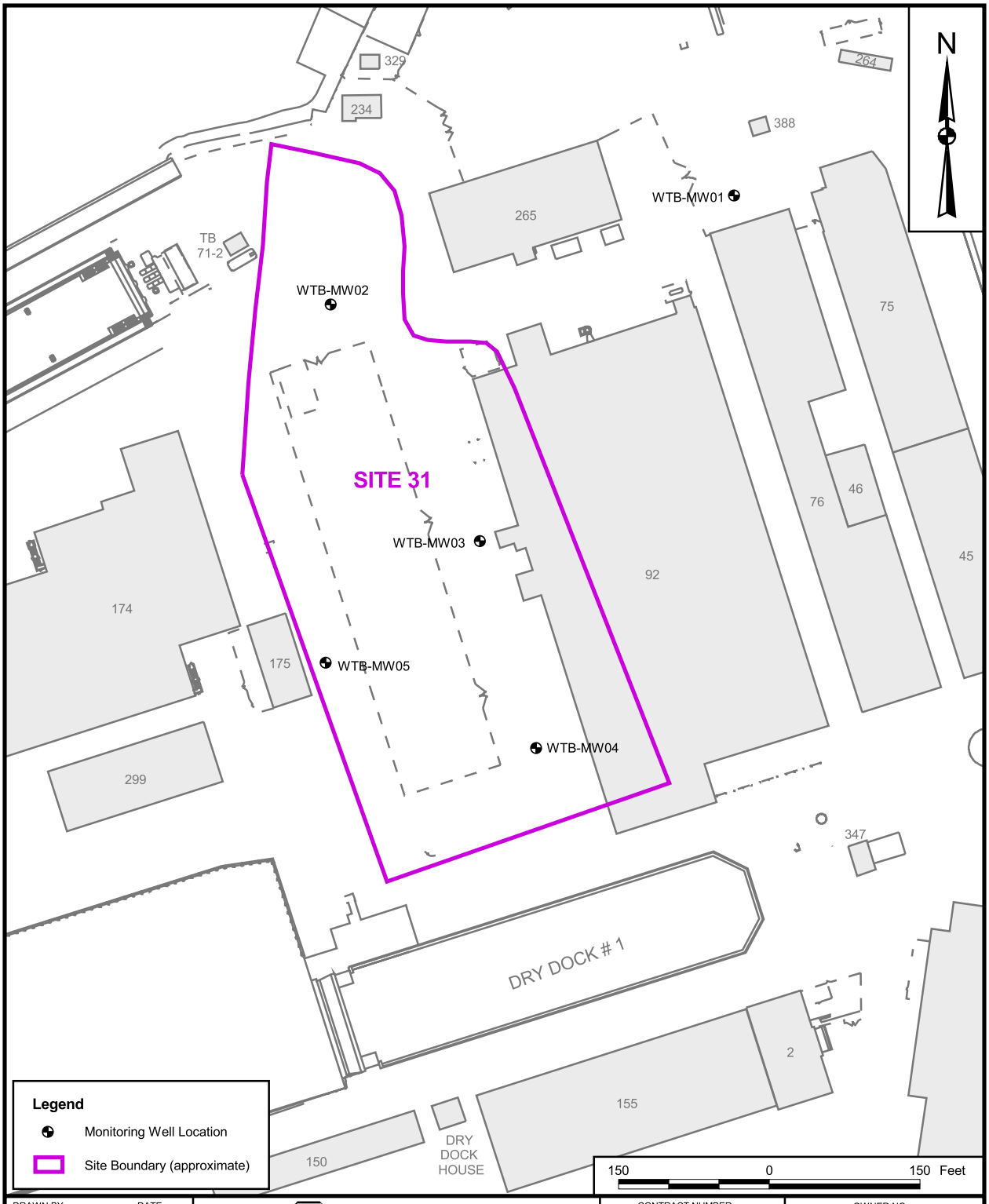
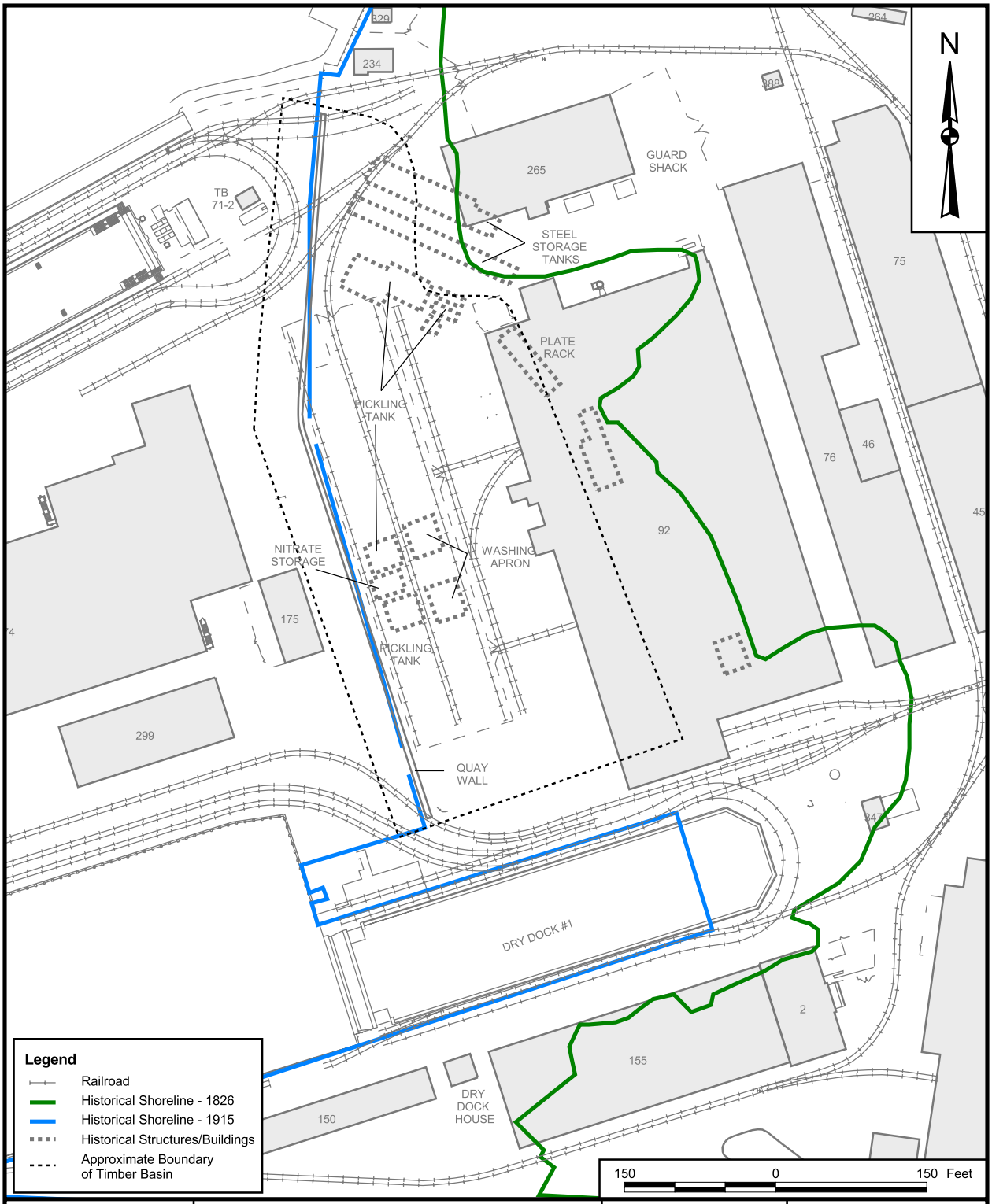


DRAWN BY	DATE	Tetra Tech NUS, Inc.	CONTRACT NUMBER	OWNER NO.
S. PAXTON	10/30/06		1291	CTO 022
CHECKED BY	DATE	OU8 LAYOUT MAP	APPROVED BY	DATE
D. COHEN	4/12/07	FIVE-YEAR REVIEW REPORT	—	—
COST/SCHEDULE-AREA		PORTSMOUTH NAVAL SHIPYARD	APPROVED BY	DATE
		KITTERY, MAINE	—	—
SCALE			DRAWING NO.	REV
AS NOTED			FIGURE 7 - 1	0

P:\GIS\PORTSMOUTH_NSY\APR\INTERIM_OFFSHORE_MONITORING.APR OU8 SITE LAYOUT - ASIZE 4/12/07 SP



DRAWN BY	DATE	Tetra Tech NUS, Inc.	CONTRACT NUMBER	OWNER NO.
S. PAXTON	10/30/06		1291	CTO 022
CHECKED BY	DATE	OU8 HISTORICAL LAYOUT MAP	APPROVED BY	DATE
D. COHEN	11/07/06	FIVE-YEAR REVIEW REPORT	—	—
COST/SCHEDULE-AREA		PORTSMOUTH NAVAL SHIPYARD	APPROVED BY	DATE
		KITTERY, MAINE	—	—
SCALE			DRAWING NO.	REV
AS NOTED			FIGURE 7 - 2	0

P:\GIS\PORTSMOUTH_NSY\APR\INTERIM_OFFSHORE_MONITORING.APR OU8 HISTORICAL MAP LAYOUT - 150 FEET 11/07/06 SP

8.0 OPERABLE UNIT 9

OU9 contains Site 34 – Former Oil Gasification Plant, Building 62. An RI will be conducted for this site. Although OU9 is still under investigation under CERCLA, a five-year review is being conducted for OU9 because hazardous substances, pollutants, or contaminants remain on site in excess of levels that allow for unlimited use and unrestricted exposure. Based on site conditions, the Navy determined that a non-time-critical removal action for the ash at the site to address the majority of potential risk is appropriate before conducting an RI for the site. An action memorandum will be signed for the removal action.

8.1 HISTORY AND SITE CHRONOLOGY

The history of environmental activities at PNS is discussed in Section 1.2.2. A list of important OU9 historical events and relevant dates in the site chronology is shown below. The identified events are illustrative, not comprehensive.

Event	Date
Ash was generated during coal (fuel) combustion as part of the oil gasification process	1870s to early 1900s
Ash was generated during coal (fuel) combustion as part of the blacksmithing operation	1915 to 1930
Building 62 reportedly gutted by a fire	1919
Shipyard Public Works Department used Building 62 for storage	1930 to Present
Pesticides stored at Building 62	1960s to 1985
Site identified as site screening area and removal of six drums of ash (less than 2 cubic yards) from pile north of Building 62	1998 and 1999
Site screening investigation conducted and extent of ash investigated	2003 and 2004
Engineering Evaluation/Cost Analysis (EE/CA) for Site 34 prepared and public comment period held	2005
Design for removal action began	2006

The offshore area of OU9 is part of the Back Channel AOC that was investigated as part of the EERA and is part of the more recent interim offshore sampling at monitoring station MS-01. Sampling locations at MS-01 are in the intertidal area and subtidal area along the OU9 shoreline (TtNUS, November 2004a). Additional sampling in the offshore area (AS01) was conducted as part of the Additional Scrutiny Investigation (TtNUS, August 2005a). The offshore area is discussed as part of OU4 in Section 5.0.

8.2 BACKGROUND

OU9 (Site 34) is located in the central portion of PNS as shown on Figure 1-2. The OU9 layout is shown on Figure 8-1. The buildings at and in the vicinity of OU9 are used for industrial and commercial uses,

and the paved areas surrounding the buildings are used for parking. A new parking garage is located east of the former locations of Buildings 63 and 188. OU9 is in the historic district at PNS, and buildings at and near the site (Buildings 40, 43, 60, and 62) are considered contributing elements to the National Registry District (Louis Berger Group, April 2003). There is a relatively flat, grassy area with a picnic table north of former Building 63. In general, the land on the northern side of Building 62 Annex and northeast of Building 62 slopes gently north towards the roadway and then slopes steeply (i.e., forms ledges) to the water's edge at the shoreline of the site adjoining the Back Channel of the Piscataqua River. Access to the shoreline from the site is difficult because of the rapid changes in terrain at the ledges.

Building 62 and its annex are currently used by the Shipyard Public Works Department as a mini-bulldozer shop and for storage. Building 62 (built in the late 1800s) and the more recent annex (built in the 1940s) are the most prominent features related to the use of the site. Ash was generated from the combustion of coal as part of the oil gasification (kerosene was converted to illuminating gas) from 1870s to early 1900 and as part of the blacksmith shop from 1915 to 1930. Ash, assumed to be from the combustion of coal (and potentially including ash from the building fire) appears to have been deposited primarily north of Building 62, resulting in an ash pile. The pile is covered by vegetation including grass and small bushes and trees. Ash was also found under asphalt around Buildings 62, 62 Annex, and 63. After 1930, Building 62 and Annex were used by the Shipyard's Public Works Department. Pesticide storage activities were conducted in Building 62 in the 1960s and ended when a new pesticide control shop was built on the southern side of the Shipyard in 1985.

Previous environmental activities at OU9 included removal of six drums of ash (less than 2 cubic yards) from the ash pile in 1999, soil and sediment sampling in 1998 and 2003 (as part of the site screening investigation), and an ash extent investigation in 2004. An EE/CA was completed in 2005 that recommended excavation and landfill disposal of the ash pile and ash exposed at ledge areas, and a non-time-critical removal action to implement these recommendations is being planned.

High concentrations of PAHs and metals are associated with the presence of ash in site samples, and a rapid decrease in concentrations occurs with depth. Concentrations of PAHs and metals are typically low in samples without ash. The visual presence of ash was used to define the approximate extent of contamination as part of the 2004 investigation. The human health risk screening conducted as part of the Site Screening Investigation indicated potential human health risks from exposure to ash material at the site because it contains PAHs and metals at concentrations exceeding residential and industrial risk screening levels. The depth to the bottom of the deepest ash layer was 5 feet bgs, and typically there were significant reductions in concentrations beneath the deepest ash layer. Based on data from temporary wells installed (and subsequently abandoned), no overburden groundwater is present at the site. The depth to bedrock varies from 5 to 12 feet bgs.

Based on the results of the investigation (TtNUS, August 2004), the site was recommended for an RI to assess the potential risks from site operations. The Navy recommended a removal action be performed before the RI because the PAH and metals concentrations in the ash material are much greater than risk screening levels and would result in potentially unacceptable risks if the ash was uncovered. Because the majority of the contamination at the site appears to be associated with ash material, a removal action for the ash could address the majority of unacceptable risks at the site. The RI would then address residual site-related risks after removal of the ash.

An EE/CA (TtNUS, September 2005) was conducted to develop and evaluate non-time-critical removal action alternatives to reduce potential risks to human health from exposure to ash and to reduce potential future erosion of ash at Site 34. The recommended alternative was excavation and landfill disposal of the ash pile and ash exposed at ledge areas. The main components of this alternative consist of the removal of ash from the northern side of Building 62, where the ash under vegetation layers or near the shoreline is the most vulnerable for exposure. The removal action work plan is scheduled to be prepared and the removal action conducted in 2007.

8.3 REMEDIAL ACTIONS

A final remedy has not been selected or implemented for OU9. This section discusses the current CERCLA status for OU9 and the associated schedule.

8.3.1 Remedy Selection

Limited excavation of ash from the pile adjacent to the northern edge of Building 62 was conducted in 1999 (less than 2 cubic yards). The excavated material was disposed off site by PNS, and the excavation area was seeded. The ash pile is covered with vegetation; a roadway and Building 62 are adjacent to the pile. Most of the area around Building 62 is used for parking or as a roadway. Based on the results of the site screening investigation and the ash extent investigation, the Navy will conduct a removal action for the ash. Based on the FY07 schedule for OU9 (Navy, July 2006), the removal action work plan will be prepared and the removal action conducted in 2007. The schedule for the RI will be determined after the removal action is completed.

8.3.2 Remedy Implementation

A final remedy has not been selected or implemented for OU9. An EE/CA has been completed, and a removal action is scheduled to be conducted in 2007. Following completion of the removal action, an RI

schedule will be determined. Review of the status of OU9 will be conducted as part of the Second Five-Year Review.

8.4 FIVE-YEAR REVIEW PROCESS

This section provides a summary of the five-year review process and the actions taken to complete this review.

8.4.1 Document and Data Review

The EE/CA for Site 34 (TtNUS, September 2005) is the primary document reviewed as part of the five-year review. The EE/CA provides a summary of the previous investigations conducted at Site 34. Based on the results of the investigations, the Navy will conduct a removal action for the ash to remove the majority of risk associated with OU9. The public comment period for the EE/CA was held in 2005. The Navy is preparing the action memorandum and design documents for the removal action.

8.4.2 ARAR and Site-Specific Action Level Changes

A remedy has not been selected and a ROD has not been signed for OU9; therefore, ARARs and site-specific action levels have not been identified for a remedial action for OU9.

8.4.3 Site Inspection

Site 34 was visually inspected on August 29, 2006. Weather conditions during the inspection were cool (60 degrees Fahrenheit), damp, and overcast at high tide. The inspection was performed by TtNUS personnel escorted by PNS personnel. No conditions presenting an immediate threat or unacceptable risk were observed. Although small areas of ash and geotextile were exposed on the pile, the roadway between the ash pile and ledge was blocked off to prevent parking. The ledge along the Back Channel was heavily vegetated. The Navy has no plans to change the current use of the site.

The Site 34 shoreline was inspected at low and high tide. Photographs of the shoreline were taken in January 2007 by PNS personnel and are provided in Appendix B.

8.5 TECHNICAL ASSESSMENT

A final remedy has not been selected for OU9; therefore, conclusions cannot be made at this time to support the determination that the remedy at OU9 is protective of human health and the environment. The removal of ash at OU9 is expected to address the majority of risk associated with the site. The action is expected to be protective of human health and the environment upon completion, and in the interim,

asphalt and soil cover prevent human contact with contaminated material. Following completion of the removal action, an RI will be conducted to investigate and characterize residual risks. The OU9 area is designated on Shipyard land use maps as IRP Site 34. As discussed in Section 1.1, Shipyard policy restricts digging and excavation activities without a permit from the PNS Environmental Division.

8.6 ISSUES

A final remedy has not been implemented at OU9; therefore, deficiencies cannot be determined at this time. No issues were identified during the site inspection.

8.7 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

It is recommended that the removal action be completed. Following completion of the removal action, an RI will be conducted to investigate and characterize residual risks. Based on the RI, appropriate remedial action will be determined. Any planned and approved digging or excavation at OU9 should be conducted following the appropriate health and safety protocols for a hazardous waste site, and any excavated material should be managed appropriately.

8.8 PROTECTIVENESS STATEMENT

A remedy at OU9 has not yet been selected. The results of the investigations at OU9 do not indicate any imminent threats to human health or the environment under the current land use scenario. The current use of OU9 is industrial and commercial, and the future planned land use is anticipated to remain the same. The non-time-critical removal action for the ash at OU9 will address the majority of risk associated with the site. Following completion of the removal action, an RI will be conducted. Current site conditions and Shipyard policies provide for protection of human health and the environmental until the removal action is completed and the final remedy is selected.

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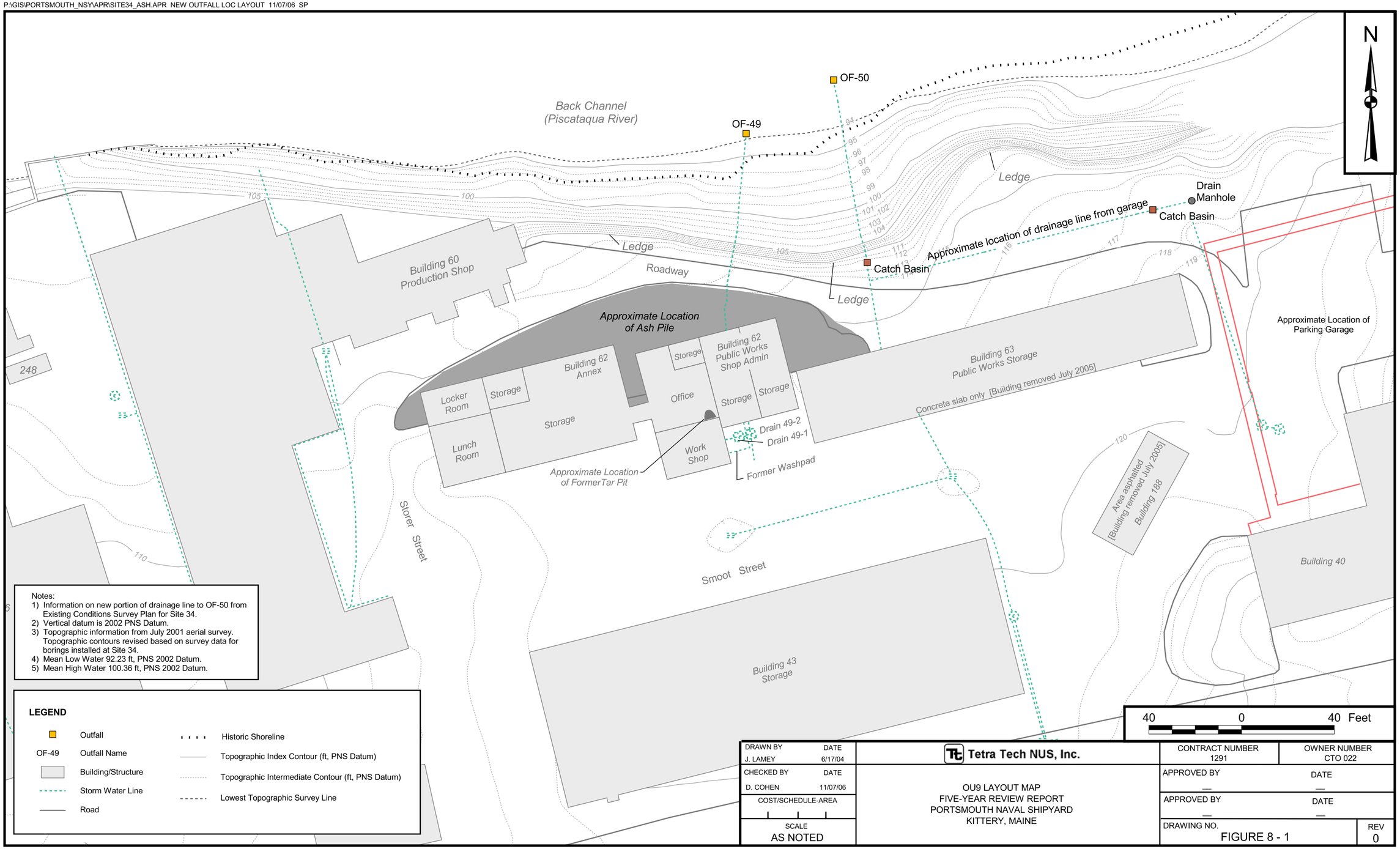
P:\GIS\PORTSMOUTH_NSY\APR\SITE34_ASH.APR NEW OUTFALL LOC LAYOUT 11/07/06 SP



Notes:
1) Information on new portion of drainage line to OF-50 from Existing Conditions Survey Plan for Site 34.
2) Vertical datum is 2002 PNS Datum.
3) Topographic information from July 2001 aerial survey. Topographic contours revised based on survey data for borings installed at Site 34.
4) Mean Low Water 92.23 ft, PNS 2002 Datum.
5) Mean High Water 100.36 ft, PNS 2002 Datum.

LEGEND

■	Outfall		Historic Shoreline
OF-49	Outfall Name		Topographic Index Contour (ft, PNS Datum)
	Building/Structure		Topographic Intermediate Contour (ft, PNS Datum)
	Storm Water Line		Lowest Topographic Survey Line
	Road		

DRAWN BY J. LAMEY	DATE 6/17/04	Tetra Tech NUS, Inc.	CONTRACT NUMBER 1291 / OWNER NUMBER CTO 022
CHECKED BY D. COHEN	DATE 11/07/06	OU9 LAYOUT MAP FIVE-YEAR REVIEW REPORT PORTSMOUTH NAVAL SHIPYARD KITTERY, MAINE	APPROVED BY — / DATE —
COST/SCHEDULE-AREA			APPROVED BY — / DATE —
SCALE AS NOTED			DRAWING NO. FIGURE 8 - 1 / REV 0

9.0 STUDY AREA – SITE 30

Site 30 – Galvanizing Plant, Building 184, is a study area at PNS. This area is still under investigation to determine whether further action as part of an RI/FS is needed. Based on site conditions, the Navy determined that a non-time-critical removal action is appropriate for Site 30 before determining whether an RI/FS is necessary. The final action memorandum for the removal action (Navy, January 2006) was signed in June 2006. A five-year review is being conducted because hazardous substances, pollutants, or contaminants remain on site in excess of levels that allow for unlimited use and unrestricted exposure.

9.1 HISTORY AND SITE CHRONOLOGY

The history of environmental activities at PNS is discussed in Section 1.2.2. A list of important Site 30 historical events and relevant dates in the site chronology is shown below. The identified events are illustrative, not comprehensive.

Event	Date
Building 184 constructed as a galvanizing plant (acid proof pit used)	1943
Building 184 converted to an electrical testing facility (pit covered)	1946
Building 184 converted to clean room facility for cleaning metals parts (pit uncovered and used)	Between 1954 and 1956
Building 184 used as welding school (pit covered with concrete floor)	Early 1960s to present
Crystalline substance observed along edge of acid pit	1973
Crystalline substance observed and analyzed	1994 and 1996 to 1997
Site screening investigation conducted	1998
Test pit excavated within acid pit, and samples of fill material and crystalline substance analyzed	2001
EE/CA for Site 30 finalized and public comment period held	2005
Action memorandum for non-time-critical removal action signed	2006
Periodic removal of crystalline material by Shipyard	1997 to 2006
Most recent removal of crystalline material; affected area covered	June 2006

9.2 BACKGROUND

Site 30 is located in the central portion of PNS as shown on Figure 1-2. Site 30 is the acid pit within Building 184. The Site 30 layout is shown on Figure 9-1. As-built conditions for the buildings and pit and the location of the pit within the building are shown on as-built figures in Appendix A. Building 184 is used for industrial purposes (welding school), and the surrounding buildings are commercial and industrial. Another IRP site at PNS (Site 32) is located approximately 200 feet north and northeast of Site 30.

Building 184 was constructed in 1943 as a galvanizing plant to accommodate the Shipyard's increased production schedule in support of the WWII effort. However, by the end of the war, the Shipyard's production requirements were reduced dramatically, and galvanizing was performed off yard by a private contractor. In 1946, Building 184 was converted from a galvanizing plant to the Shipyard's electrical testing laboratory. Sometime between 1954 and 1956, the building was converted into a clean room facility and used for cleaning and assembling metal parts. In the early 1960s, the building was converted into a welding school, and a flame-spray galvanizing system was installed in the building. The building is still being used as a welding school (Navy, January 2006).

The specific types and quantities of chemicals used throughout the history of Building 184 are largely unknown. However, chemicals used in industrial cleaning operations similar to these performed at the Shipyard include caustic solutions (sodium hydroxide, sodium carbonate, trisodium phosphate, and tetrasodium pyrophosphate), acid solutions (hydrochloric and sulfuric), and flux solutions (sodium silicate). These chemicals were most likely used when Building 184 was a galvanizing plant and when the tanks in the acid pit were used as industrial cleaning tanks. For the metal parts assembly operations, the tanks were filled with various chemicals including large amounts of sulfuric acid, trisodium phosphate, alcohol, and acetone (Navy, January 2006).

As part of the original galvanizing operations, an acid pit was constructed in the floor of the central portion of Building 184, along the eastern wall. With the changes in usage of Building 184, the use of the acid pit also changed. The acid pit was filled and covered as part of the electrical testing laboratory where large shock-testing and vibration-testing machines were used. Moulds and dies were stored in the area. The conditions of the acid pit and tank at the time of covering are unknown. The acid pit was then uncovered when the building was converted to a clean room facility. The pickling tanks within the pit were used for metal parts assembly in the clean room. Use of the pit and tanks was again discontinued when the building was converted to a welding school. The pit was filled and covered. An office was constructed over the former acid pit area in the early to mid-1970s (Navy, January 2006).

The former acid pit, measuring approximately 52 feet long, 35 feet wide, and a maximum of 4 feet deep, was constructed as a concrete pit lined with acid-proof bricks set in acid-proof cement. The bottom of the acid pit was sloped to a drain at the center of the western side of the pit. The original drain appears to have been connected to the sanitary sewer system on the western side of the building, although detailed historical sewer drawings are not available (Navy, January 2006).

The acid pit originally contained pickling tanks used as part of galvanizing operations. The tanks, including a flux tank, a water tank, an acid tank, and a caustic tank, were used to remove oxide scale from metal surfaces and to obtain a chemically clean surface in preparation for plating and galvanizing by

immersion in a diluted acid bath. When the building use was converted to a clean room, the pickling tanks within the pit were used as part of the metal parts assembly (Navy, January 2006).

The condition of the pit and tanks is unknown; however, test pitting activities conducted in 2001 indicated the presence of chemicals that are likely residuals from the cleaning operations. The chemicals within the former acid pit are believed to be the source of the crystalline substance observed along the base of the wall adjacent to the acid pit. The former acid pit is currently covered by a concrete floor slab, and the boundaries are clearly delineated by a slightly raised floor slab and by the joints between the original adjacent floor and the slab placed over the former acid pit area. A wood-framed office structure, welding training booths, and various equipment are located on the former acid pit area floor slab. Additionally, two floor drains and a clean-out plug are present within the concrete slab in the area of the former acid pit. A utility trough transects the entire width of the northern end of the former acid pit.

The crystalline substance along the edges of the former acid pit was first observed in 1973 and again in 1994 and 1996. The crystals had a low pH (around 1.0 or 2.0) and were composed of predominantly sulfate and metals. The material was not hazardous based on Toxicity Characteristic Leaching Procedure (TCLP) characteristics but may be hazardous based on the RCRA corrosivity criterion if brought in contact with water (Navy, January 2006).

Environmental investigations were conducted in 1998 as part of the Site Screening Investigation (TtNUS, May 2000) and Test Pitting Investigation (TtNUS, May 2002). The Site Screening Investigation Report indicated that soil and groundwater sampled outside the building were not impacted by any potential environmental releases from the pit inside the building. However, the report recommended that it might be necessary to perform additional investigation activities at the former acid pit within Building 184 to more accurately assess potential past environmental releases. A Test Pitting Investigation was conducted in 2001. During the Test Pitting Investigation, water was observed in the pit, and the water coming in contact with crystalline materials within the pit are believed to be the cause of the crystalline growth along the outside edges of the pit. The investigation report stated that the pit water is not expected to be hydraulically connected to groundwater at the site as indicated by the difference in elevations between the pit water and groundwater in a monitoring well outside the building adjacent to the pit location. However, the source of the water is not known.

Based on regulatory concerns regarding the investigation of groundwater at Site 30, it was determined that more discussion among the Navy and regulators was needed to resolve the concerns. Although it was determined that further work for Site 30 was a low priority compared to other IRP sites at PNS, the Navy determined that a non-time-critical removal action for the former acid pit was warranted to abate potential exposure to nearby human populations and to mitigate the potential threat of a release to the

environment of hazardous substances associated with the former acid pit within Building 184. An EE/CA (TtNUS, August 2005b) was finalized and a removal action alternative that does not require relocation activities and excavation of pit materials within Building 184 was recommended. The action memorandum, dated January 2006, was signed in June 2006. The removal action will include periodic scraping and appropriate disposal of the crystals, taking measures to minimize water entering the pit, and installation and operation of a pit dewatering system. The removal action is scheduled to begin in 2008 and will be conducted until Building 184 operations are relocated and a permanent CERCLA remedy is determined.

Because the removal action is not scheduled to begin until 2008, in June 2006, the Navy removed crystals, cleaned the area, and placed a vinyl cover over the affected area within Building 184.

9.3 REMEDIAL ACTIONS

A final remedy has not been selected or implemented for Site 30. This section discusses the current CERCLA status of the site and associated schedule.

9.3.1 Remedy Selection

A revised EE/CA (TtNUS, August 2005b) was finalized for a non-time-critical removal action to provide long-term periodic crystal removal, minimize water entering the pit, and remove water from the pit until a permanent CERCLA remedy is determined for the site. Pre-construction investigation would be conducted as necessary to determine the source(s) of pit water, the suspected mechanism of crystalline material growth, and the configuration and condition of the sewer system associated with the pit. Based on the FY07 schedule for Site 30 (Navy, July 2006), a work plan for the removal action, including the other components, is scheduled to be prepared in 2007, and the removal action activities are scheduled to begin in 2008. The schedule for an RI/FS, if needed, will be determined after the removal action is completed.

9.3.2 Remedy Implementation

A final remedy has not yet been chosen for Site 30. An EE/CA has been completed, and a removal action is scheduled to begin in 2007 with the preparation of the removal action work plan. Following completion of the removal action, an RI schedule will be determined. Review of the status of Site 30 will be conducted as part of the Second Five-Year Review.

9.4 FIVE-YEAR REVIEW PROCESS

This section provides a summary of the five-year review process and the actions taken to complete this review.

9.4.1 Document and Data Review

The Action Memorandum for Non-Time-Critical Removal Action for Site 30 (Navy, January 2006) and the Letter Report for Building 184 Crystalline Material Cleanup (TtEC, July 2006) were the primary documents reviewed. The Action Memorandum summarizes the results of the previous investigations at Site 30. Based on conditions at Site 30, the Navy determined that a non-time-critical removal action is appropriate for the site before determining whether an RI/FS is necessary. Following completion of the removal action, additional evaluation will be needed to determine whether further investigation or action is needed for Site 30.

9.4.2 ARAR and Site-Specific Action Level Changes

A final remedy has not been selected and a ROD has not been signed for Site 30; therefore, ARARs and site-specific action levels have not been identified for a remedial action for Site 30.

9.4.3 Site Inspection

Site 30 was visually inspected on August 29, 2006. Weather conditions during the inspection were cool (60 degrees Fahrenheit), damp, and overcast. The inspection was performed by TtNUS personnel were escorted by Navy personnel. No conditions presenting an immediate threat or unacceptable risk were observed. Minor monitoring well maintenance items were noted on the inspection log in Appendix A. Some crystalline growth was observed emerging from under the vinyl liner inside Building 184. The Shipyard is planning to move the welding school to another location at PNS; however, a schedule for the move has not been determined. There are no other plans to change the current use of the site.

Photographs of the area where crystalline material was removed in 2006 were taken by PNS personnel before and after the removal. The photographs are provided in Appendix B.

9.5 TECHNICAL ASSESSMENT

A final remedy has not been selected for Site 30; therefore, conclusions cannot be made at this time to support the determination that the remedy at Site 30 is protective of human health and the environment. The removal action is expected to be protective of human health and the environment upon completion, and in the interim, a vinyl cover was placed over the affected area within Building 184. The pit is covered

with a concrete floor. Access to Building 184 is restricted, and the building is for industrial (occupational) use. Contamination has not apparently migrated outside of the building. Following completion of the removal action, the Navy will determine the need for an RI/FS. The site is designated on Shipyard land use maps as IRP Site 30. As discussed in Section 1.1, Shipyard policy restricts digging and excavation activities without a permit from the PNS Environmental Division and groundwater is not used at PNS.

9.6 ISSUES

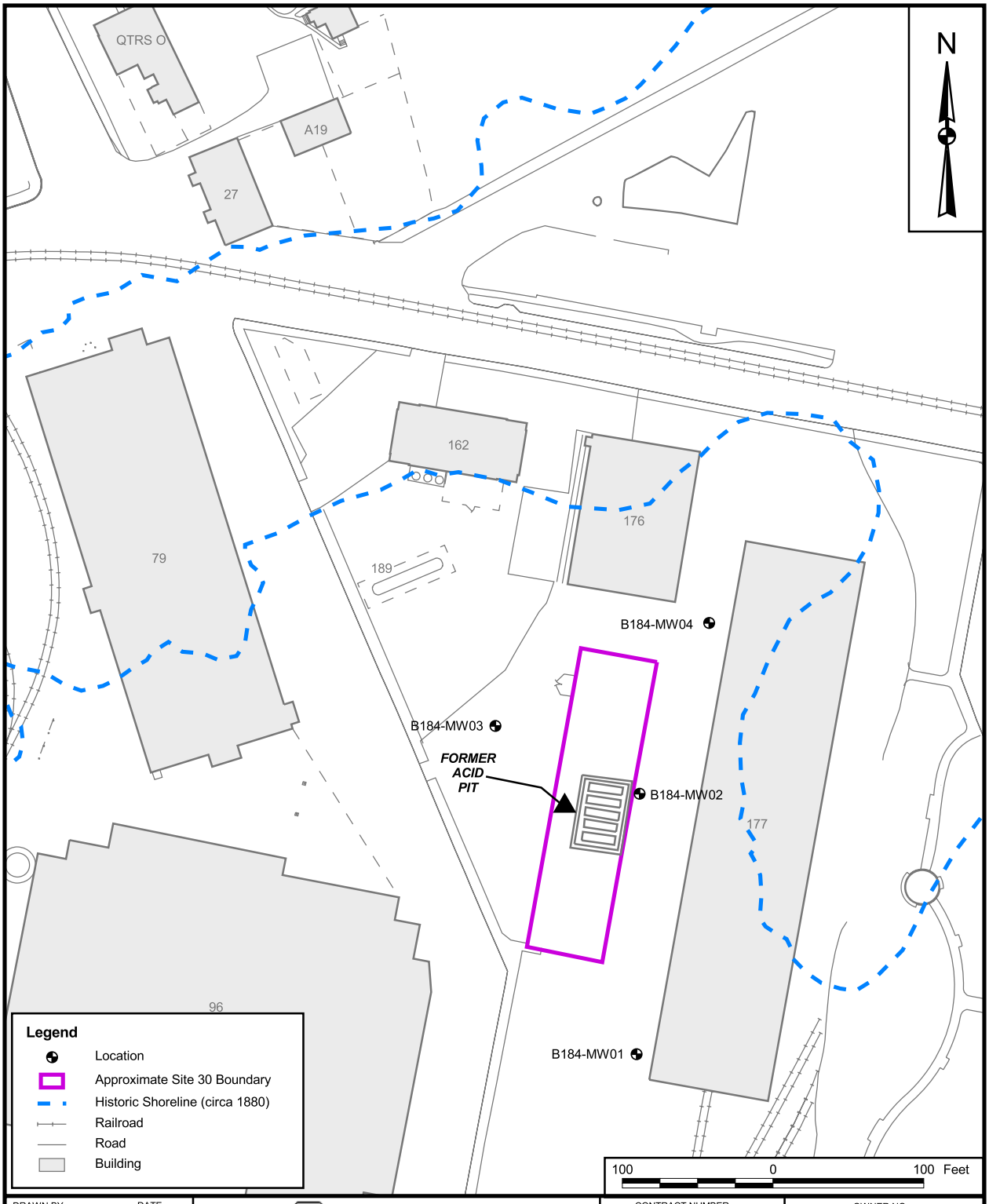
A final remedy has not been implemented at Site 30; therefore, deficiencies cannot be determined at this time. Minor maintenance items were noted on the inspection log in Appendix A.

9.7 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

It is recommended that the removal action be implemented. Following completion of the removal action, additional evaluation will be needed to determine whether further investigation or action is needed for Site 30. The Navy/PNS should address the maintenance items (see Appendix A). Any planned and approved digging, excavation, or removal action activities at Site 30 should be conducted following the appropriate health and safety protocols for a hazardous waste site, and any excavated material should be managed appropriately.

9.8 PROTECTIVENESS STATEMENT

A final remedy at Site 30 has not yet been selected. A non-time-critical removal action will be performed. Current site conditions and Shipyard policies provide for protection of human health and the environmental until the removal action is complete and the final remedy is selected.



DRAWN BY S. PAXTON	DATE 10/30/06	Tetra Tech NUS, Inc.	CONTRACT NUMBER 1291 / OWNER NO. CTO 022
CHECKED BY D. COHEN	DATE 10/30/06	SITE 30 LAYOUT MAP FIVE-YEAR REVIEW REPORT PORTSMOUTH NAVAL SHIPYARD KITTERY, MAINE	APPROVED BY — DATE —
COST/SCHEDULE-AREA			APPROVED BY — DATE —
SCALE AS NOTED			DRAWING NO. FIGURE 9 - 1 / REV 0

P:\GIS\PORTSMOUTH_NSY\APR\INTERIM_OFFSHORE_MONITORING.APR SITE 30 SITE MAP LAYOUT 10/30/06 SP

10.0 BASE-WIDE CONCLUSIONS AND RECOMMENDATIONS

The base-wide conclusions and recommendations are presented below. These conclusions and recommendations are provided in the form of a base-wide protectiveness statement and a summary of the requirements for the next five-year review.

10.1 PROTECTIVENESS STATEMENT

The remedial action at OU3 at PNS is expected to be protective of human health and the environment. The interim action at OU4 is expected to be protective of human health and the environment until a final remedy is selected. The other OUs (1, 2, 7, 8, and 9) and Site 30 are under various stages of investigation under CERCLA, and final or interim remedies have not been selected. There are no imminent threats to human health or the environment under current land use scenarios for any of the OUs or Site 30. Recent (2005 and 2006) removal actions were conducted to provide shoreline stabilization at OU2 and OU7. Non-time-critical removal actions are planned for OU9 and Site 30. Crystalline growth was removed from Site 30 in 2006. Current site conditions and Shipyard policies provide for protection of human health and the environment for OUs 1, 2, 7, 8, and 9 and Site 30 until final remedies are selected.

This five-year review shows that the Navy is meeting the requirements of the ROD for OU3 and the Interim ROD for OU4. Minor maintenance deficiencies for each OU or site are listed in their respective sections and in Appendix A. Several maintenance activities were conducted at OU3 in October 2006. The proposed schedule for other maintenance activities is provided in Appendix A. One major concern was that the OU3 cap internal drainage pipe outlets could not be located as shown on the final construction drawings. This concern does not effect immediate protectiveness, but should be addressed to assure proper functioning of the landfill cover.

10.2 NEXT REVIEW

Five-year reviews are required by statute under CERCLA for PNS. Remedial actions were conducted at IRP sites at PNS that allowed hazardous substances, pollutants, or contaminants to remain on site in excess of levels that allow for unlimited use and unrestricted exposure. This report represents the first five-year review conducted at PNS. The next five-year review will be required within 5 years of the signature date of this review, June 2012. A summary of the anticipated requirements for the next five-year review is as follows.

- An evaluation of groundwater monitoring and O&M activities at OU3 and the costs for the activities and finalization of the Land Use Control Plan for OU3.

- An evaluation of actions to address the potential threats posed by the conditions at OU4.

- Verification that the “no dig” policy has been properly implemented at PNS and that there continues to be no groundwater uses

- A review of the recommendations listed in the first five-year review.

Five-year reviews will continue at all of the sites presented in this review because hazardous substances, pollutants, and contaminants remain at the sites that will not allow for unlimited use and unrestricted exposure. It is anticipated that final RODs will be completed for OU1 and OU2 at the time of the next review. The next review will include updates of the appropriate sections to discuss the remedial actions and/or decisions that occurred at these sites.

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APPENDIX A

FIVE-YEAR REVIEW INSPECTION ITEMS

A.1 PNS LAND USE CONTROL AREAS

A.2 AS BUILT FIGURES

- OU2
- OU3
- OU7
- SITE 30

A.3 INSPECTION LISTS AND PROPOSED MAINTENANCE SCHEDULE

A.4 OU3 INSPECTION FORM

A.5 ARARs FOR OU3 AND OU4

A.6 NO FURTHER ACTION SITE LOCATIONS

A.1 PNS LAND USE CONTROL AREAS

INSTALLATION RESTORATION PROGRAM SITES

SITE #5 – INDUSTRIAL WASTE OUTFALLS
SITE #6 – DRMO STORAGE/SCRAP YARD
SITE #8 – JAMAICA ISLAND LANDFILL (JILF)
SITE #10 – BLDG 238 BATTERY ACID TANK (No. 24)
SITE #21 – BLDG 75 RINSE WATER TANK, GROUND WATER ONLY
SITE #29 – INCINERATOR SITE
SITE #30 – GALVANIZING PLANT (BLDG 184)
SITE #31 – WEST TIMBER BASIN
SITE #32 – TOPEKA PIER
SITE #34 – OIL GASIFICATION PLANT

INDEX OF STRUCTURES

NO.	LOC.	DESCRIPTION
A	F-5	PUBLIC QUARTERS
B	G-5	PUBLIC QUARTERS
CD	G-5	PUBLIC QUARTERS
EF	G-5	PUBLIC QUARTERS
GHJ	G-5	PUBLIC QUARTERS
K	G-4	PUBLIC QUARTERS
L	F-4	PUBLIC QUARTERS
M	J-8	PUBLIC QUARTERS
N	H-10	PUBLIC QUARTERS
O	H-5	PUBLIC QUARTERS
P	H-5	PUBLIC QUARTERS
Q	J-9	PUBLIC QUARTERS
S	H-10	PUBLIC QUARTERS
U	H-8	PUBLIC QUARTERS
V	H-8	PUBLIC QUARTERS
W	H-8	PUBLIC QUARTERS
X	I-10	PUBLIC QUARTERS
Y	I-2	PUBLIC QUARTERS
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3	E-8	RIGGERS SHOP
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33	H-3	STORAGE
34	H-3	STORAGE
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151	G-8	PRODUCTION SHOP
153	H-7	ADMIN, SUPPLY
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A2	F-5	QTRS A GREENHOUSE
A3	F-5	GARDEN SHED QTRS A
A5	F-5	GARDEN HOUSE QTRS A
A7	F-5	QTRS A TOOL HOUSE
A8	G-4	GARAGE – QTRS B
A10	G-4	QTRS C UTILITY BUILDING
A12	G-4	TOOL SHED/GARAGE – QTRS D
A15	H-4	UTILITY BLDG – QTRS F
A19	H-5	GARAGE QTRS O-P
A20	H-10	QTRS R GARAGE
A25	H-10	GARAGE QTRS 68
A26	H-8	GARAGE QTRS U
A30	H-8	GARAGE QTRS V
A44	I-3	GARAGE QTRS Y
A58	J-9	GARAGE QTRS Q
A74	H-10	GARAGE QTRS S
A75	I-10	GARAGE QTRS X
A76	H-8	GARAGE QTRS V
A83	H-4	INFLAMMABLE STORAGE
BR1	E-3	BRIDGE 1
BR2	H-3	BRIDGE 2
BTH 1	C-6	BERTH 1
BTH 2A	E-7	BERTH 2A
BTH 3B	E-7	BERTH 3B
BTH 3	E-7	BERTH 3
BTH 4	D-7	BERTH 4
BTH 5	G-7	BERTH 5
BTH 6A	H-7	BERTH 6A
BTH 6B	H-8	BERTH 6B
BTH 6C	H-8	BERTH 6C
BTH 7A	H-9	BERTH 7A
BTH 7B	H-10	BERTH 7B
BTH 11A	E-6	BERTH 11A
BTH 11B	E-6	BERTH 11B
BTH 11C	G-6	BERTH 11C
BTH 12	G-6	BERTH 12
BTH 13A	C-5	BERTH 13A
BTH 13B	C-6	BERTH 13B
BTH 14	D-5	BERTH 14
BTH 15	J-4	BERTHS 15-16
BERTH 17	M-9	SMALL CRAFT MARINA
DD1	E-6	DRY DOCK 1
DD2	G-6	DRY DOCK 2
DD3	D-5	DRY DOCK 3
H1	K-7	US NAVAL CLINIC
H3	K-8	PUBLIC QUARTERS
H4	K-8	PUBLIC QUARTERS
H5	K-8	PUBLIC QUARTERS
H6	K-8	GARAGE
H10	K-7	STORAGE P-A OFFICE
H13	K-8	GARAGE
H21	K-8	BARRACKS – VACANT
H23	J-8	TRANSIENT BARRACKS
H25	K-9	SPECIAL SERVICES STORAGE
H27	M-5	PUBLIC QTRS
H29	K-9	ADMIN OFFICE
H30	K-7	STORAGE
M	H-4	LEGAL/ADMIN
M4	H-4	MOTION PICTURE BLDG (VACANT)
M6	H-4	VIDEO TAPE PRODUCTION
M8	H-4	MAG SMALL ARMS AMMUNITION
M10	H-4	STATION ARMORY
M11	H-4	STORAGE
M17	I-4	GARAGE
M18	H-4	PHOTO LAB
M19	I-5	BASKETBALL COURT
MJH	G-3	ELECTRICAL LOAD HOUSE
SLD1	H-6	STIFFLEG DERRICK(CRANE & MACHINERY HOUSE)
TB1	K-8	WHEELER WASTE OIL STORAGE TANK
TB9	G-4	GARAGE QTRS. B
WH3	D-4	WELDING HOUSE NO 3

ZONE LEGEND

- HISTORIC DISTRICT BOUNDRY
- HISTORIC FACILITY
- HISTORIC DISTRIC
- ARCHAEOLOGICAL SITE
- ARCHAEOLOGICAL POTENTIAL
- REMEDY IN PLACE INSTALLATION RESTORATION PROGRAM SITES (SEE TABLE ABOVE)
- INSTALLATION RESTORATION PROGRAM SITES (SEE TABLE ABOVE)
- NATURAL GAS EXCAVATION RESTRICTION AREA, SEE NATURAL GAS NOTE.
- INDUSTRIAL/COMMERCIAL (FORMER FUEL OIL STORAGE SITES)

SHORELINE LEGEND

- INDICATES TOP OF BANK
- SHORELINE AT ELEV. 100ft
- SHORELINE AT ELEV. 93ft
- CONTROLLED INDUSTRIAL AREA (CIA) FENCE
- HISTORICAL SHORELINE

NATURAL GAS NOTE:
CALL 1-888-344-7233 (DIG SAFE) PRIOR TO PERFORMING ANY EXCAVATION ON ANY STREET WHERE NATURAL GAS LINES ARE LOCATED. ADDITIONALLY, CALL 1-888-344-7233 (DIG SAFE) PRIOR TO PERFORMING ANY EXCAVATION WITH IN 20' OF A NATURAL GAS LINE. THIS PERTAINS TO NATURAL GAS DISTRIBUTION ONLY. CALL 1-800-525-8222 TO REPORT NATURAL GAS LEAKS.

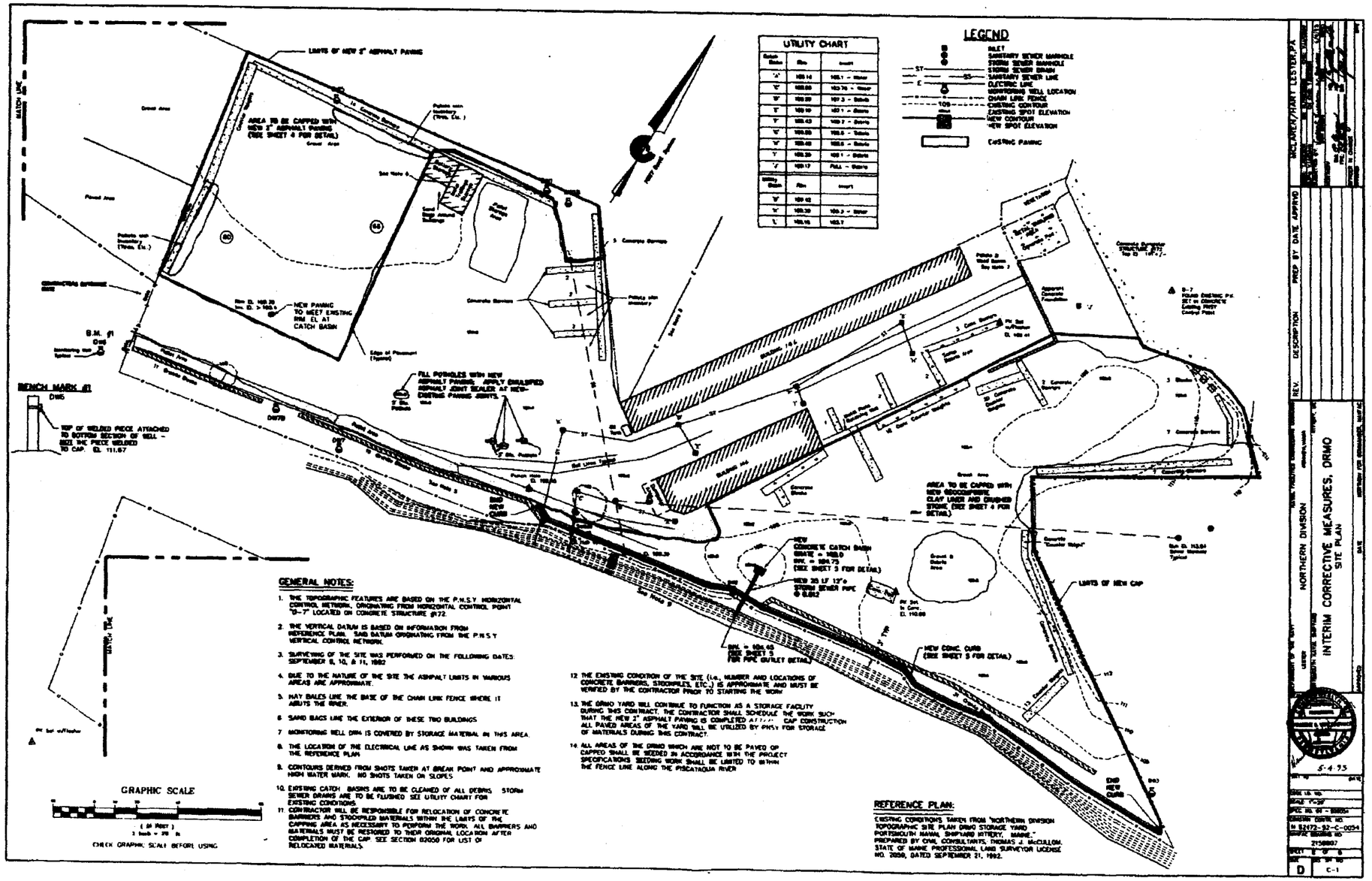
REVISION	DATE	DESCRIPTION	BY

DRAWING NO. VY-98-149	DEPT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND NAVAL SHIPYARD PORTSMOUTH, N.H.
DRAWN D.ALLEN C.91.30A	LAND USE CONTROL AREAS EXISTING CONDITIONS AUGUST 2006
BRANCH HEAD	
APPROVED DATE HEAD, ENGINEERING DIVISION	SIZE D CODE IDENT NO. 80091 NAVFAC DRAWING NO. 2'25994 SHEET
SATISFACTORY TO DATE	CONSTR. CONTR. NO.
SCALE AS SHOWN	SHEET 1 OF 1

31 Aug 2006 – 8:11am
P:\jhall_910\Drawings\archive\Maps\land-use.dwg

A.2 AS BUILT FIGURES

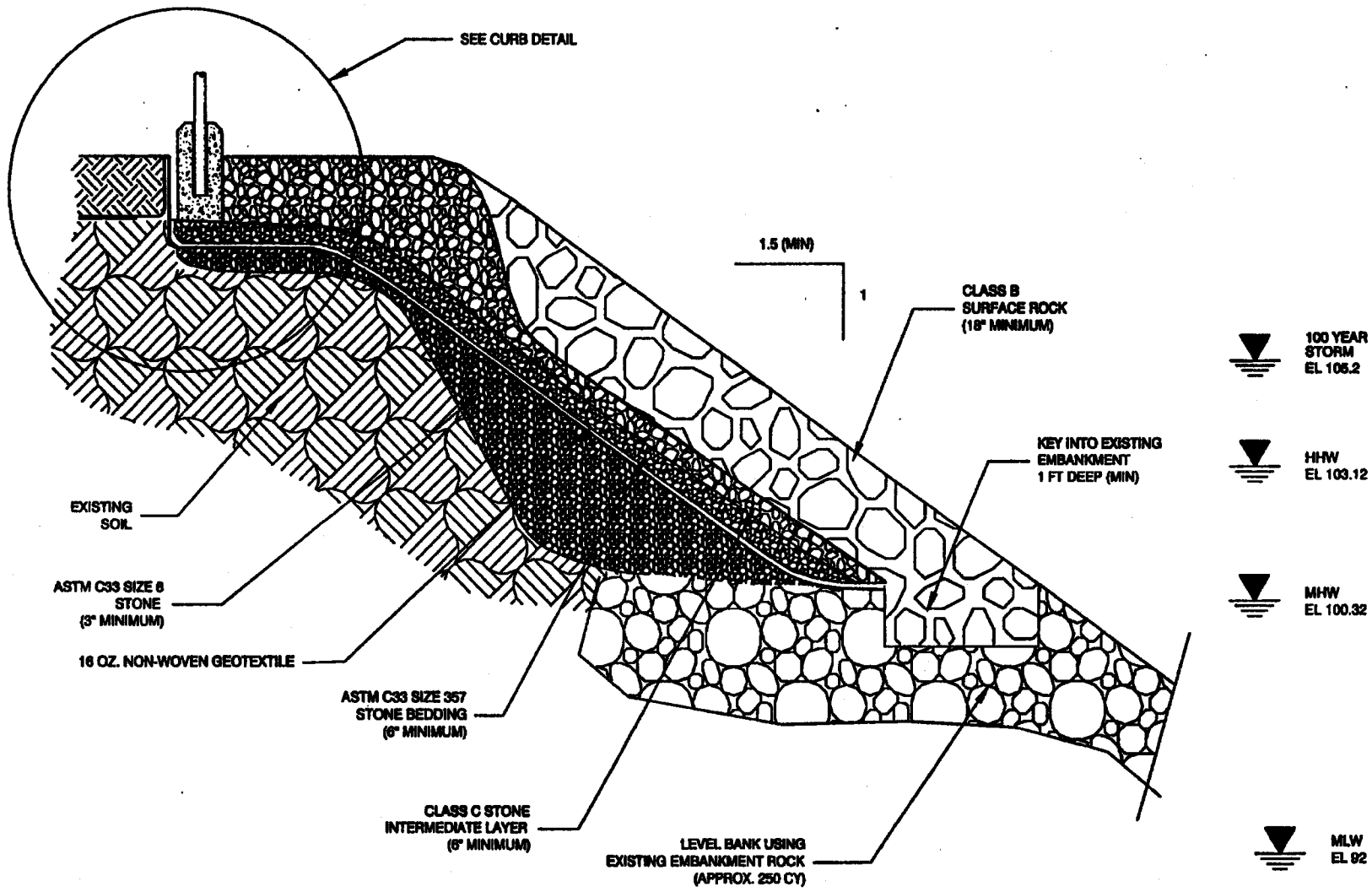
OU2



OU2: 1993 Interim Measures at the DRMO (McLaren/Hart, April 1993)

HALF SIZE

0149G06X

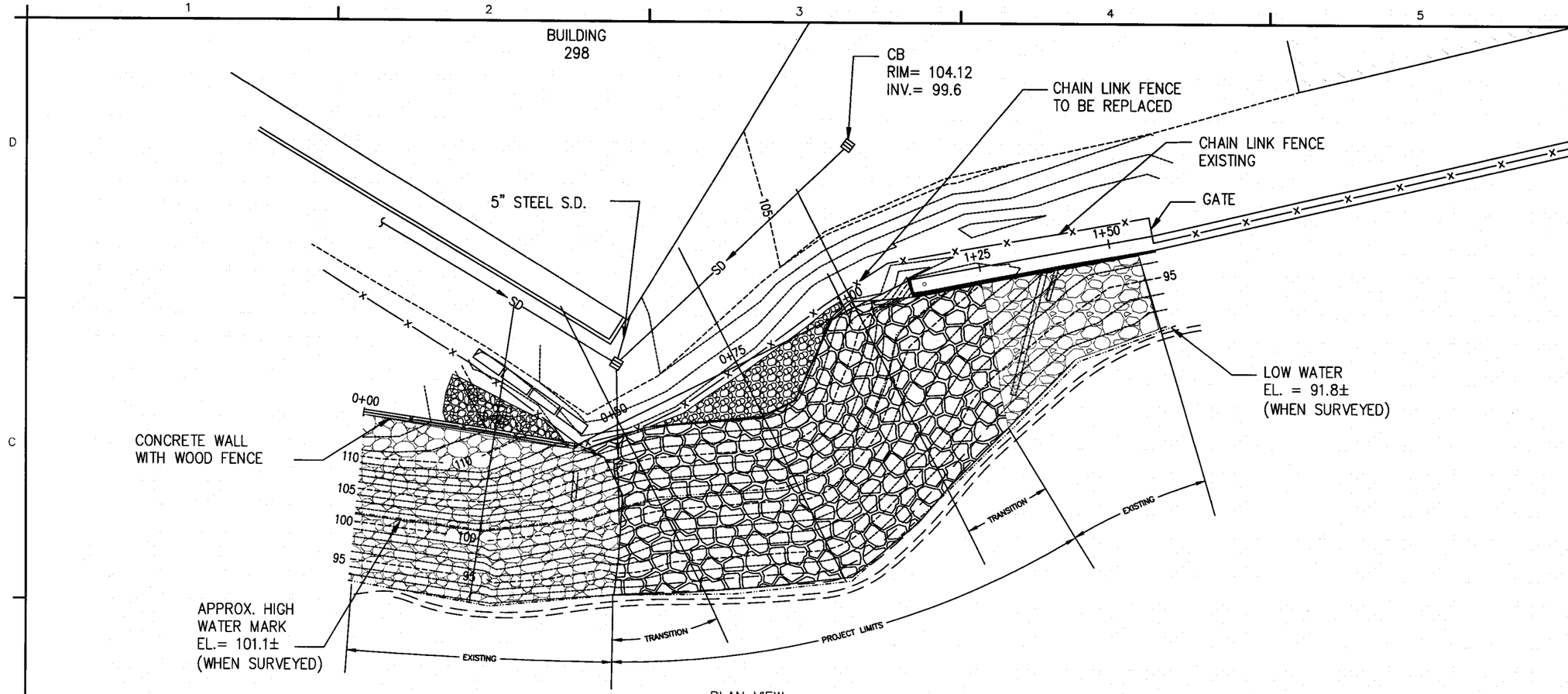


U.S. Navy RAC
Portsmouth Naval Shipyard
Kittery, Maine

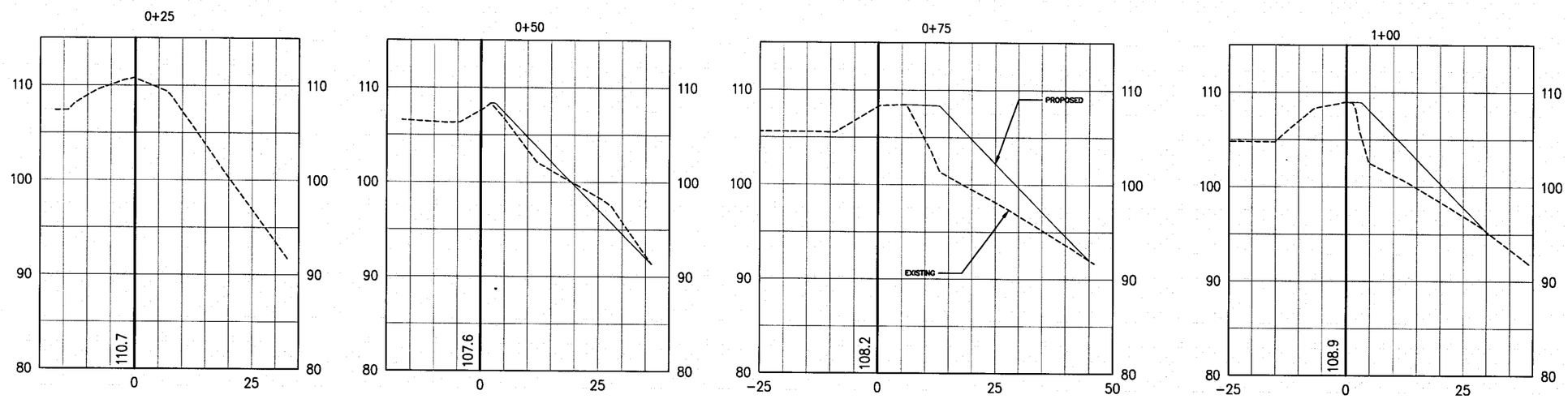
FIGURE 4
DRMO Shoreline Stabilization:
As-Built Cross Section

FOSTER WHEELER ENVIRONMENTAL CORPORATION

NAVYRAC\maine\slope as-built.dwg



PLAN VIEW



CROSS SECTIONS

OCTOBER 7, 2005

Mark	Description	Date	Appr.
0	ISSUED FOR CONSTRUCTION	10-7-05	REC

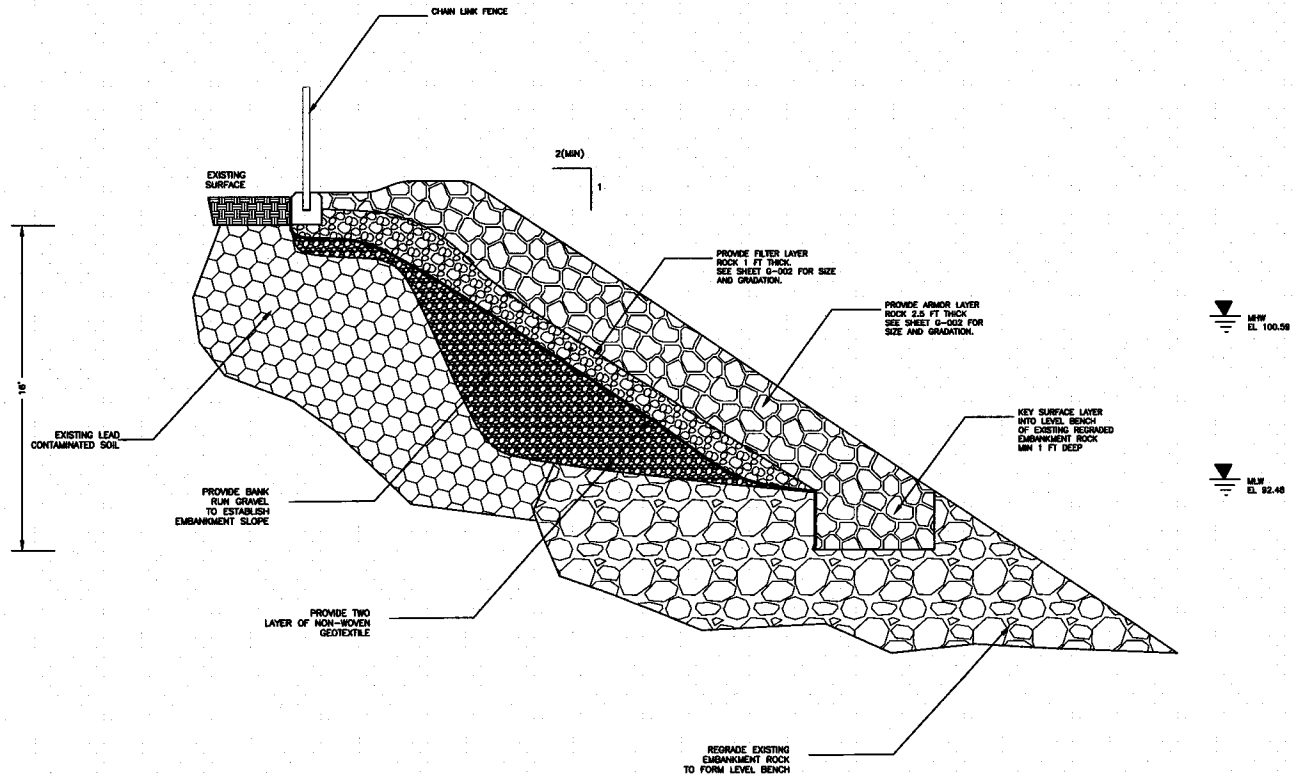
Designed by: REC
Drawn by: GC
Checked by: LT
Design file no. 27610-102-00.DWG
Drawing scale: AS SHOWN

TETRA TECH EC, INC.
1901 SOUTH CONGRESS AVENUE
SUITE 270
BOYNTON BEACH, FL 33426
TEL: (561) 735-0482
FAX: (561) 742-0673

SITE 29 SHORELINE STABILIZATION

STABILIZATION PLAN

Sheet Reference:
C-102
Sheet 4 OF 5



TYPICAL SECTION

OCTOBER 7, 2005

Mark	Description	Date	Appr.
0	ISSUED FOR CONSTRUCTION	10-7-05	REC

Designed by: REC
Drawn by: REC
Checked by: LT
Design file no. 27611C_301-02.DWG
Drawing scale: NTS

TETRA TECH EC, INC.
1951 SOUTH CONGRESS AVENUE
SUITE 270
BOYNTON BEACH, FL 33426
TEL: (561) 737-7900
FAX: (561) 742-6873

SITE 29 SHORELINE STABILIZATION

TYPICAL SECTION

Sheet Reference:
C-301
Sheet 5 OF 5

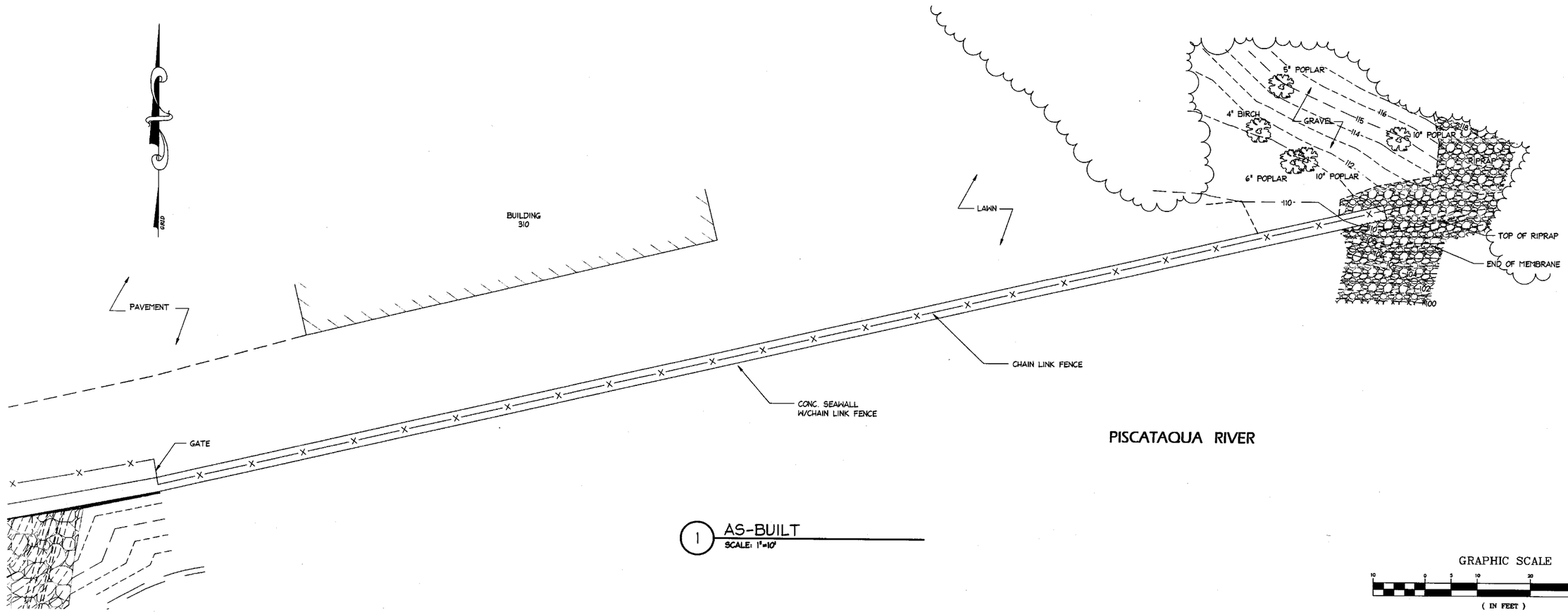
OU2: 2005 Shoreline Stabilization (TtEC, October 2005)

PLAN REFERENCES:

1. U.S. NAVAL ACTIVITIES, SEAVEY ISLAND, KITTERY, ME.; SURVEY CONTROL NETWORK, FEBRUARY, 2002; DIGITAL FILE "CONTROL2002.DWG" OBTAINED FROM P.N.S.Y. PUBLIC WORKS DEPARTMENT.

GENERAL NOTES:

1. HORIZONTAL DATUM - MAINE STATE PLANE COORDINATE SYSTEM NAD 27, BASED ON SURVEY CONTROL STATIONS H-14 AND H-25. SEE PLAN REFERENCE 1.
2. VERTICAL DATUM - PORTSMOUTH NAVAL SHIPYARD (P.N.S.Y.) DATUM, ALSO BASED ON SURVEY CONTROL STATIONS H-14 AND H-25 (SEE PLAN REFERENCE 1). TO COMPUTE ELEVATIONS IN THE NATIONAL GEODETIC VERTICAL DATUM OF 1929 SUBTRACT 96.012 FEET.
3. TOPOGRAPHIC SURVEY PERFORMED BY OEST ASSOCIATES, INC. JULY 2006. CONTOUR INTERVAL IS ONE FOOT.



1 AS-BUILT
SCALE: 1"=10'

GRAPHIC SCALE
10 0 5 10 20 40
(IN FEET)
1 inch = 10 ft.

THIS SURVEY WAS PERFORMED UNDER MY DIRECT SUPERVISION AND IS TRUE AND IS CORRECT TO THE BEST OF MY KNOWLEDGE.

JEROME B. WATTS P.L.S. 1245

STATE OF MAINE JEROME B. WATTS 1245 PROFESSIONAL LAND SURVEYOR

PLEASE NOTE: THIS DOCUMENT MAY NOT ACCURATELY REPRESENT THE FINAL DOCUMENT. ONLY AN ENGINEER, ARCHITECT OR SURVEYOR SIGNED, SEALED AND DATED PAPER COPY, PROVIDED BY THIS OFFICE, MAY BE UTILIZED FOR BIDDING OR CONSTRUCTION PURPOSES.

REV.	DESCRIPTION	DR. BY	CKD. BY	APP. BY	DATE
A	As-Built	WJW	DRB	DRB	7-14-06

TETRA TECH, EC INC.
133 Federal Street Boston, MA 02110

PORTSMOUTH NAVAL SHIPYARD
Kittery, Maine

AS-BUILT PLAN
SITE 29

OEST Associates, Inc.
343 Gorham Road · South Portland, ME 04106-2317
Tel: (207)761-1770 Fax: (207)774-1246
Web: www.oest.com Email: mail@oest.com
engineers · architects · surveyors · construction managers

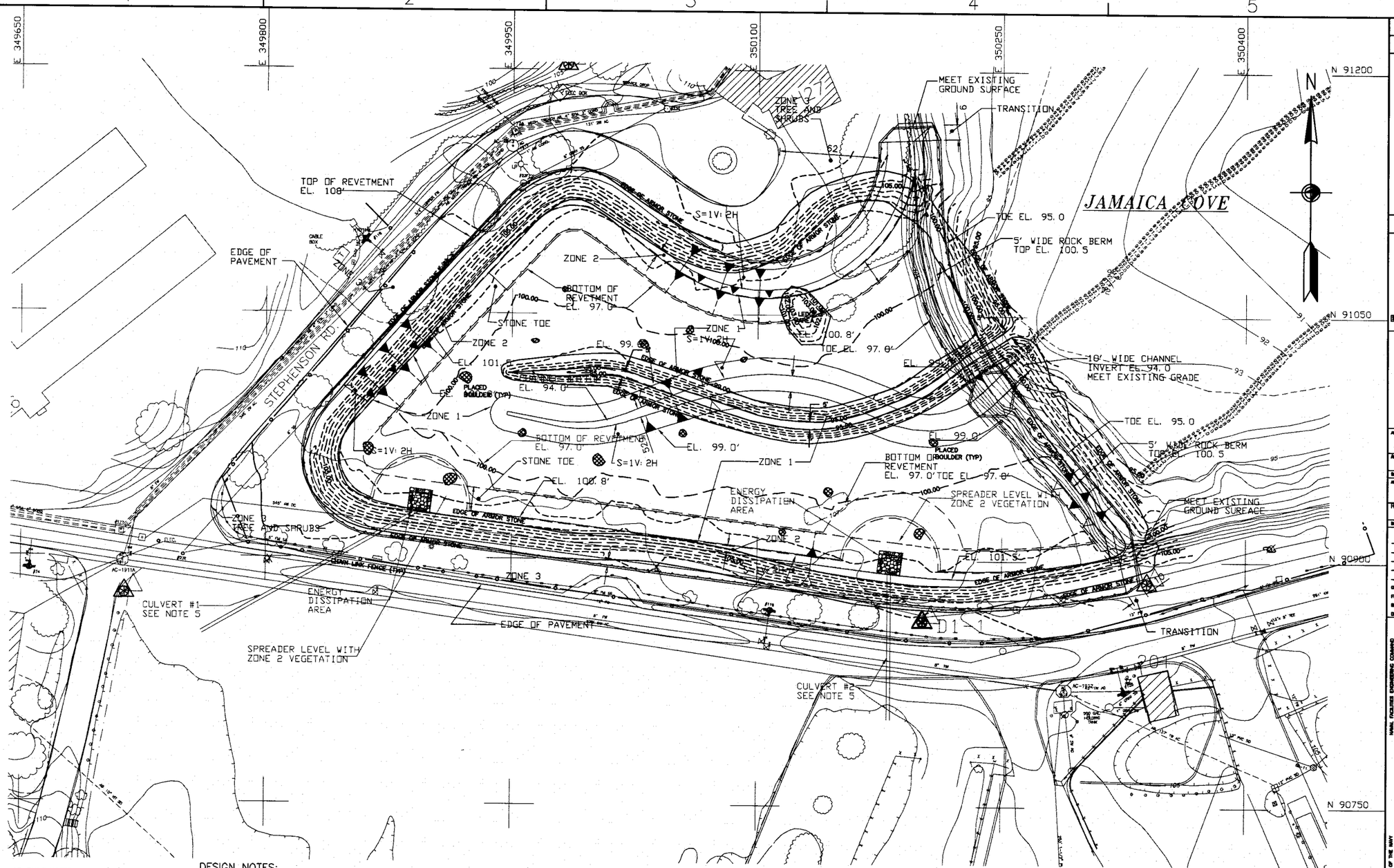
SCALE: As Noted
DATE : July 2006
DES BY: D.R. Bolender
DWN BY: W. Wilritten
CHK BY: D.R. Bolender

PROJECT NO. 323.10.01
SHEET 1 OF 1
DRAWING NO. C-2

T:\3230601\Sheets\3230601_AsBuilt-C2.dwg Jul 12, 2006 - 9:43am

OU2: 2006 Shoreline Stabilization (TtEC, September 2006)

OU3



AS-BUILT NOTES:

1. THE AS-BUILT INFORMATION SHOWN ON THIS PLAN IS A RESULT OF AN ON-THE-GROUND SURVEY PERFORMED ON SEPTEMBER 30, 2002 BY SAI SURVEY CORPORATION.
2. VERTICAL DATUM IS BASED ON THE PORTSMOUTH NAVAL SHIPYARD DATUM. THE VERTICAL CONTROL USED FOR CONSTRUCTION LAYOUT WAS ESTABLISHED BY CIVIL CONSULTANTS OF SOUTH BERWICK, MAINE IN FEBRUARY 2002. THE AS-BUILT SURVEY WAS PERFORMED BASED ON VERTICAL CONTROL ESTABLISHED BY OWEN HASKELL, INC. OF PORTLAND, MAINE IN OCTOBER, 2001. THE RELATIONSHIP BETWEEN THIS CONTROL IS:
   OWEN HASKELL = CIVIL CONSULTANTS + 0.20'
3. THE HORIZONTAL DATUM IS BASED ON MAINE STATE PLANE COORDINATE SYSTEM WEST ZONE NAD 1983.

DESIGN NOTES:

1. ELEVATIONS SHOWN ON ALL DRAWINGS REFER TO PORTSMOUTH NAVAL SHIPYARD DATUM (PNS). THE ASSUMED RELATIONSHIP BETWEEN PNS AND NGVD 1929 IS; NGVD 1929 = PNS-96.5.
2. MHW = 100.85 PNS OR 4.35 NGVD
   MLW = 92.72 PNS OR -3.78 NGVD
3. ZONE 1 LOW MARSH EL. 99.0 TO 100.8
   ZONE 2 HIGH MARSH EL. 100.8 TO 101.5
   ZONE 3 TREES AND SHRUBS EL. 108+
4. ELEVATION OF EXISTING REVETMENT TOE VARIES. VERTICAL AND HORIZONTAL ALIGNMENT OF NEW STONE BERM WILL BE FIXED TO MATCH EXISTING.
5. CULVERT ALIGNMENTS WITH COORDINATES, ENERGY DISSIPATION AREA AND SPREADER SHALL BE COMPLETED IN PHASE 2.

JAMAICA COVE-SITE PLAN
SALT MARSH

SCALE: 1"=30'

GRAPHIC SCALE: 1" = 30' (30 0 30 60)

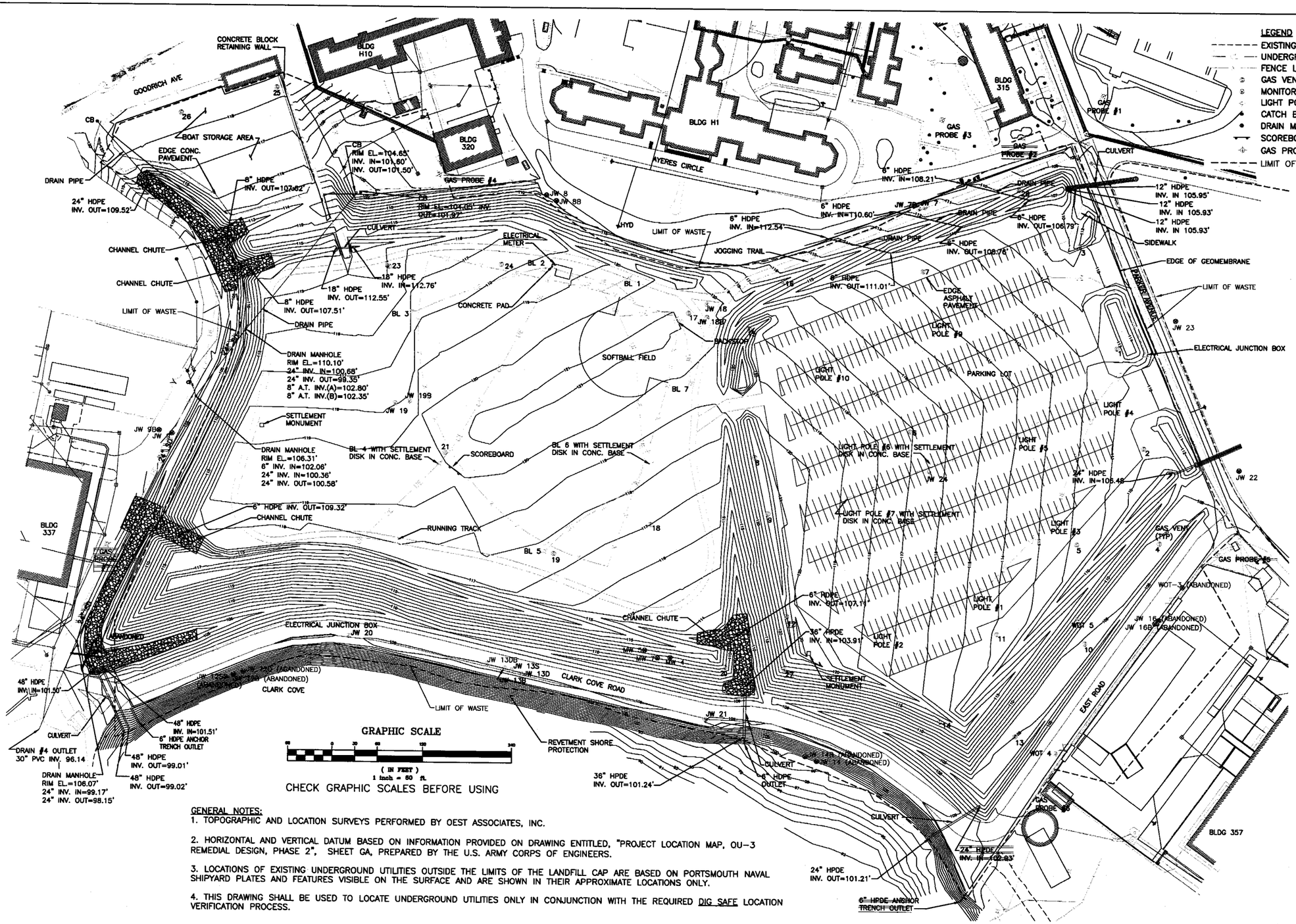
DESIGNED & ENGINEERED BY: EFA NORTHEAST
NAVAL FACILITIES ENGINEERING COMMAND

ACTIVITY - SATISFACTORY TO
FOR EFA FOR COMMANDER NAVFAC

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
ENGINEERING FIELD ACTIVITY NORTHEAST
PENNSYLVANIA
LOCATION: NAVAL SHIPYARD - PORTSMOUTH
KITTERY, ME
JAMAICA ISLAND LANDFILL CAP
JAMAICA COVE SALT MARSH - AS-BUILT DRAWING

CODE ID. NO. 80091 SIZE D
SCALE: 30:1
EFD NO.
STA. FACIL. NO.
SPEC. NO. N62472-99-C-0032
CONTR. COMM. NO. 04890032
NAVFAC DRAWING NO. 2212011
SHEET 8 OF 12
C1

DRAFTING REVISION FEBRUARY 2001
JI01C101.DGN
jl01bord.dgn



GENERAL NOTES:

1. TOPOGRAPHIC AND LOCATION SURVEYS PERFORMED BY OEST ASSOCIATES, INC.

2. HORIZONTAL AND VERTICAL DATUM BASED ON INFORMATION PROVIDED ON DRAWING ENTITLED, "PROJECT LOCATION MAP, OU-3 REMEDIAL DESIGN, PHASE 2", SHEET GA, PREPARED BY THE U.S. ARMY CORPS OF ENGINEERS.

3. LOCATIONS OF EXISTING UNDERGROUND UTILITIES OUTSIDE THE LIMITS OF THE LANDFILL CAP ARE BASED ON PORTSMOUTH NAVAL SHIPYARD PLATES AND FEATURES VISIBLE ON THE SURFACE AND ARE SHOWN IN THEIR APPROXIMATE LOCATIONS ONLY.

4. THIS DRAWING SHALL BE USED TO LOCATE UNDERGROUND UTILITIES ONLY IN CONJUNCTION WITH THE REQUIRED DIG SAFE LOCATION VERIFICATION PROCESS.

REVISIONS			
REVISION	DATE	DESCRIPTION	BY
A	12/02/04	TO CLIENT	
B	1/18/05	PER TETRA TECH COMMENTS	
C	1/26/05	PER TETRA TECH COMMENTS	
4	04/21/06	(TECC) ADDED LIMITS OF WASTE AND UPDATED WELLS	

A/E FIRM NAME: OEST ASSOCIATES, INC.
AND ADDRESS: 343 Gorham Road South Portland, ME
DSGN: TJH DRWN: CBM CHK: DRB
SUPV:
SUBMITTED BY: DATE
DRAWN: DATE
APPROVED: DATE

CHIEF, FACILITIES DESIGN DIVISION

STATE OF MAINE
DANNY R. BOLENDER 2244
PROFESSIONAL LAND SURVEYOR

DEPARTMENT OF THE NAVY
NAVAL SHIPYARD
NAVAL FACILITIES ENGINEERING COMMAND
PORTSMOUTH, N.H.

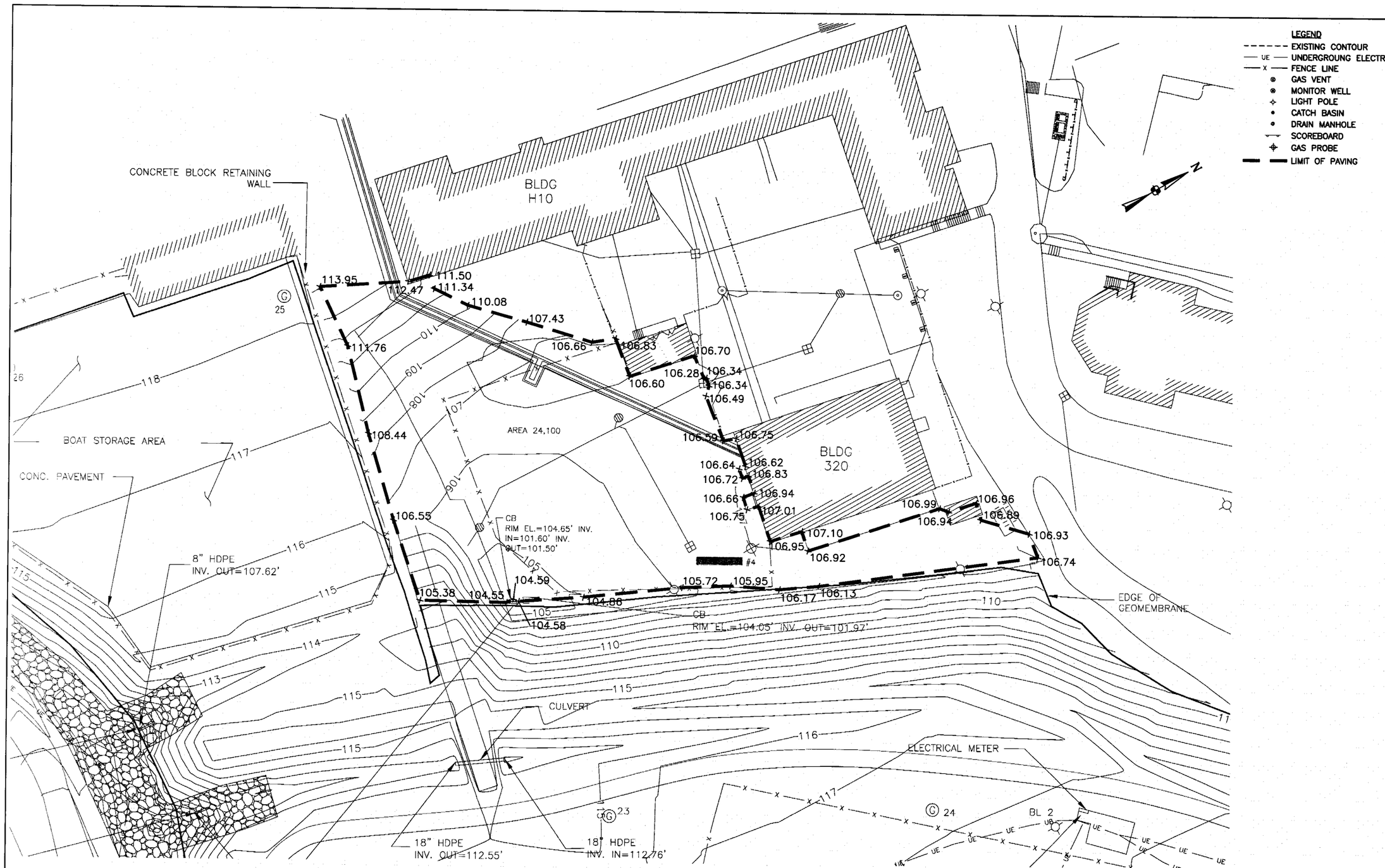
JAMAICA ISLAND LANDFILL

FINAL GRADE AS-BUILT

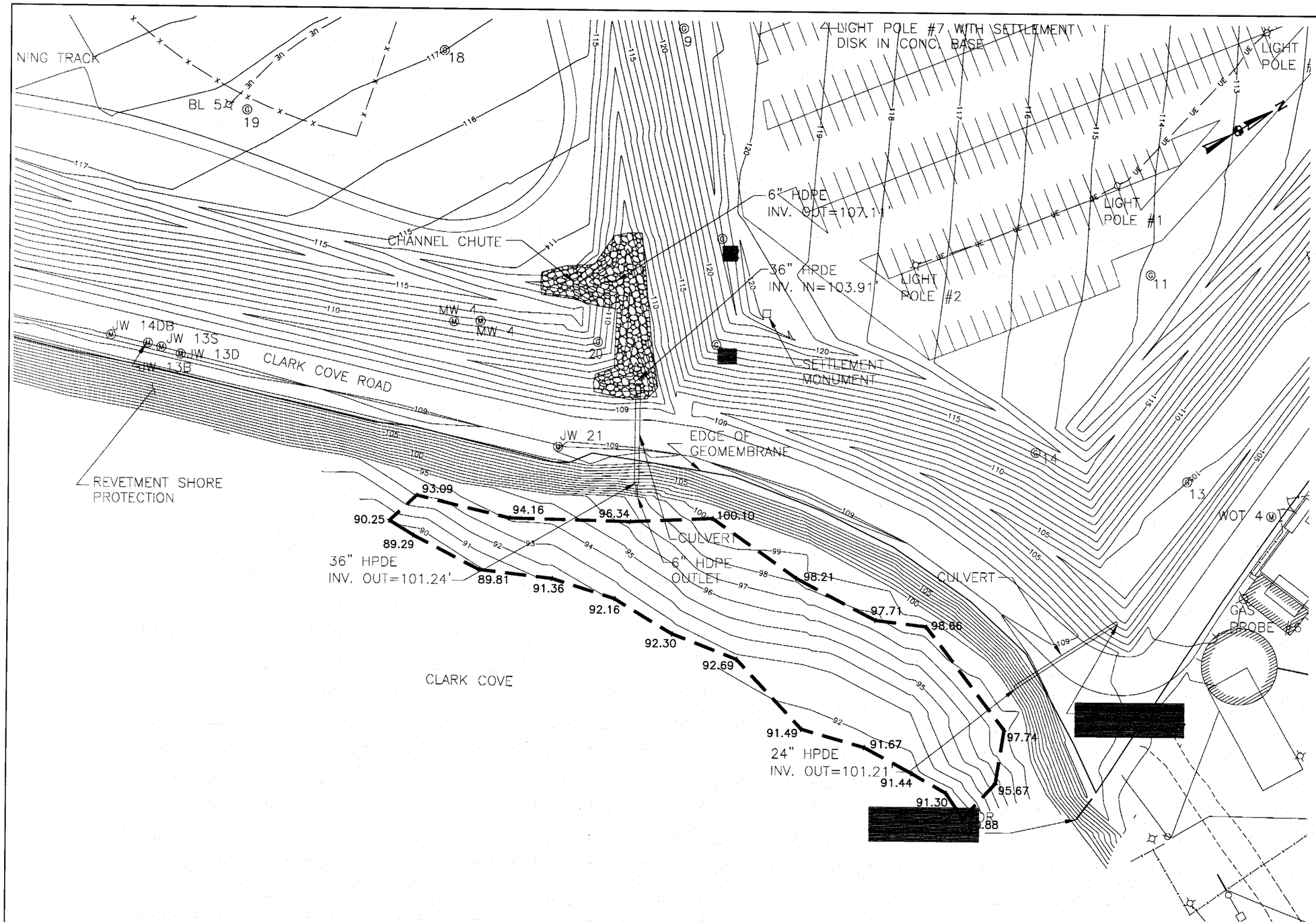
CODE I.D. NO.
DRAWING SIZE: D
CONST. CONT. NO.
SPEC.
NAVFAC DRAWING NO.
SHT C2
SHEET 2 OF 3
PW NO.

UNCLASSIFIED

P:\NORTHDIV\QC\Working Folder\CTO-045\Working files (J. Grey)\C-2 as-built.dwg, 5/15/2006 1:08:09 PM



OU3: Remedial Action As-built (TtEC, May 2006)



GENERAL NOTES:

1. TOPOGRAPHIC AND LOCATION SURVEYS PERFORMED BY OEST ASSOCIATES, INC.
2. HORIZONTAL AND VERTICAL DATUM BASED ON INFORMATION PROVIDED ON DRAWING ENTITLED, "PROJECT LOCATION MAP, OU-3 REMEDIAL DESIGN, PHASE 2", SHEET GA, PREPARED BY THE U.S. ARMY CORPS OF ENGINEERS.
3. LOCATIONS OF EXISTING UNDERGROUND UTILITIES OUTSIDE THE LIMITS OF THE LANDFILL CAP ARE BASED ON PORTSMOUTH NAVAL SHIPYARD PLATES AND FEATURES VISIBLE ON THE SURFACE AND ARE SHOWN IN THEIR APPROXIMATE LOCATIONS ONLY.
4. THIS DRAWING SHALL BE USED TO LOCATE UNDERGROUND UTILITIES ONLY IN CONJUNCTION WITH THE REQUIRED DIG SAFE LOCATION VERIFICATION PROCESS.

REFERENCE:

"FINAL GRADE AS-BUILT", JAMAICA ISLAND LANDFILL, DEPT. OF THE NAVY, NAVAL SHIPYARD, PORTSMOUTH, N.H., BY OEST ASSOCIATES, INC., DRAWING: C2, SHEET 2 OF 3, LAST REVISED: 1/24/05 PER TETRA TECH COMMENTS.

GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)
1 inch = 30 ft.

CHECK GRAPHIC SCALES BEFORE USING

TETRA TECH EC, INC.

REV	DESCRIPTION	PREP BY	DATE	APPRVD

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
ENGINEERING FIELD ACTIVITY - NORTHEAST
LISTER
NAVAL SHIPYARD
PENNSYLVANIA
KITTERY, MAINE

JAMAICA ISLAND LANDFILL
LIMIT OF CLARK COVE EXCAVATION

DATE
APPROVED
EFANE FOR COMMANDER, NAVFAC

SEAL AREA

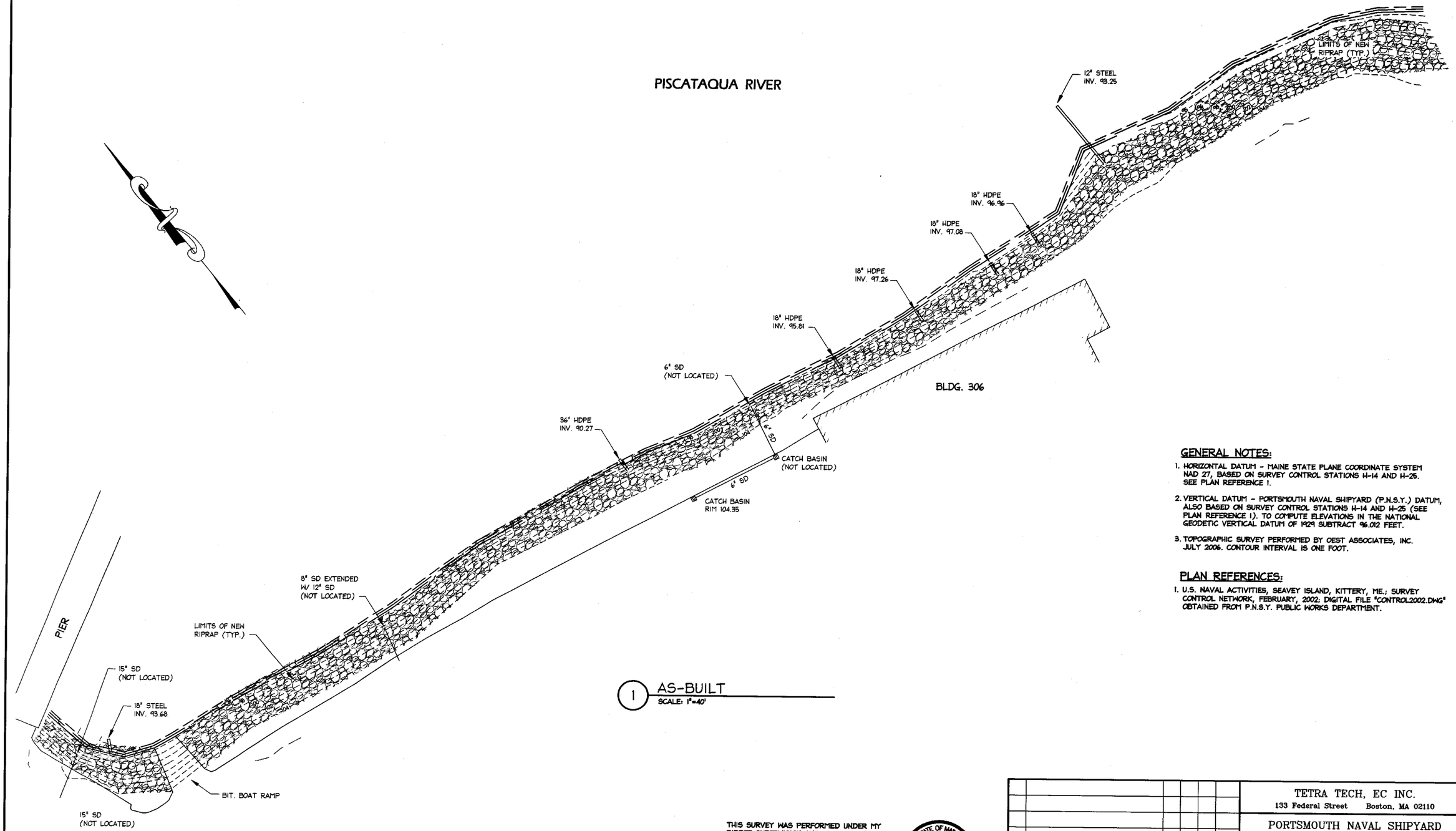
SAT TO DATE

CODE I.D. NO.
SCALE : AS SHOWN
SPEC. NO.
CONSTRM. CONTR. NO.
NAVFAC DRAWING NO.
SHEET OF
SIZE: D
DIS. SH. NO.

P:\Navy RACWAINE\ILF OEST survey\CLARK COVE LIMIT asbuilt.dwg, 02/16/2005 02:25:10 PM

OU3: Remedial Action As-built (TtEC, May 2006)

OU7



1 AS-BUILT
SCALE: 1"=40'

GENERAL NOTES:

1. HORIZONTAL DATUM - MAINE STATE PLANE COORDINATE SYSTEM NAD 27, BASED ON SURVEY CONTROL STATIONS H-14 AND H-25. SEE PLAN REFERENCE 1.
2. VERTICAL DATUM - PORTSMOUTH NAVAL SHIPYARD (P.N.S.Y.) DATUM, ALSO BASED ON SURVEY CONTROL STATIONS H-14 AND H-25 (SEE PLAN REFERENCE 1). TO COMPUTE ELEVATIONS IN THE NATIONAL GEODETIC VERTICAL DATUM OF 1929 SUBTRACT 96.012 FEET.
3. TOPOGRAPHIC SURVEY PERFORMED BY OEST ASSOCIATES, INC. JULY 2006. CONTOUR INTERVAL IS ONE FOOT.

PLAN REFERENCES:

1. U.S. NAVAL ACTIVITIES, SEAVEY ISLAND, KITTERY, ME.; SURVEY CONTROL NETWORK, FEBRUARY, 2002; DIGITAL FILE "CONTROL2002.DWG" OBTAINED FROM P.N.S.Y. PUBLIC WORKS DEPARTMENT.

THIS SURVEY WAS PERFORMED UNDER MY DIRECT SUPERVISION AND IS TRUE AND IS CORRECT TO THE BEST OF MY KNOWLEDGE.

JEROME B. WATTS P.L.S. 1245

STATE OF MAINE
JEROME B. WATTS 1245
PROFESSIONAL LAND SURVEYOR

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REV.	DESCRIPTION	DR. BY	CKD. BY	APP. BY	DATE
A	As-Built	WJW	DRB	DRB	7-14-06

TETRA TECH, EC INC.
133 Federal Street Boston, MA 02110

PORTSMOUTH NAVAL SHIPYARD
Kittery, Maine

AS-BUILT PLAN
SITE 32

OEST Associates, Inc.
343 Gorham Road · South Portland, ME 04106-2317
Tel: (207)761-1770 Fax: (207)774-1246
Web: www.oest.com Email: mail@oest.com
engineers · architects · surveyors · construction managers

SCALE: As Noted
DATE : July 2006
DES BY: D.R. Bolender
DWN BY: W. Whitten
CHK BY: D.R. Bolender

PROJECT NO. 323.10.05
SHEET 1 OF 1

DRAWING NO. C-1

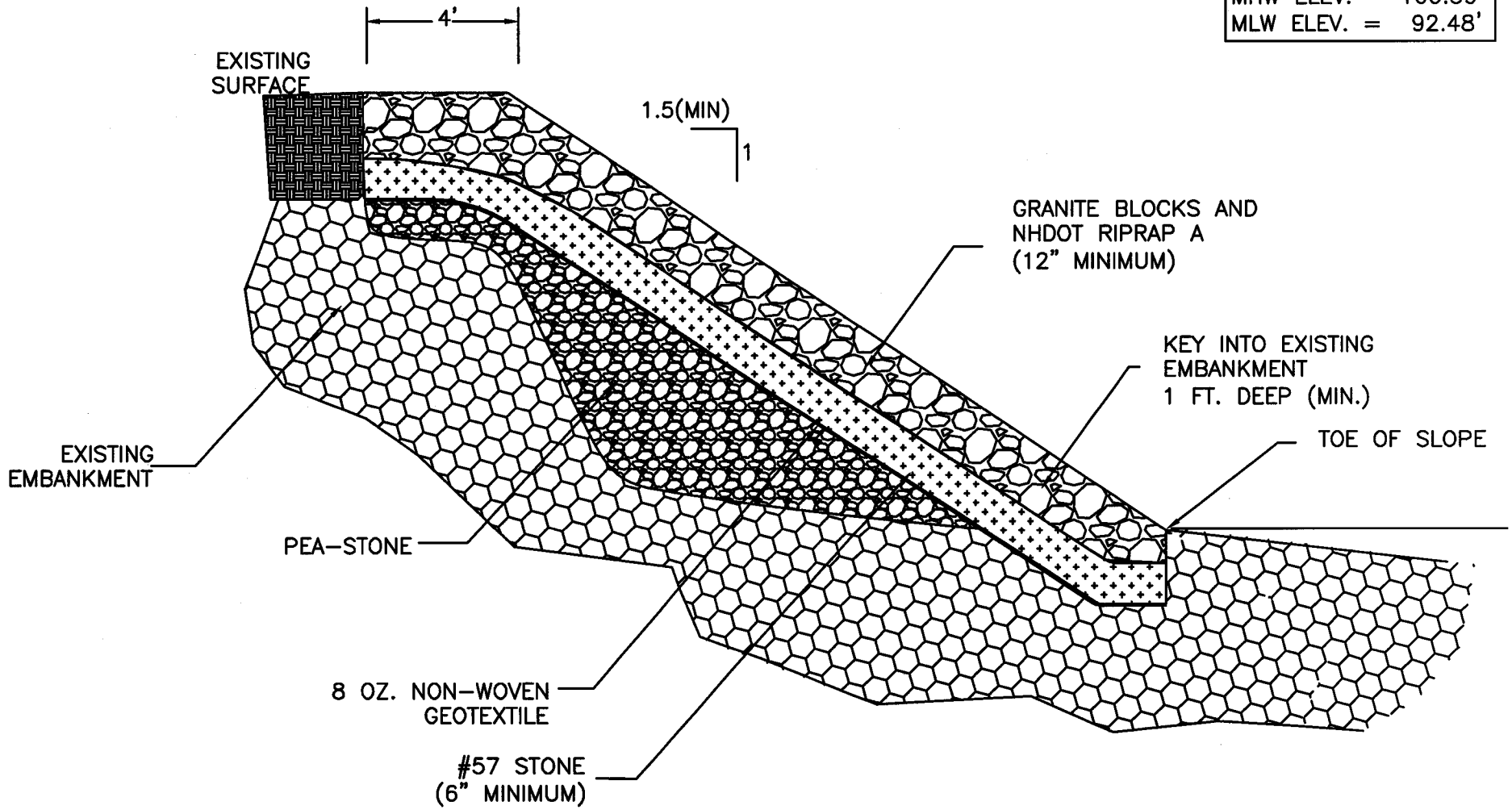
Cadd: 3230302_01-C1.dwg

T:\3230302\Sheets\3230302_01-C1.dwg Jul 13, 2006 - 11:29am

OU7: 2006 Shoreline Stabilization (TtEC, September 2006)

NOTE:

MHW ELEV. = 100.59'
MLW ELEV. = 92.48'



U.S. Navy RAC
Portsmouth Naval Shipyard
Kittery, Maine

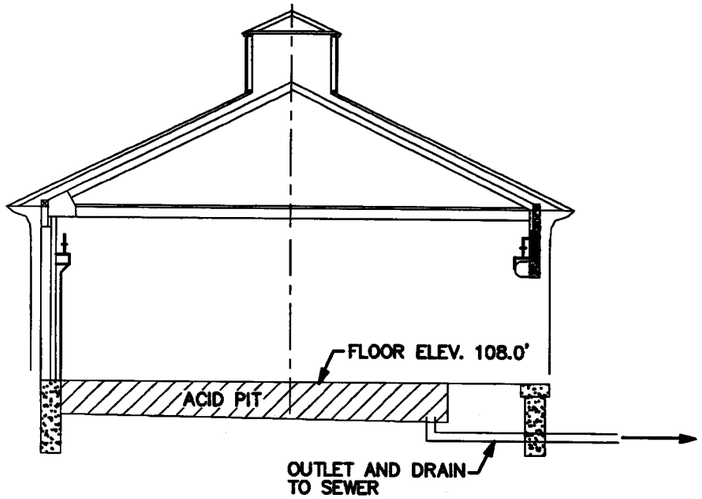
Figure 4
Typical Section

TETRA TECH EC INC.

OU7: 2006 Shoreline Stabilization (TtEC, September 2006)

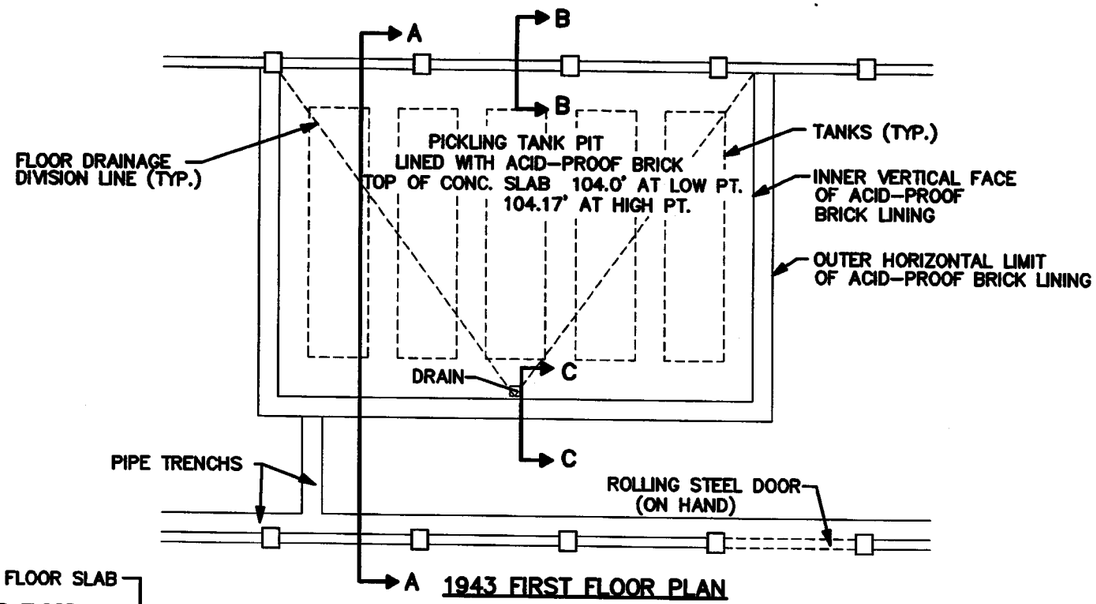
SITE 30

ACAD:1291CP03.dwg 11/02/05 DM PIT



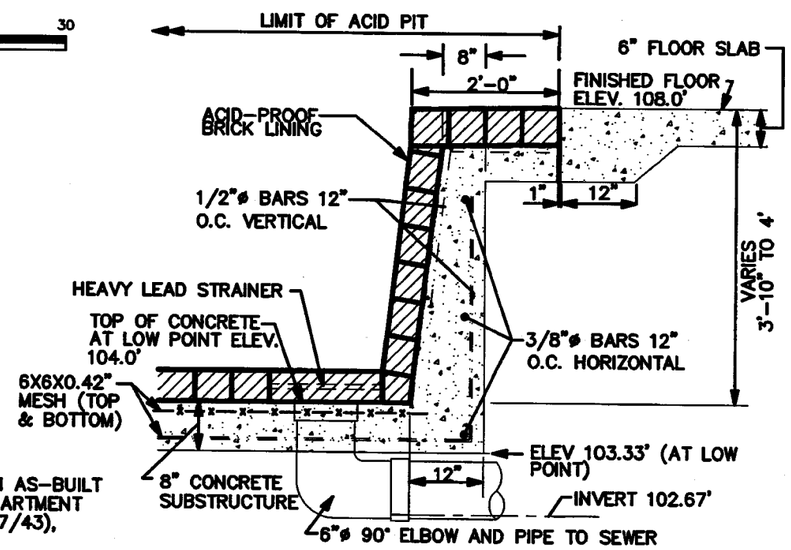
SECTION A–A

0 15 30
SCALE IN FEET

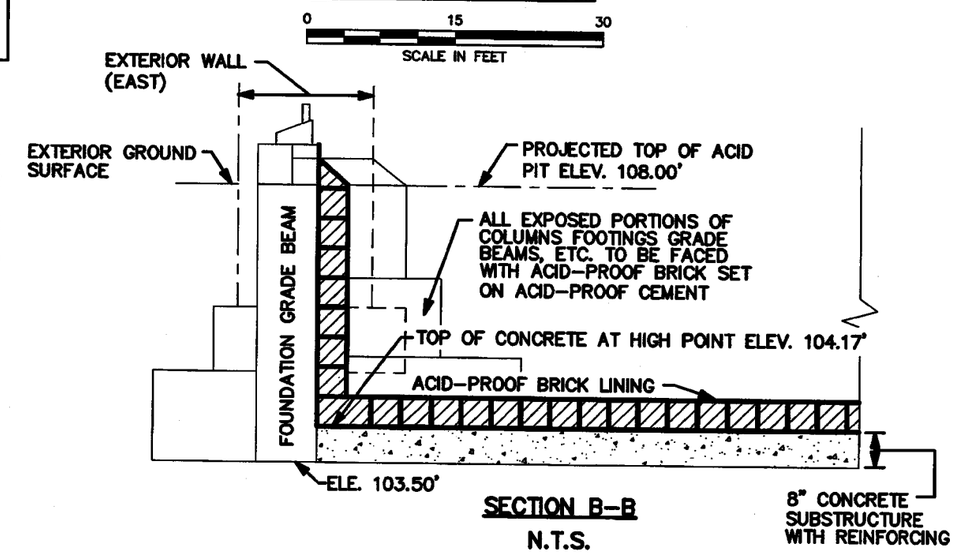


1943 FIRST FLOOR PLAN

0 15 30
SCALE IN FEET



SECTION C–C
N.T.S.



SECTION B–B
N.T.S.

NOTES:

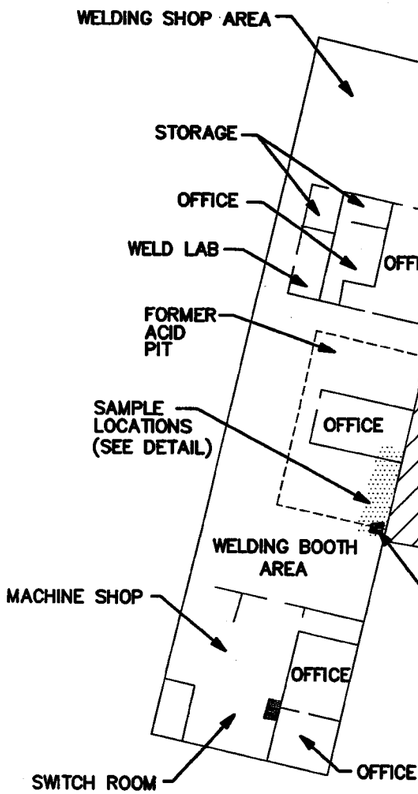
INFORMATION ON THIS FIGURE IS COMPILED FROM AS–BUILT DRAWINGS REVIEWED AT THE PUBLIC WORKS DEPARTMENT AT PNS, DRAWINGS USED ARE: 184–43–11 (6/17/43), 184–43–18 (10/12/43), 184–43–10 (6/5/43), 184–43–3 (3/27/43), 184–43–13 (6/21/43), AND 184–43–2 (3/27/43)

DRAWN BY DM	DATE 11/2/05	Tetra Tech NUS, Inc.	1943 AS-BUILT BUILDING CONDITIONS PLAN AND SECTIONS SITE 30 (BUILDING 184) PORTSMOUTH NAVAL SHIPYARD KITTERY, MAINE
CHECKED BY	DATE		
REVISED BY No revision from EE/CA	DATE		
SCALE AS NOTED			

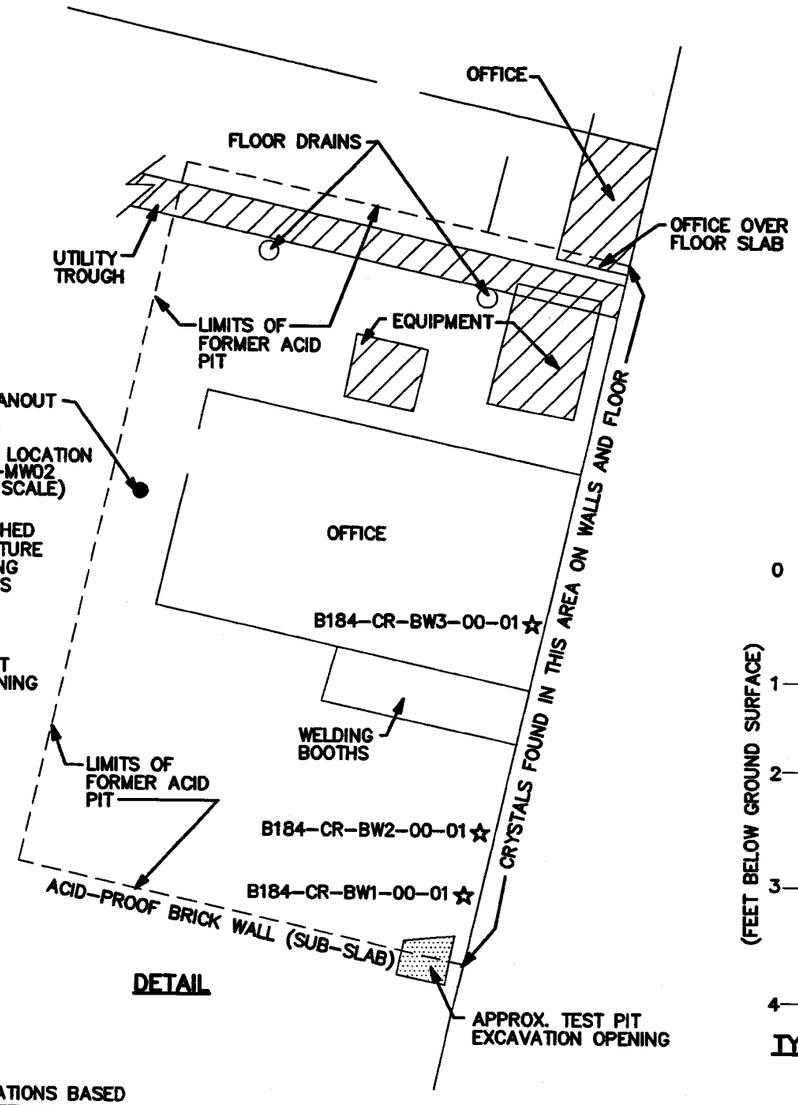
CONTRACT NO. 1291
OWNER NO. 0022
APPROVED BY DJC DATE 11/9/05
DRAWING NO. FIGURE 2-3
REV. 0

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

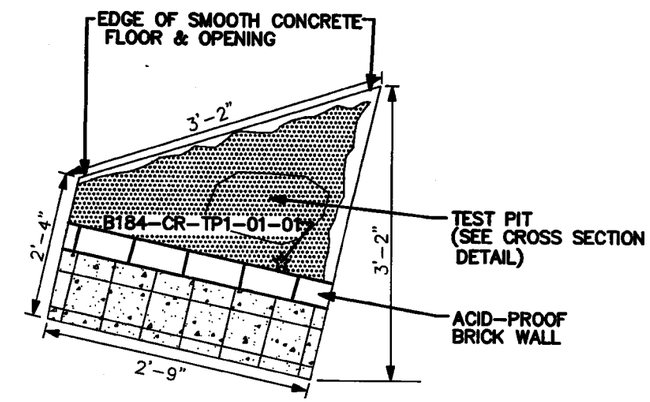
ACAD:1291CP04.dwg 11/02/05 DM PIT



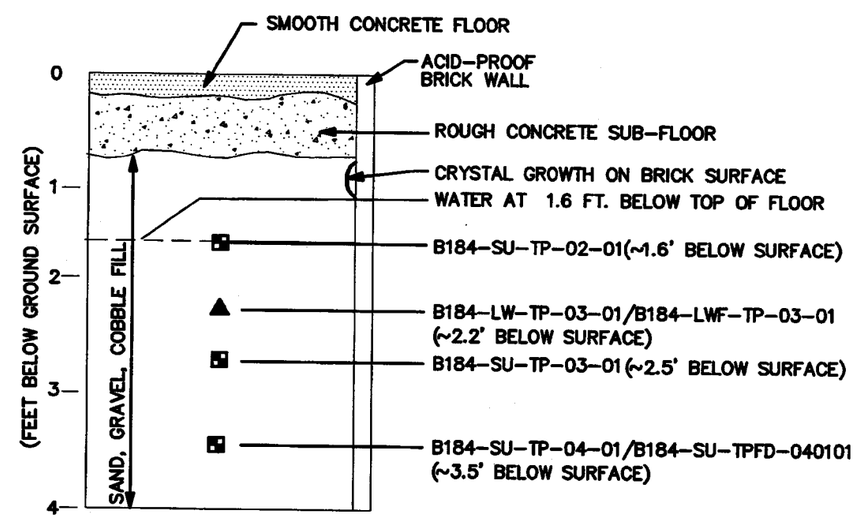
CURRENT LAYOUT
BUILDING 184 (SITE 30)



DETAIL



TEST PIT DETAIL IN PLAN VIEW



TYPICAL CROSS SECTION DETAIL

NOTE:

NOT TO SCALE – FEATURES ARE ESTIMATED USING LOCATIONS BASED ON NOTES FROM SITE VISIT ON DECEMBER 11, 2001 BY TTNUS.

LEGEND:

- ■ SOIL SAMPLE
- ▲ LIQUID WASTE SAMPLE
- ☆ CRYSTAL SAMPLE

DRAWN BY DM DATE 11/2/05	Tetra Tech NUS, Inc.	GENERAL BUILDING LAYOUT AND TEST PIT MATERIAL PHYSICAL CHARACTERISTICS SITE 30 (BUILDING 184) PORTSMOUTH NAVAL SHIPYARD KITTERY, MAINE	CONTRACT NO. 1291
CHECKED BY DATE			OWNER NO. 0022
REVISED BY DATE No Revision from EBCA			APPROVED BY DJC 11/9/05 DATE
SCALE AS NOTED			DRAWING NO. FIGURE 2-4 REV. 0

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

A.3 INSPECTION LISTS AND PROPOSED MAINTENANCE SCHEDULE

Inspection Log For Five-year Review Inspection
Portsmouth Naval Shipyard, Kittery, Maine
August 29 and 30, 2006 and September 25 and 26, 2006

An inspection of the IRP sites (by OU) was conducted by TtNUS on August 29 and 30, 2006 to support the 5-year Review Report that TtNUS is preparing for the Navy. Additional inspection activities were conducted by TtNUS on September 25 and 26, 2006. No major deficiencies were noted during the inspection. One major item (for OU3) and various minor items were identified and recommendations provided. These are provided below by OU.

OU1

-Site 10, Former Battery Acid Tank No. 24 (Building 238) and Site 21 – Acid/Alkaline Drain Tank (groundwater)

- Monitoring well BA-MW4 was in a depression that was completely inundated with water leaking from the tank at Building 303 and possibly the recent rain. This does not appear to be a constant problem because water was not found in the depression when BA-MW4 was sampled earlier in August 2006. Reportedly the tank at Building 303 will be demolished in the near future when the testing facility is moved adjacent to Building 306. This should alleviate the problem with ponding water.
- Monitoring well BA-MW4 well cover was missing a bolt. The Navy should replace the bolt.
- One of the crawlspace covers/signs on Building 238 was not attached. The Navy should replace covers/signs for the crawl space openings.
- There is no deficiency/recommendation for Site 21. A no further action decision document for soil was signed for Site 21 and groundwater was investigated and recommended for no further action as part of the 1998 Site 31 investigation. The tank is no longer present and there are no groundwater monitoring wells associated with Site 21. Therefore, there was no specific inspection of Site 21. NFA for Site 21 groundwater will be addressed as part of the OU1 RI report.

OU2

-Site 6, Defense Reutilization and Marketing Office Storage Yard (DRMO)

Asphalt in the area is not in good condition; however, no areas of exposed soil were observed. The asphalt was in the fenced area of the DRMO. Equipment stored in the area was on pallets. One well (DW-4) could not be located. All the wells had some amount of rust. The wells should be checked and repaired as needed as part of the additional investigation for OU2.

-Site 29, Former Teepee Incinerator Site

- Locks on stickup monitoring wells DW-3, DW-8, DW-8B, and DW-9 were rusted. The locks may need to be replaced as part of the additional investigation for OU2.
- Fabric under the rip-rap in the eastern portion of the site can be seen. Additional rip-rap should be placed over the fabric to completely cover it (particularly by the shoreline).

OU3

-Site 8 - Jamaica Island Landfill

- There is no comprehensive figure for OU3 showing all of the necessary features for site inspection. Various drawings from the OU3 completion report were needed to be able to check the items for the 5-year review inspection. Many of the Legend symbols on Final Grade As-Built Drawing C2, such as the gas vent and monitoring well symbols, are barely visible to invisible on the black and white PDF. Also, red-line and as-built drawings do not always match (wetlands area). Having one or two drawings (with the North arrows facing the same way) that clearly show all numbered constructed vents, wells, gas probes, and settlement plates, as well as drainage layer pipe outlets and numbered ditches, pipes, chutes, and culverts would make site inspection easier. The drawings should also include the location of signs indicating dig restriction. The Navy should prepare OU3 site map(s) specifically for O&M inspections. Color figures would make it easier to distinguish features at OU3.

Monitoring wells:

All monitoring wells should be labeled on the outside and inside, should be bolted and locked. The Navy should label the wells and make any necessary repairs. The following were noted during the inspection.

- Monitoring well JW20 cover is missing bolts.
- JW19 and JW19B well covers were covered with grass.
- Broken concrete pad at monitoring well JW 7B.
- Bolts at monitoring well JW13DB not connected, lid lifts off.
- Monitoring wells at Building 357 that will be included in the OU3 OM&M (HW-2 and HW-3) were not inspected; however, these wells are inspected as part of the OU3 OM&M.
- The as-built drawing (C2 – final grade as-built, last revised April 2006) shows the incorrect locations of monitoring wells JW-22 and JW-23. The figure needs to be corrected. JW-22 is located to the west of JW-23 (JW-23 is closer to Building 357). Also, the north arrow appears to be missing.

Gas vents:

- All gas vents are missing bird screens. These screens should be placed in all gas vents.
- Soil was noted around Gas Vent #3 such that the vertical distance between the gas vent opening and the ground surface is approximately 3 feet. The Navy should check the vent and fix as needed.
- Ground hog hole at Gas Vent # 14 and near WOT 5. The Navy should inspect and repair as needed.

Gas Probes

- Inspectors had difficulty locating Gas Probe #6. This probe cover was completely covered with sand. The Navy should mark the location of the probe cover.

Top of landfill:

- Vegetative cover on the soccer and softball fields was a little sparse but adequate. (No action necessary.)
- A portion of the softball field appeared to be saturated but stable. (No action necessary.)

- The parking lot on the landfill is being used for trailer storage; all trailers should have blocks under the load posts to prevent damage to the pavement. The Navy should monitor the area to ensure that trailer storage is acceptable.

Ditches & Culverts:

- Exposed excess erosion control material (ECM) is a nuisance in some locations along ditches. Large pieces of ECM should be trimmed.
- Culverts #3 and #5 had small amount of brush. The Navy should clear the brush.
- Small amount of vegetation at outlet of Drain Pipe #3 and in rock lining of Ditch #5. The Navy should inspect and clear as needed.
- Cattails in Ditch #5 are small but will impede flow if allowed to grow. Cattails should be removed. Based on discussion the Navy will consider removing the check dam in ditch 5 to facility flow of water in the ditch.

Internal Drainage Pipe Outlets:

- Pipe outlets, as shown on Final Remedial Action Report Red Line Drawings H6, H8, G16, G16A, G21, and G22 could not be located.

OU4

– Offshore Area

- TtNUS observed the offshore areas where interim offshore monitoring is being conducted. Except for the interim offshore monitoring locations offshore of OU7 (MS-03 and MS-04), no obvious changes were noted for the offshore areas by sampling locations. The shoreline controls placed at OU7 appear to end around mid-tide; therefore, it is unlikely that the intertidal sampling locations at MS-03 and MS-04 were covered by the shoreline controls. The sampling location markers are in the low tide area and these were not observed during the inspections.

OU7

-Site 32, Topeka Pier Site

- There were no locks on stickup monitoring wells FA-01, FA-01DB, and FA-01B. The Navy should provide locks for all wells.
- The polyethylene tube in FA-01B was pulled out. The Navy should look at this well to determine whether anything is needed for this well.
- The monitoring well TP-MW07 location had no cap or concrete pad and was covered with soil and vegetation. The Navy should repair this well.
- The concrete pads surrounding TP-MW02 and TP-MW08 were cracked. The Navy should look at these wells to see whether any repairs are needed.
- TP-MW02 cover was missing a bolt. The Navy should replace the bolt.
- The slag and other debris along the shoreline were either removed from the surface or covered by the shoreline controls as part of the removal action conducted in 2006. The shoreline should be remapped as needed during the Phase II RI investigation activities.

OU8

-Site 31, West Timber Basin Landfill

- Because of the state of the plate yard, the inspectors did not enter the plate yard to locate the two monitoring wells within the plate yard area. The Shipyard is planning to remove the plate yard and construct a road in the area. Site 31 is not scheduled to be investigated until 2012 or later. The Navy may want to consider abandoning the wells that would be affected by construction activities or identify how to protect the monitoring wells.

OU9

-Site 34, Former Oil Gasification Plant

- No items noted.

Study Area

- Site 30, Galvanizing Plant Building 184

- B184-MW04 well cover has no bolts. The Navy should replace the bolts
- B184-MW01is missing the well cover, plants growing in mud in well. The Navy should repair the well cover.
- Cracked concrete pad at B184-MW03. The Navy should look at the well to see whether any repairs are need.
- Some crystal growth emerging from Herculite liner inside Building 184. The Shipyard should continue to remove crystal growth regularly.

Site Visit
Portsmouth Naval Shipyard, Kittery Maine

Attended by:
John Gildersleeve (Navy)
Aaron Bernhardt (Tetra Tech NUS, Inc.)
J.P. Kumar (Tetra Tech NUS, Inc.)

Attachments:
- January 2007 Tide Chart for Seavy Island

January 16, 2007 (high tide 8:51 am, low tide 3:22 pm):

MS-1 at OU9 (~9:30 am) [OU9/Site 34]
- Walked along top of shoreline were unable to climb down because it was icy and the water level was too high. .
- The velocity of the water appears to slow a little in the area of the monitoring station.
- It was difficult to see much of the ground because of the snow/ice cover.

MS-1 at OU9 (~2:45 pm) [OU9/Site 34]
- Were able to walk along the shoreline because the tide was out.
- Took several photographs of areas were exposed soil/ash appeared to be present. The areas were located about half-way between the top of the slope and the shoreline. It was a little difficult to see how much ash was exposed because the soil was frozen and it was all the same color. It appeared to be the same areas where the composite soil sample from AS01-SS02 was collected as part of the Additional Scrutiny investigation.
- The water did not contact the exposed soil/ash but the high tide today (8.2 ft) was 1.4 feet lower than the highest high (9.6 ft) tide for the month.

MS-3 and 4 at OU7 (~3:15 pm) [OU7/Site 32]
- Walked the shoreline along MS-4 and MS-3
- Found the interim offshore monitoring program monitoring station markers for MS-4 Loc. 3 in saltmarsh and MS-3 Loc. 2.
- Unable to find the marker for MS-4 Loc 1. Using the aerial figure, the estimated distance between a tree and the station location was approximately 90 feet. The distance between the tree and the end of the rip-rap was approximately 100 feet. Therefore, it is likely that the marker for MS-4, Loc. 1 is buried under the rip-rap. The intertidal area is wide in this area (at least 40 feet) so the location could be relocated.
- Unable to find the marker for MS-3 Loc. 1, which is located by the large seep/outfall pipe. The water is probably not out far enough for the marker to be visible. It is also possible that the marker is buried.
- Some metal debris was visible along the shoreline but the amount of debris was not substantial and was much less than what were previously in this area before the removal action. No pieces of copper slag were observed during the site walk.
- Water was draining through the rocks to the offshore area because the tide was going out.

MS-11 (~10:30 am) [OU2/Sites 6 and 29]

- Unable to access DRMO to observe the pavement because the area was covered with ice.
- Observed the new rip-rap along western side the seawall. The rip-rap appeared to be in good shape and extended down to the water.
- Observed the older rip-rap (from the 1999 emergency removal action) and it appeared to be in good shape.
- Surface water samples could be collected from the water surface at various tides by walking down the slope carefully. A safety harness should be worn when collecting the samples for because the slope is relatively steep.
- Observed the new rip-rap along eastern side the seawall. The rip-rap appeared to be in good shape but did not extend down to the water by MS-11, Loc 3. It is possible that some contaminated soil/debris is not covered with rip-rap, but we were unable to walk down the slope to investigate because the rocks were covered with ice. The area of potentially exposed soil/debris is much smaller than it was prior to the placement of the erosion controls.
- No sediment was visible at MS-11, Loc 3.
- Gravel was placed in the area above the shoreline to help limit the amount of soil erosion in this area.
- Took several photographs of the rip-rap on both the eastern and western sides of the shoreline, along with the gravel area above the shoreline near MS11, Loc. 3

MS-11 (~4:00 pm) [OU2/Sites 6 and 29]

- Returned to observe the shoreline by MS-11, Loc 3 at low tide.
- No sediment was visible at this monitoring station location, but it is likely that the tide needs to be a lower for the sediment to be exposed. The intertidal area by this location is small and typically only exposed at very low tide. The low tide today (0.4 ft) was approximately 1.5 feet higher than the lowest low tide (-1.1 ft) for the month.
- Took additional photographs of the area.

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Badgers Island Kittery

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Maine

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SEAVEY ISLAND

Piscataqua River 43°05'N 070°45'W

January Tide Chart 2007

DATE		HIGH				LOW						
		AM	hgt	PM	hgt	AM	hgt	PM	hgt	rise	set	qtr
1	Mon	9:03	9.3	9:50	7.9	2:42	0.5	3:34	-0.6	7:15	4:19	
2	Tue	9:58	9.4	10:43	8.0	3:38	0.4	4:26	-0.7	7:15	4:19	
3	Wed	10:48	9.4	11:32	8.0	4:30	0.4	5:16	-0.7	7:15	4:20	●
4	Thu	11:36	9.3	-	-	5:19	0.4	6:02	-0.6	7:15	4:21	
5	Fri	12:18	8.0	12:22	9.1	6:06	0.5	6:46	-0.4	7:15	4:22	
6	Sat	1:01	7.9	1:06	8.8	6:51	0.6	7:28	-0.2	7:15	4:23	
7	Sun	1:44	7.8	1:49	8.4	7:36	0.8	8:09	0.2	7:14	4:24	
8	Mon	2:26	7.7	2:33	8.0	8:21	1.0	8:50	0.5	7:14	4:25	
9	Tue	3:08	7.6	3:19	7.6	9:08	1.1	9:32	0.8	7:14	4:26	
10	Wed	3:51	7.5	4:08	7.2	9:58	1.3	10:15	1.2	7:14	4:28	
11	Thu	4:37	7.4	5:01	6.8	10:51	1.4	11:02	1.5	7:14	4:29	◐
12	Fri	5:25	7.4	5:58	6.6	11:48	1.4	11:53	1.7	7:13	4:30	
13	Sat	6:16	7.5	6:57	6.5	-	-	12:46	1.3	7:13	4:31	
14	Sun	7:09	7.6	7:55	6.5	12:46	1.7	1:42	1.1	7:12	4:32	
15	Mon	8:01	7.9	8:48	6.7	1:40	1.7	2:34	0.8	7:12	4:33	
16	Tue	8:51	8.2	9:37	7.0	2:31	1.5	3:22	0.4	7:11	4:34	
17	Wed	9:37	8.6	10:21	7.4	3:19	1.1	4:07	0.0	7:11	4:36	
18	Thu	10:23	9.0	11:04	7.7	4:05	0.8	4:49	-0.4	7:10	4:37	●
19	Fri	11:07	9.3	11:46	8.1	4:50	0.4	5:32	-0.8	7:10	4:38	
20	Sat	11:52	9.6	-	-	5:36	0.0	6:14	-1.0	7:09	4:39	
21	Sun	12:30	8.4	12:39	9.6	6:23	-0.2	6:58	-1.1	7:08	4:41	
22	Mon	1:14	8.7	1:27	9.5	7:12	-0.4	7:44	-1.0	7:08	4:42	
23	Tue	2:01	8.9	2:19	9.2	8:04	-0.4	8:32	-0.8	7:07	4:43	
24	Wed	2:51	9.0	3:13	8.7	8:59	-0.3	9:22	-0.4	7:06	4:45	
25	Thu	3:43	8.9	4:13	8.2	9:59	-0.2	10:18	0.0	7:05	4:46	◐
26	Fri	4:40	8.8	5:18	7.7	11:03	0.0	11:18	0.5	7:04	4:47	
27	Sat	5:42	8.7	6:29	7.4	-	-	12:12	0.1	7:04	4:48	
28	Sun	6:48	8.6	7:40	7.3	12:23	0.8	1:22	0.1	7:03	4:50	
29	Mon	7:54	8.6	8:45	7.3	1:30	0.9	2:27	0.0	7:02	4:51	
30	Tue	8:56	8.7	9:43	7.5	2:33	0.9	3:26	-0.2	7:01	4:52	
31	Wed	9:51	8.9	10:34	7.7	3:31	0.7	4:17	-0.4	7:00	4:54	

Eastern Standard Time

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Southern Coast Tides

PROPOSED SCHEDULE FOR MAINTENANCE ITEMS

Maintenance Item	Responsible Organization	Proposed Schedule
OU1		
Fix missing bolt at monitoring well BA-MW4.	NAVFAC	July 2007.
Fix signs covering Building 238 crawl space entry ways.	NAVFAC	July 2007.
OU2		
Check all monitoring wells and repair as needed. Check asphalt and determine any repairs needed.	NAVFAC	As part of OU2 Additional Investigation, currently planned for 2007.
Place additional rip-rap to completely cover fabric in eastern portion of Site 29.	NAVFAC	Completed in October 2006.
OU3		
Create comprehensive figure for OU3 showing all features for site inspections. Correct locations of JW-22 and JW-23 (JW-23 is closer to Building 357). Make sure north arrow is appropriately marked.	NAVFAC	July 2007.
Check that all monitoring wells are labeled on the outside and inside and are bolted and locked.	NAVFAC	July 2007.
Fix items for monitoring wells JW-7B, JW-13DB, and JW-20.	NAVFAC	Completed in October 2006.
Place bird screens in gas vents.	NAVFAC	Completed in October 2006.
Inspect Gas Vent #3 and fix vertical distance between vent opening and ground surface if needed.	NAVFAC	Inspected in October 2006, no repairs required.
Inspect and repair any ground hog holes.	NAVFAC	Completed in October 2006.
Mark location of Gas Probe #6	NAVFAC	Completed in October 2006.
Ensure all trailers have blocks under the load posts in the parking lot.	PNS	Checked regularly.
Remove debris, brush, and vegetation from ditches, culverts, and trash racks.	NAVFAC	Completed in October 2006.
Inspect internal drainage pipe outlets to determine whether located as per design. Note any changes from design and evaluate potential impacts of changes.	NAVFAC	July 2007.

Maintenance Item	Responsible Organization	Proposed Schedule
OU7		
Inspect and repair monitoring wells at Site 32, including the FA-01 cluster, TP-MW02, TP-MW07, and TP-MW08.	NAVFAC	July 2007.
Remap location of slag and debris, if needed.	NAVFAC	As part of the Phase II RI investigation activities.
OU8		
Determine whether to abandon the wells within the former plate yard.	NAVFAC	Wells were not impacted by the construction activities; no action required.
Site 30		
Inspect and repair monitoring wells B184-MW01, B184-MW03, and B184-MW04.	NAVFAC	July 2007.
Regularly remove crystal growth emerging from plastic liner.	NAVFAC/PNS	As needed.

A.4 OU3 INSPECTION FORM

FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST

I. SITE INFORMATION	
Site name: OU3, Jamaica Island Landfill (JILF)	**Date of inspection:** August 30, 2006
Location and Region: Portsmouth Naval Shipyard, EPA Region I	**EPA ID:** ME7170022019
Agency, office, or company leading the five-year review: Navy	**Weather/temperature:** AM -70° and cloudy, low tide; PM - to 78° and sunny; rained the day before

Remedy Includes: (Check all that apply)

- ☒ Landfill cover/containment
- ☒ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Other _____
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls

Attachments: ☒ Inspection team roster attached ☒ Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** Ken Plaisted (Name) Division Head (Title) _____ (Date)

Interviewed ☐ at site ☒ at office ☐ by phone Phone no. x3830

Problems, suggestions; ☐ Report attached _____

2. **O&M staff** Marty Raymond, PNS Environmental Division Point of Contact (Name, Title) 8/30/2006 (Date)

Interviewed ☒ at site ☐ at office ☐ by phone Phone no. x 2536, Code 106.3

Problems, suggestions; ☐ Report attached _____

FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency EPA

Contact _____ _____ _____ _____

Name Title Date Phone no.

Problems; suggestions; ☐ Report attached Will provide input through review and comment on draft and draft final reports.

Agency MEDEP

Contact _____ _____ _____ _____

Name Title Date Phone no.

Problems; suggestions; ☐ Report attached Will provide input through review and comment on draft and draft final reports.

Agency _____

Contact _____ _____ _____ _____

Name Title Date Phone no.

Problems; suggestions; ☐ Report attached _____

Agency _____

Contact _____ _____ _____ _____

Name Title Date Phone no.

Problems; suggestions; ☐ Report attached _____

4. **Other interviews** (optional) ☐Report attached.
Community members will provide input at RAB meeting for Draft Report and comment on Draft Report.

FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**

☒ O&M manual	☒ Readily available	☒ Up to date	☐ N/A
☒ As-built drawings	☒ Readily available	☒ Up to date	☐ N/A
☐ Maintenance logs	☐ Readily available	☐ Up to date	☒ N/A

Remarks no maintenance logs yet

2. **Site-Specific Health and Safety Plan** ☐ Readily available ☒ Up to date ☐ N/A

☐ Contingency plan/emergency response plan ☐ Readily available ☐ Up to date ☒ N/A

Remarks Separate Health and Safety Plan prepared for each round of O&M.

3. **O&M and OSHA Training Records** ☒ Readily available ☒ Up to date ☐ N/A

Remarks Kept at company that performs the O&M.

4. **Permits and Service Agreements**

☐ Air discharge permit	☐ Readily available	☐ Up to date	☒ N/A
☐ Effluent discharge	☐ Readily available	☐ Up to date	☒ N/A
☐ Waste disposal, POTW	☐ Readily available	☐ Up to date	☒ N/A
☐ Other permits _____	☐ Readily available	☐ Up to date	☒ N/A

Remarks

5. **Gas Generation Records** ☐ Readily available ☐ Up to date ☐ N/A

Remarks Round 1 sampled but not yet submitted; documentation due in the fall.

6. **Settlement Monument Records** ☐ Readily available ☐ Up to date ☐ N/A

Remarks Round 1 sampled but not yet submitted; documentation due in the fall.

7. **Groundwater Monitoring Records** ☐ Readily available ☐ Up to date ☐ N/A

Remarks Round 1 sampled but not yet submitted; documentation due in the fall.

8. **Leachate Extraction Records** ☐ Readily available ☐ Up to date ☒ N/A

Remarks

9. **Discharge Compliance Records**

☐ Air	☐ Readily available	☐ Up to date	☒ N/A
☐ Water (effluent)	☐ Readily available	☐ Up to date	☒ N/A

Remarks

10. **Daily Access/Security Logs** ☐ Readily available ☐ Up to date ☒ N/A

Remarks Access to PNS is restricted but access to Jamaica Island Landfill not restricted within PNS.

FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State ☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☒ Contractor for Federal Facility
☐ Other Contractor for Navy

2. **O&M Cost Records**

☐ Readily available ☐ Up to date ☒ Funding mechanism/agreement in place
Original O&M cost estimate _____ ☐ Breakdown attached

Total annual cost by year for review period if available

From _____ To _____ _____ ☐ Breakdown attached
Date Date Total cost
From _____ To _____ _____ ☐ Breakdown attached
Date Date Total cost
From _____ To _____ _____ ☐ Breakdown attached
Date Date Total cost
From _____ To _____ _____ ☐ Breakdown attached
Date Date Total cost
From _____ To _____ _____ ☐ Breakdown attached
Date Date Total cost
From _____ To _____ _____ ☐ Breakdown attached
Date Date Total cost

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons:

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☐ Gates secured ☒ N/A
Remarks Access to enter the shipyard is restricted, but OU3 site access is not restricted within the shipyard.

B. Other Access Restrictions

1. **Signs and other security measures** ☒ Location shown on site map ☐ N/A
Remarks Signs restricting digging were installed by Navy; signs not shown on TtEC drawings. Photograph of sign will be include in Appendix B.

FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☒ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☒ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) During O&M Rounds
Frequency Two times per year and after episodic storms
Responsible party/agency Navy, NAVFAC Mid-Atlantic
Contact Kirk Stevens (Name) RPM (Title) _____ (Date) _____ (Phone no.)

Reporting is up to date ☒ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☒ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☒ Yes ☐ No ☐ N/A
Violations have been reported ☐ Yes ☐ No ☒ N/A

Other problems or suggestions: ☐ Report attached
The paved area of the landfill is being used for trailer storage. All trailers should have blocks under the load posts to prevent damage to the pavement.

The Land Use Control Plan for OU3 needs to be finalized.

2. **Adequacy** ☒ ICs are adequate ☐ ICs are inadequate ☐ N/A
Remarks

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident
Remarks

2. **Land use changes on site** ☐ N/A
Remarks No

3. **Land use changes off site** ☒ N/A
Remarks

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. **Roads damaged** ☐ Location shown on site map ☒ Roads adequate ☐ N/A
Remarks

FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST

B. Other Site Conditions

Remarks All hazardous waste was removed from Jamaica Cove and the wetland was constructed. The wetland is in excellent condition and plants are growing. Wetland maintenance is not part of the OU3 O&M responsibilities. Wetland construction does not match As-Built Drawing C1 but does match Red-Line Drawing G18. No visible seeps on face of wetland embankment.

VII. LANDFILL COVER ☒ Applicable ☐ N/A

A. Landfill Surface

1. **Settlement** (Low spots) ☐ Location shown on site map ☒ Settlement not evident
   Areal extent _____ Depth _____
   Remarks _____

2. **Cracks** ☐ Location shown on site map ☒ Cracking not evident
   Lengths _____ Widths _____ Depths _____
   Remarks _____

3. **Erosion** ☐ Location shown on site map ☒ Erosion not evident
   Areal extent _____ Depth _____
   Remarks _____

4. **Holes** ☒ Location shown on site map ☐ Holes not evident
   Areal extent minor Depth minor
   Remarks Groundhog holes noted near gas vent #14

5. **Vegetative Cover** ☐ Grass ☒ Cover properly established ☐ No signs of stress
   ☐ Trees/Shrubs (indicate size and locations on a diagram)
   Remarks Grass a little sparse over flat top of landfill, but not a problem.

6. **Alternative Cover (armored rock, concrete, etc.)** ☐ N/A
   Remarks Riprap at Clark Cove in excellent condition.

FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST

7. **Bulges** ☐ Location shown on site map ☒ Bulges not evident

Areal extent _____ Height _____

Remarks _____

8. **Wet Areas/Water Damage** ☐ Wet areas/water damage not evident

☒ Wet areas ☒ Location shown on site map Areal extent _____

☐ Ponding ☐ Location shown on site map Areal extent _____

☐ Seeps ☐ Location shown on site map Areal extent _____

☐ Soft subgrade ☐ Location shown on site map Areal extent _____

Remarks Ground was saturated in "left field" of softball field and further left beyond the fence. Wet area was not unstable.

9. **Slope Instability** ☐ Slides ☐ Location shown on site map ☒ No evidence of slope instability

Areal extent _____

Remarks _____

B. Benches ☐ Applicable ☒ N/A

(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

C. Letdown Channels ☒ Applicable (Channel Chutes) ☐ N/A

(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** ☐ Location shown on site map ☒ No evidence of settlement

Areal extent_____ Depth_____

Remarks _____

2. **Material Degradation** ☐ Location shown on site map ☒ No evidence of degradation

Material type_____ Areal extent_____

Remarks _____

3. **Erosion** ☐ Location shown on site map ☒ No evidence of erosion

Areal extent_____ Depth_____

Remarks _____

FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST

4. **Undercutting** ☐ Location shown on site map ☒ No evidence of undercutting

Areal extent_____ Depth_____

Remarks _____

5. **Obstructions** Type_____ ☒ No obstructions

☐ Location shown on site map Areal extent_____

Size_____

Remarks Ponded water at toe of Channel Chute #2 but this matched the depressed area on the design drawing.

6. **Excessive Vegetative Growth** Type_____

☐ No evidence of excessive growth

☒ Vegetation in channels does not obstruct flow

☒ Location shown on site map Areal extent_____

Remarks Minor vegetation at western end of Ditch #5 in rock lining.

D. Cover Penetrations ☒ Applicable ☐ N/A

1. **Gas Vents** ☐ Active ☒ Passive

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☒ Good condition

☐ Evidence of leakage at penetration ☐ Needs Maintenance

☐ N/A

Remarks Gas Vent #3 is buried too deeply. Groundhog hole near Gas Vent #14. Grass growing in Gas Vent #27. Design drawings, as-builts and red-line drawings all show a bird screen at the opening of gas vent. None of the gas vents have bird screens.

2. **Gas Monitoring Probes**

☒ Properly secured/locked ☐Functioning ☐ Routinely sampled ☒ Good condition

☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A

Remarks Could not locate Gas Probe #6. (Located during subsequent site visit in September 2006.)

3. **Monitoring Wells** (within surface area of landfill)

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐N/A

Remarks Found JW19 or JW19B, but could not find both – covered with vegetation, no concrete pad. JW 20 is missing bolts. Broken concrete around JW7B. Bolts at MW13DB not connected, lid lifts off. Remaining OU3 wells located and acceptable. (JW9 and JW19B were located during subsequent site visit in September 2006.)

FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST

4. **Leachate Extraction Wells**

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ Evidence of leakage at penetration ☐ Needs Maintenance ☒ N/A

Remarks _____

5. **Settlement Monuments** ☒ Located ☐ Routinely surveyed ☐ N/A

Remarks Settlement monument #1 covered with vegetation but can be located by bollards. Settlement monument #5 covered with vegetation.

E. Gas Collection and Treatment ☐ Applicable ☒ N/A

F. Cover Drainage Layer ☒ Applicable ☐ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☐ N/A

Remarks Outlets shown on as-built/red line construction drawings G16 and G16A were not found.

2. **Outlet Rock Inspected** ☒ Functioning ☐ N/A

Remarks _____

G. Detention/Sedimentation Ponds ☐ Applicable ☒ N/A

H. Retaining Walls ☒ Applicable ☐ N/A

1. **Deformations** ☐ Location shown on site map ☒ Deformation not evident

Horizontal displacement _____ Vertical displacement ____

Rotational displacement _____

Remarks _____

2. **Degradation** ☐ Location shown on site map ☒ Degradation not evident

Remarks Wall at boat storage yard inspected and is acceptable.

I. Perimeter Ditches/Off-Site Discharge ☒ Applicable ☐ N/A

1. **Siltation** ☐ Location shown on site map ☒ Siltation not evident

Areal extent _____ Depth _____

Remarks _____

FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST

2. **Vegetative Growth** ☒ Location shown on site map ☐ N/A

☒ Vegetation does not impede flow

Areal extent _____ Depth _____

Remarks Start of cattails in Ditch #5 near Building 337, growing through ECM. Does not yet impede flow but will when the cattails grow larger. Excess ECM is exposed along some ditches and should be removed (at locations in addition to that shown on site map).

3. **Erosion** ☒ Location shown on site map ☐ Erosion not evident

Areal extent _____ Depth _____

Remarks Start of very small erosion gully in Ditch #5 near cattails.

4. **Discharge Structure** ☒ Functioning ☐ N/A

Remarks Brush/debris at inlets of Culverts #3 and #5 (locations shown on site map).

J. Monitoring Wells (off site)

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition

☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A

Remarks Off-site wells HW2 and HW3 were not inspected.

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

IX. GROUNDWATER/SURFACE WATER REMEDIES ☐ Applicable ☒ N/A

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

The purpose of the landfill cover is to prevent contact with contaminated soil and/or waste. The cover also minimizes infiltration of water to the landfill material. Institutional controls are to restrict land and fresh groundwater uses within the JILF boundary to prevent unacceptable human exposure to site contaminants. Institutional controls are also to prevent unrestricted disturbance of the hazardous waste landfill cover and shoreline erosion controls. Shoreline erosion controls, including rip-rap and/or wetlands created along the shoreline, are to minimize the potential for washing away of soil and/or waste materials from the edge of the JILF.

The remedy appears to be effective and to be functioning as designed. The cap prevents contact and infiltration. The Jamaica Cove wetland and Clark Cove rip-rap prevent erosion of the edge of the landfill. Several signs have been added around the perimeter to prevent digging. No indication of disturbance of the landfill cover or erosion controls was evident. Overall, exposure to site contaminants appears to be effectively prevented by the remedy.

In addition to being effective, the Clark Cove rip-rap, Jamaica Cove wetland, JILF side-slope vegetation, landscaping, and landfill contours have a very nice appearance.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

Overall, the condition of the asphalt, Clark Cove rip-rap, and Jamaica Cove wetland, and apparent condition of the gas vents, gas probes, and settlement plates is excellent.

Minor repairs are needed on two monitoring wells. All gas vents require bird screens and soil should be removed around Gas Vent #3 such that the vertical distance between the gas vent opening and the ground surface is approximately 3 feet. Inspectors were unable to locate one well and Gas Probe #6. (Located during September 2006 site visit.) Vegetative cover on the soccer and softball fields was a little sparse but adequate. A portion of the softball field appeared to be saturated but stable. Exposed excess ECM is a nuisance in some locations along ditches. Culverts #3 and #5 need to be cleared of small amount of brush. Small amount of vegetation at outlet of Drain Pipe #3, in rock lining of Ditch #5, and in Gas Vent #27 should be removed before it becomes excessive. Ground hog borrow at Gas Vent #14. The paved area of the landfill is being used for trailer storage; all trailers should have blocks under the load posts to prevent damage to the pavement.

Cattails in Ditch #5 were small but will impede flow if allowed to grow. Regrading of Ditch #5 would keep the ditch dry and preclude repeated cattail removal.

FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.

Internal drainage pipe outlets could not be located. This should be investigated.

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

Many of the Legend symbols on Final Grade As-Built Drawing C2, such as the gas vent and monitoring well symbols, are barely visible to invisible on the black and white PDF. Also, red-line and as-built drawings do not always match. Having one or two drawings (with the North arrows facing the same way) that clearly show all numbered constructed vents, wells, gas probes, and settlement plates, as well as drainage layer pipe outlets and numbered ditches, pipes, chutes, and culverts would make site inspection easier.

Marking drainage layer pipe outlets in the field would also aid inspectors.

All monitoring well covers/caps should be labeled

Opportunities to optimize the groundwater and gas monitoring programs are not available at this time, as monitoring has just been initiated.

Portsmouth Naval Shipyard
OU3, Jamaica Island Landfill

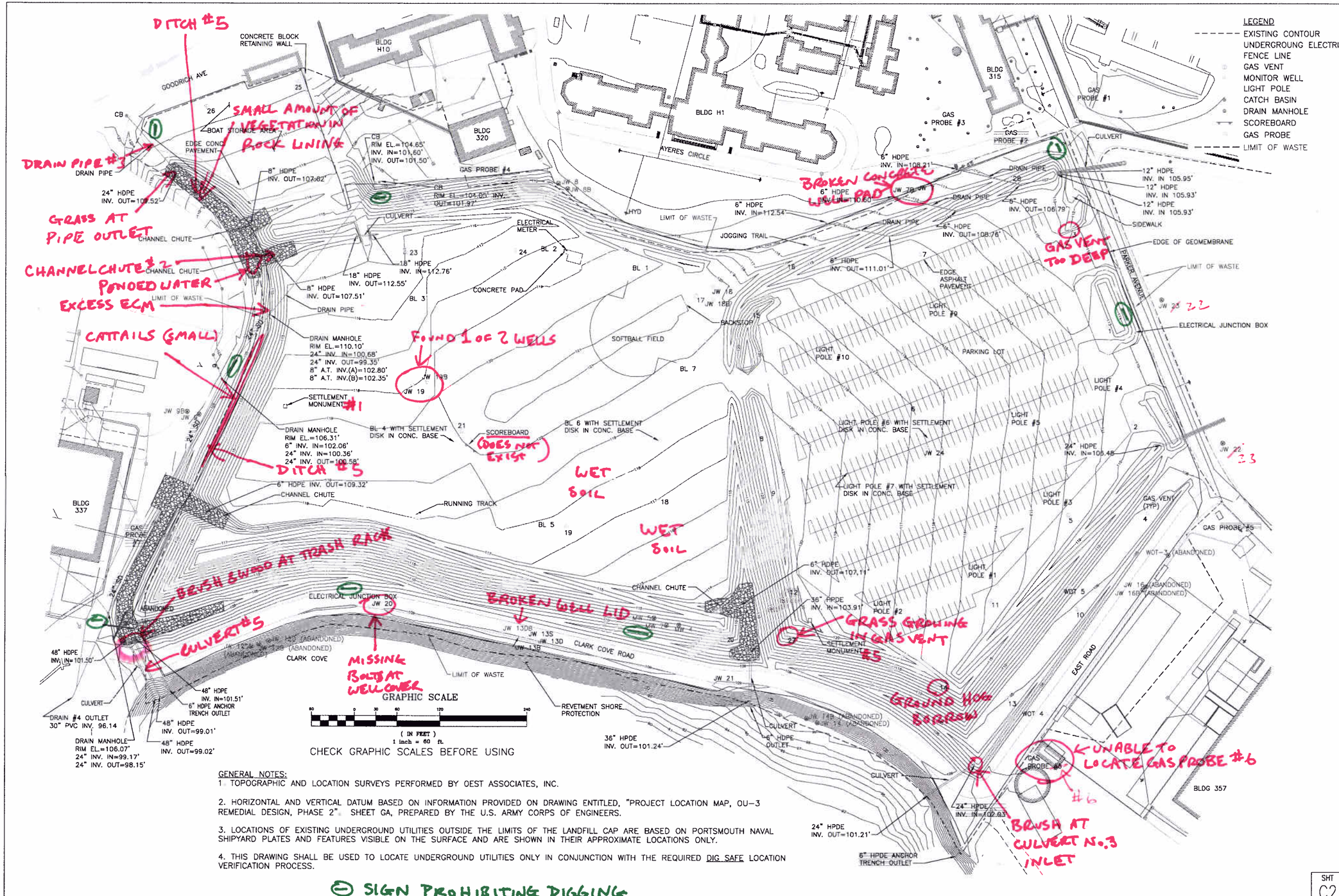
August 30, 2006
TtNUS Inspection Team Roster

Deborah J. Cohen, P. E.
Project Manager/Facility Coordinator

Nina J. Balsamo, P. E.
Project Engineer

September 26, 2006
TtNUS Inspection Team Roster

Deborah J. Cohen, P. E.
Project Manager/Facility Coordinator



GENERAL NOTES:

1. TOPOGRAPHIC AND LOCATION SURVEYS PERFORMED BY OEST ASSOCIATES, INC.

2. HORIZONTAL AND VERTICAL DATUM BASED ON INFORMATION PROVIDED ON DRAWING ENTITLED, "PROJECT LOCATION MAP, OU-3 REMEDIAL DESIGN, PHASE 2". SHEET GA, PREPARED BY THE U.S. ARMY CORPS OF ENGINEERS.

3. LOCATIONS OF EXISTING UNDERGROUND UTILITIES OUTSIDE THE LIMITS OF THE LANDFILL CAP ARE BASED ON PORTSMOUTH NAVAL SHIPYARD PLATES AND FEATURES VISIBLE ON THE SURFACE AND ARE SHOWN IN THEIR APPROXIMATE LOCATIONS ONLY.

4. THIS DRAWING SHALL BE USED TO LOCATE UNDERGROUND UTILITIES ONLY IN CONJUNCTION WITH THE REQUIRED DIG SAFE LOCATION VERIFICATION PROCESS.

SIGN PROHIBITING DIGGING

REVISIONS			
C	04/27/06	(TEC) ADDED LIMITS OF WASTE AND UPDATED WELLS	
B	1/24/05	PER TETRA TECH COMMENTS	
A	1/18/05	PER TETRA TECH COMMENTS	
REVISION	DATE	DESCRIPTION	BY

A/E FIRM NAME: OEST ASSOCIATES, INC.
AND ADDRESS: 343 Gorham Road South Portland, ME
DSGN: TLH DRWN: CBN CHK: DRB
SUPV: SUBMITTED BY: DATE
SUBMITTED BY: DATE
SUBMITTED TO: DATE
SUBMITTED TO: DATE
APPROVED: DATE
REAL FACILITIES DIVISION

DIV. STA.
PROJ.
DATE
SUBMITTED TO
SUBMITTED TO
REAL ENGINEERING BRANCH

STATE OF MAINE
DANNY R. BOLENDER
2244
PROFESSIONAL LAND SURVEYOR

NAVAL FACILITIES ENGINEERING COMMAND
DEPARTMENT OF THE NAVY
NAVAL SHIPYARD
PORTSMOUTH, N.H.

JAMAICA ISLAND LANDFILL

FINAL GRADE AS-BUILT

CODE I.D. NO.
DRAWING SIZE: D
CONST. CONT. NO.
SPEC.
NAVFAC DRAWING NO.

SHT C2 | SHEET 2 OF 3
PW NO.

UNCLASSIFIED

INSPECTION ITEMS FROM AUGUST 2006

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A.5 ARARs FOR OU3 AND OU4

OU3 ARARs FROM APPENDIX C.1
OF THE RECORD OF DECISION FOR OU3
(NAVY, AUGUST 2001c)
AND FROM THE ESD FOR THE
RECORD OF DECISION (NAVY, OCTOBER 2005)

ALTERNATIVE-SPECIFIC ARARS AND TBCS
ALTERNATIVE 3 – COVER WITH COMPOSITE LINER AND ENHANCED DRAINAGE LAYER, INSTITUTIONAL CONTROLS, EROSION CONTROLS, AND MONITORING
PORTSMOUTH NAVAL SHIPYARD, KITTERY, MAINE

Medium/Activity	Requirement/ Citation	Status	Synopsis	Action To Be Taken
Federal Chemical-Specific:				
Groundwater	Health Advisories, EPA Office of Drinking Water	To Be Considered	These advisories establishes short-term, long-term, and lifetime exposure limits for children and adults.	These advisories were used to document contaminant exceedances in groundwater (as part of the OU3 risk assessment).
Risk Assessment	EPA Risk Reference Doses (RfDs)	To Be Considered	RfDs are the concentrations considered unlikely to cause significant adverse health effects associated with a threshold mechanism of action in human exposure over a lifetime.	RfDs were used to estimate noncarcinogenic risks as part of the OU3 risk assessment.
Risk Assessment	EPA Human Health Assessment Group Cancer Slope Factors (CSFs)	To Be Considered	CSFs present the most up-to-date information on cancer risk potency for known and suspected carcinogens.	CSFs were used to estimate carcinogenic risks as part of the OU3 risk assessment.
State of Maine Chemical-Specific:				
Soil/Ground-water	Guidance Manual for Human Health Risk Assessments at Hazardous Substance Sites, June 1994	To Be Considered	This guidance manual prepared by the MEDEP and the Maine Department of Human Resources provides acceptable carcinogenic and noncarcinogenic risk levels ($1x10^{-5}$ and 1, respectively).	This guidance manual was considered in determining acceptable risk levels for RAOs related to the protection of human health.

Medium/Activity	Requirement/ Citation	Status	Synopsis	Action To Be Taken
Federal Location-Specific:				
Other Natural Resources	Fish and Wildlife Coordination Act (16 USC 661 et seq.;33 CFR 320; 40 CFR 6.302)	Relevant and Appropriate	This act requires any federal agency proposing to modify a body of water to consult with the U.S. Fish and Wildlife Service or National Marine Fisheries Service and appropriate state agencies if alteration of a body of water, including discharges of pollutants into a wetland or construction in a wetland, will occur as a result of off-site remedial activities. Consultation is strongly recommended for on-site actions.	Precautions will be taken to minimize the potential effect on fish and wildlife during construction and maintenance of the shoreline erosion controls.
Floodplains	Floodplain Management, Executive Order 11988 (40 CFR 6, Appendix A)	Applicable	Appendix A includes the federal policy on floodplain management. Under this order, federal agencies are required to avoid long-term and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid support of floodplain development wherever there is a practicable alternative. If no practicable alternative exists to performing cleanup in a floodplain, potential harm must be mitigated and actions taken to preserve the beneficial value of the floodplain.	Implementation of this alternative will include construction in the floodplain. No practicable alternative to this construction exists. However, best management practices will be used during remedial activities to reduce any adverse impacts to the floodplain. The shoreline erosion controls will be constructed so that they do not adversely affect the floodplain and will ensure the bank is sufficiently stabilized to contain the waste materials.

ALTERNATIVE-SPECIFIC ARARS AND TBCS
ALTERNATIVE 3 – COVER WITH COMPOSITE LINER AND ENHANCED DRAINAGE LAYER, INSTITUTIONAL CONTROLS, EROSION CONTROLS, AND MONITORING
PORTSMOUTH NAVAL SHIPYARD, KITTERY, MAINE

Medium/Activity	Requirement/ Citation	Status	Synopsis	Action To Be Taken
Floodplains	RCRA Floodplain Restrictions for Hazardous Waste Facilities (40 CFR 264.18(b))	Relevant and Appropriate	A hazardous waste facility located in a 100-year floodplain must be designed, constructed, operated, and maintained to prevent washout of any hazardous waste by a 100-year flood or result in no adverse effects on human health and the environment if washout were to occur.	The landfill cap will be designed, constructed, operated, and maintained to prevent washout of any hazardous waste by a 100-year flood and to result in no adverse effects on human health or the environment if washout were to occur.
Wetlands	Federal Protection of Wetlands, Executive Order 11990 (40 CFR 6, Appendix A)	Applicable	Appendix A includes the federal policy on wetlands protection. Under this order, federal agencies are required to minimize the destruction, loss, or degradation of wetlands and preserve and enhance natural and beneficial values of wetlands. If no practicable alternative exists to remedial activity that may adversely affect a wetland, impacts from implementing the chosen alternative must be mitigated.	Implementation of this alternative will include construction in tidal wetlands. No practicable alternative to this construction exists. However, best management practices will be used during remedial activities to reduce any adverse impacts to wetlands. The shoreline erosion controls will be constructed so that they do not adversely affect wetlands and will ensure the bank is sufficiently stabilized to contain the waste materials.
Wetlands	CWA Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material (40 CFR 230; 33 CFR 320-330)	Applicable	Section 404 of the CWA regulates the discharge of dredged or fill material into U.S. waters, including wetlands. The purpose of Section 404 is to ensure that proposed discharges are evaluated with respect to impacts on the aquatic ecosystem. No activity that adversely effects a wetland is permitted if a practicable alternative that has less effect is available. If there is no practicable alternative, impacts must be mitigated.	Remedial activities will involve dredged or fill material discharge to a tidal wetland. There is no practicable alternative to such discharge. However, the construction will be conducted to comply with these requirements.

ALTERNATIVE-SPECIFIC ARARS AND TBCS
ALTERNATIVE 3 – COVER WITH COMPOSITE LINER AND ENHANCED DRAINAGE LAYER, INSTITUTIONAL CONTROLS, EROSION CONTROLS, AND MONITORING
PORTSMOUTH NAVAL SHIPYARD, KITTERY, MAINE

Medium/Activity	Requirement/ Citation	Status	Synopsis	Action To Be Taken
Wetlands	Coastal Zone Management Act (16 USC 1451 et seq.)	Applicable	This act provides for the preservation and protection of coastal zone areas. Federal activities that are in or directly affecting the coastal zone must be consistent to the maximum extent practicable with a federally approved state management program.	Implementation of this alternative will include construction in the coastal zone. However, best management practices will be used during remedial activities to reduce any adverse impacts to the coastal zone. The remedial action will be consistent with Maine Coastal Management Policies. The shoreline erosion controls will ensure the bank is sufficiently stabilized to contain the waste material.
Navigable Waters	River and Harbors Act (33 USC 403; 33 CFR 320-323)	Applicable	Section 10 of the River and Harbors Act prohibits unauthorized obstruction or alteration of navigable waters. Activities involving excavation or deposition of materials in navigable waters or affecting such waters must serve the public interest, and benefits must outweigh adverse impacts on natural resources, aesthetics, and navigation.	The shoreline erosion control work in the Piscataqua River (at OU3) will meet the substantive requirements of Section 10 of the Act to prevent obstruction or alteration of navigable waters.

Medium/Activity	Requirement/ Citation	Status	Synopsis	Action To Be Taken
State of Maine Location-Specific:				
Wetlands	Maine Site Location of Development Law (38 MRSA 481 et seq.; 06-096 CMR 371-377)	Applicable	This statute and the related regulations prohibit any development from adversely affecting existing uses, scenic character or existing natural resources in or near a community. Remediation activities must not have adverse effect on the natural environment, historic sites, unusual natural areas, and wildlife and fisheries. Also, this act requires that activities shall not interfere with existing uses of the site.	Because the landfill cover will be more than 3 acres, this alternative will need to meet the substantive requirements of the statute and regulations. However, no adverse effects on the existing uses, scenic character, or existing natural resources will occur due to the construction of the cover.
Wetlands	Maine Natural Resources Protection Act (NRPA) Permit by Rule Standards (38 MRSA 480 et seq.; 06-096 CMR 305)	Relevant and Appropriate	This act requires a permit for any activity conducted in, on, or over any protected natural resource or any activity conducted on land adjacent to and operates in such a way that material or soil may be washed into any freshwater or coastal wetland, great pond, river, stream or brook.	Implementation of this alternative will include construction in tidal wetlands or the offshore. Remedial activities (grading/capping) will be performed in compliance with substantive requirements. Erosion and sediment controls will be included during implementation of the alternative. There will be little to no net loss of naturally vegetated areas after implementation of this alternative.
Wetlands	Maine Wetland Protection Rules (06-096 CMR 310)	Applicable	Standards are provided for wetlands protection. Activities that have an unreasonable impact on the wetlands are prohibited.	Implementation of this alternative will include construction in wetlands. However, the shoreline erosion controls will not adversely affect wetlands and will ensure the banks are sufficiently stabilized to contain the waste materials.

ALTERNATIVE-SPECIFIC ARARS AND TBCS
ALTERNATIVE 3 – COVER WITH COMPOSITE LINER AND ENHANCED DRAINAGE LAYER, INSTITUTIONAL CONTROLS, EROSION CONTROLS, AND MONITORING
PORTSMOUTH NAVAL SHIPYARD, KITTERY, MAINE

Medium/Activity	Requirement/ Citation	Status	Synopsis	Action To Be Taken
Coastal Zone	Maine Coastal Management Policies (38 MSRA 1801 et seq.)	Applicable	These policies provide for the regulation, conservation, beneficial use, and management of coastal resources.	The remedial action will be consistent with these policies. The shoreline reconstruction will ensure the bank is sufficiently stabilized to contain the waste materials.
Other Natural Resources	Maine Endangered Species Act (12 MRSA 7751 et seq.)	To Be Considered	The state of Maine has authority to research, list, and protect any species deemed endangered or threatened. The Maine Department of Inland Fisheries and Wildlife determines appropriate use(s) of various habitats on a case-by-case basis. The Maine lists may differ from the federal lists of endangered species.	No known endangered or threatened species or critical habitats are present at OU3. However, to prevent flushing of birds from their nests on Clark's Island, guidance from the Maine Department of Inland Fisheries and Wildlife to refrain from remedial activities from April 1 to August 15 within 0.25 miles of a nesting habitat will be considered.
Other Natural Resources	Maine Significant Wildlife Habitat Rules (06-096 CMR 335)	To Be Considered	These rules outline requirements associated with a NRPA permit for an activity impacting significant wildlife habitat, including certain seabird nesting islands.	No known endangered or threatened species or critical habitats are present at OU3. However, to prevent flushing of birds from their nests at Clark's Island, guidance from the Maine Department of Inland Fisheries and Wildlife to refrain from remedial activities from April 1 to August 15 within 0.25 miles of a nesting habitat will be considered.
Federal Action-Specific:				
Hazardous Waste	RCRA Subtitle C Standards for Owners and Operators of TSD Facilities (40 CFR 264)	Relevant and Appropriate	These regulations outline specifications and standards for design, operation, closure, and monitoring of performance for hazardous waste storage, treatment, and disposal facilities.	These regulations are relevant and appropriate, not applicable, because disposal of wastes at this site ceased prior to the promulgation of RCRA in 1980. However, substantive requirements will be met and adhered to on site.

Medium/Activity	Requirement/ Citation	Status	Synopsis	Action To Be Taken
Hazardous Waste	RCRA Subtitle C, Subpart F – Releases from Solid Waste Management Units (40 CFR 264.90-264.101)	Relevant and Appropriate	These regulations detail groundwater monitoring requirements for hazardous waste facilities. These regulations outline general groundwater monitoring standards, as well as standards for detection monitoring, compliance monitoring, and corrective action monitoring.	These regulations are relevant and appropriate, not applicable, because disposal activities at this site ceased prior to the promulgation of RCRA in 1980. However, the alternative will meet the substantive requirements of these regulations.
Hazardous Waste	RCRA Subtitle C, Subpart G – Closure and Post-Closure (40 CFR 264.110-264.120)	Relevant and Appropriate	These regulations detail general requirements for closure and post-closure of hazardous waste facilities, including installation of a groundwater monitoring program.	These regulations are relevant and appropriate, not applicable, because disposal activities at this site ceased prior to the promulgation of RCRA in 1980. However, design, monitoring, maintenance, and post-closure care will meet the substantive requirements of these regulations.
Hazardous Waste	RCRA Subtitle C, Subpart N – Landfills (40 CFR 264.310)	Relevant and Appropriate	This regulation contains closure and post-closure requirements for Subtitle C landfills.	This regulation is relevant and appropriate, not applicable, because disposal of wastes at this site ceased prior to the promulgation of RCRA in 1980. However, this alternative will meet the substantive requirements of this regulation with regard to cap design, monitoring, maintenance, and post-closure care.
Capping	Alternative Cap Design Guidance Proposed for Unlined, Hazardous Waste Landfills in the EPA Region I (memo dated 9/30/97)	To Be Considered	Guidance for design of a cover or cap for unlined, hazardous waste landfills in EPA Region I.	This guidance will be followed for design of the cap.

ALTERNATIVE-SPECIFIC ARARS AND TBCS
ALTERNATIVE 3 – COVER WITH COMPOSITE LINER AND ENHANCED DRAINAGE LAYER, INSTITUTIONAL CONTROLS, EROSION CONTROLS, AND MONITORING
PORTSMOUTH NAVAL SHIPYARD, KITTERY, MAINE

Medium/Activity	Requirement/ Citation	Status	Synopsis	Action To Be Taken
Capping	Amendment to Recommended Long Term Hydraulic Performance Criteria of the Geocomposite Drainage Layer in Landfill Cap Applications (memo dated 3/23/99	To Be Considered	Guidance for testing long-term performance characteristics of a geocomposite drainage layer.	This guidance will be followed for design of the cap.
Groundwater	Safe Drinking Water Act (SDWA), Maximum Contaminant Levels (MCLs) (40 CFR 141.11-141.16 and 141.60-141.65)	Relevant and Appropriate	MCLs have been promulgated for many common organic and inorganic contaminants. These levels regulate the concentration of contaminants in public drinking water supplies, but may also be considered relevant and appropriate for groundwater aquifers used for drinking water.	MCLs were used to document contaminant exceedances in groundwater (as part of the OU3 risk assessment). Until contaminant concentrations in the groundwater are below MCLs, a restriction on the use of groundwater within the OU3 compliance boundary will be established and maintained, and an appropriate monitoring program will be conducted.
Groundwater	SDWA Maximum Contaminant Level Goals (MCLGs) (40 CFR 141.50-141.51)	Relevant and Appropriate	MCLGs have been promulgated for many common organic and inorganic contaminants. These concentrations indicate the level of contaminants in drinking water at which no known or anticipated adverse effect on the health effect of a person would occur, allowing for an adequate margin of safety. MCLGs are non-enforceable public health goals.	Where MCLs have not been established, non-zero MCLGs were used to document contaminant exceedances in groundwater (as part of the OU3 risk assessment). Until contaminant concentrations in the groundwater are below non-zero MCLGs, a restriction on the use of groundwater within the OU3 compliance boundary will be established and maintained, and an appropriate monitoring program will be conducted.

Medium/Activity	Requirement/ Citation	Status	Synopsis	Action To Be Taken
Emissions	Air/Superfund National Technical Guidance (EPA/450/1-89/001 through 004)	To Be Considered	This guidance describes methodologies for predicting risks due to air release at a Superfund site.	Releases to air will be minimized by fugitive dust controls. Emissions of hazardous air pollutants are not anticipated.
State of Maine Action-Specific:				
Hazardous Waste	Maine Hazardous Waste Management Rules (06-096 CMR 800-802, 850, 851, 853-857)	Relevant and Appropriate	These regulations provide standards for the generation, transportation, treatment, storage, and disposal of hazardous waste. They set forth the state definition and criteria for establishing whether waste materials are hazardous and subject to associated hazardous regulations. They also provide standards for the location of facilities in a floodplain or within 300 feet of the floodplain and detail groundwater monitoring requirements for hazardous waste facilities. The regulations outline general groundwater monitoring standards, as well as standards for detection monitoring, compliance monitoring, and corrective action monitoring.	State requirements more stringent than federal requirements take precedence. At the completion of the remedial action, these remedial standards will be met under this alternative.
Emissions	Maine Air Pollution Control Law – Classification of Air Quality Control Regions (38 MSRA 583; 06-096 CMR 114)	Relevant and Appropriate	Air quality regions and classification of each region and ambient air quality and emission standards are established.	Emissions of criteria pollutants will be minimized by fugitive dust control during excavation, grading, and capping activities. Emissions of hazardous air pollutants are not anticipated during implementation of this alternative.

Medium/Activity	Requirement/ Citation	Status	Synopsis	Action To Be Taken
Emissions	Maine Ambient Air Quality Standards (38 MSRA 584; 06-096 CMR 110)	Relevant and Appropriate	Ambient air quality standards are established for particulate matter, sulfur dioxide, carbon monoxide, ozone, hydrocarbon, nitrogen dioxide, lead, and total chromium. Ambient increments that define the maximum ambient increase of a particular pollutant, which can be permitted for a given area, are defined.	Emissions of criteria air pollutants will be minimized by fugitive dust control during excavation, grading, and capping activities
Emissions	Maine Air Pollution Control Laws – Maine Emission License Regulations (38 MSRA 585 and 590; 06-096 CMR 115)	Relevant and Appropriate	Requires new sources of air emissions to demonstrate that its emissions do not violate ambient air quality standards. New sources must meet preconstruction monitoring and post-construction monitoring requirements.	Emissions of criteria air pollutants will be minimized by fugitive dust control during excavation, grading, and capping activities.
Groundwater	Maine Department of Human Services Rules Relating to Testing of Private Water Systems for Potentially Hazardous Contaminants (10-144E CMR 233, Appendix C)	Relevant and Appropriate	Maximum Exposure Guidelines (MEGs) are contained in Appendix C to these rules. MEGs include health advisories, which are maximum allowable concentrations of contaminants in drinking water.	Until contaminant concentrations in the groundwater are below MEGs, a restriction on the use of groundwater within the OU3 compliance boundary will be established and maintained, and an appropriate monitoring program will be conducted.

ALTERNATIVE-SPECIFIC ARARS AND TBCS
ALTERNATIVE 3 – COVER WITH COMPOSITE LINER AND ENHANCED DRAINAGE LAYER, INSTITUTIONAL CONTROLS, EROSION CONTROLS, AND MONITORING
PORTSMOUTH NAVAL SHIPYARD, KITTERY, MAINE

Medium/Activity	Requirement/ Citation	Status	Synopsis	Action To Be Taken
Groundwater	Maine Hazardous Waste Rules Relating to Performance Standards for Establishing, Constructing, Altering, and Operating Certain Types of Hazardous Waste Units (06-096 CMR 854)	Relevant and Appropriate	This requirements outlines the State of Maine's rules relating to establishing, constructing, altering, and operating certain types of hazardous waste units.	Until contaminant concentrations in the groundwater are below MEGs, a restriction on the use of groundwater within the OU3 compliance boundary will be established and maintained, and an appropriate monitoring program will be conducted.
Groundwater	Maine Department of Human Services Rules Relating to Drinking Water (10-144E CMR 231-233)	Relevant and Appropriate	Maine's primary drinking water standards are similar to federal MCLs as drinking water standards under the Maine Safe Drinking Water Rules. When state standards are more stringent that federal standards, and have been legally and constantly applied, the state levels shall be used.	Until contaminant concentrations in the groundwater are below Maine MCLs, a restriction on the use of groundwater within the OU3 compliance boundary will be established and maintained, and an appropriate monitoring program will be conducted.
Erosion	Erosion and Sedimentation Control (38 MRSA 420-C) and Stormwater Management (38 MSRA 420-D; 06-096 CMR 500 and 502)	Applicable	Erosion control measures must be in place before activities, such as filling, displacing, or exposing soil or other earthen materials occur. Prior MEDEP approval is required if the disturbed area is in the direct watershed of a water body most at risk.	Appropriate controls will be implemented to address erosion, sedimentation, and storm water and applicable plans will be coordinated with the MEDEP before implementation.
Waste	Maine Solid Waste Management Regulations (06-096 CMR 400-411)	To be Considered	Provides standards for generation, transportation, treatment, storage, and disposal of solid and special wastes. Also provides closure and post-closure maintenance standards.	Not applicable for a facility established before 1973. Capping performance standards are TBC for the conceptual cover design. The specific design standards are not appropriate for a landfill that has been closed since 1978.

sediment monitoring for the area offshore of OU3 is included in the Interim Offshore Monitoring for OU4.

Description of the Significant Difference

This ESD documents a modification to the OU3 ROD that significantly changes, but does not fundamentally alter, the selected remedy. The change to the remedy for the OU3 does not alter the decision to install a hazardous waste landfill cover or implement institutional controls, erosion controls, and monitoring. The OU3 remedy is modified to include management of migration as part of OU3. The remedy for OU3 with modifications based on the September 2003 ESD will meet the Applicable and Relevant and Appropriate Requirements (ARARs) and the RAO for groundwater migration from the JILF. The monitoring component of the OU3 remedy is affected by the addition of the ARARs and RAO for groundwater migration from the JILF.

The following ARARs are included in the OU3 remedy based on the addition of management of migration:

- Clean Water Act, Section 304(a), National Recommended Water Quality Criteria (33 USC 1251 et seq; 40 CFR 122.44; 40 CFR 131) (Relevant and Appropriate). These are non-enforceable guidelines developed for pollutants in surface water. States must develop water quality standards based on Ambient Water Quality Criteria (AWQC) to protect existing and attainable uses of surface waters that receive discharges of pollutants. These are health-based criteria developed for carcinogenic and noncarcinogenic compounds and water quality parameters. AWQC are set at levels that are guidelines for pollutants in surface water. AWQC are available for the protection of human health from exposure to contaminants in drinking water, ingestion of aquatic biota, and for protection of freshwater and saltwater aquatic life. These criteria are used as guidance for developing action levels for the monitoring program as part of the OU3 OM&M Plan.
- Maine Environmental Evaluation: Surface Water Toxics Control Program, Chapter 530.5 (38 MRSA 420 and 464, 06-096 CMR 530) (Applicable). This rule promulgates chemical standards for surface water, referred to as Maine Statewide Water Quality Criteria (SWQC) and procedures necessary to control levels of toxic pollutants in surface water. Maine SWQC are set at federal AWQC levels. The criteria are used for developing action levels for the monitoring program as part of the OU3 OM&M Plan.

The following RAO is added to the OU3 remedy based on the addition of management of migration:

- Ensure that the migration of groundwater contaminants does not adversely impact the offshore environment.

The post-remedial monitoring program for OU3 addresses the ARARs and RAO for groundwater migration and provides for the collection and evaluation of groundwater data to determine whether additional investigation and/or evaluation is needed to ensure that human health and the environment are protected from migration of groundwater from the JILF. As provided in the OU3 OM&M Plan, chemicals in the landfill may enter the groundwater and subsequently discharge offshore at levels that may pose unacceptable risks to human and ecological receptors. To maintain the effectiveness of the OU3 remedy, the Navy needs to ensure that chemicals from the landfill are not in the groundwater at concentrations that will adversely impact human health and the environment after the groundwater discharges to the offshore. Action levels to initiate additional evaluation or investigation are based on protection of offshore and intertidal receptors. The decisions for monitoring were developed to meet the RAOs for source control and for migration of OU3 groundwater offshore.

The OM&M Plan provides decision trees that consider whether chemical concentrations in groundwater are greater than action levels and provide for evaluation of risks to determine

whether additional evaluation and/or investigation is needed. The OU3 monitoring program action levels are based on the ARARs identified for migration. The validated downgradient groundwater data will be compared to the OU3 monitoring program action levels (i.e., greater of upgradient monitoring well concentrations or site-specific, risk-based criteria/appropriate regulatory criteria/guidance levels). The action levels are as follows:

RISK TYPE	ACTION LEVEL[1]
Human Health	Facility-wide recreational intertidal screening value (i.e., risk-based level) or upgradient concentration, whichever is greater.
Ecological	Chronic AWQC x Dilution Factor (for evaluating impacts to surface water) or upgradient concentration, whichever is greater.
	Acute AWQC (for evaluating impacts to seeps) or upgradient concentration, whichever is greater.[2]

[1]Where an AWQC does not exist, other values from peer-reviewed scientific literature will be used. Facility-wide recreational intertidal water screening levels are based on a cancer risk of 10^{-6} and a hazard quotient of 0.1 (TtNUS, December 2002).

[2]This action level will only be used if a seep is identified that originates from OU3 and forms a furrow above mid-tide level.

The decision logic in the OM&M plan shows that if the groundwater monitoring data indicate a potential concern based on comparison to the action levels, the Navy will conduct a risk evaluation to determine the potential for unacceptable risks. Data for OU3 and the offshore area (collected as part of OU4) would be considered as necessary as part of the risk evaluation. If the risk evaluation indicates there is a potential for unacceptable risk, additional investigation and/or evaluation would be conducted to address the concern. Modifications to components of the OU3 monitoring program, such as sampling frequency, analyte list, and/or media or sampling location would be considered as part of the additional evaluation and/or investigation.

Documents finalized after signature of this ESD will include source control and management of migration as part of OU3. The OU3 OM&M Plan will be updated to reflect this ESD.

UPDATED COST ESTIMATE

Addressing management of migration (OU6) as part of the OU3 remedy does not affect the cost estimate to implement the OU3 ROD because the activities for OU6 were already addressed by the OU3 remedy (as discussed under the Description of the Significant Difference). Based on evaluation of the monitoring results, additional investigation and/or evaluation may be necessary in addition to what is required to maintain the components of the source control remedy; however, the Navy cannot anticipate what these would be and therefore cannot anticipate future changes in the costs for the remedy. At the time of the additional investigation and/or evaluation, the impact to the cost of the remedy would need to be determined.

SUPPORT AGENCY COMMENTS

USEPA and MEDEP indicated support to recombine OU3 and OU6 in letters dated March 24, 2005 and August 10, 2004, respectively. USEPA and MEDEP reviewed the monitoring program (including the decision trees) provided in the OU3 OM&M Plan and provided comments that the Navy incorporated into the document. USEPA and MEDEP reviewed the fact sheet that was prepared discussing the Navy's plans to significantly change the remedy for OU3 and the ESD and provided comments that the Navy has incorporated into this document. An MEDEP letter of concurrence on the ESD was issued on September 16, 2005.

OU4 ARARs FROM APPENDIX C
OF THE INTERIM RECORD OF DECISION FOR OU4
(NAVY, MAY 1999)

TABLE C-1

CHEMICAL-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS, ADVISORIES, AND GUIDANCE
PORTSMOUTH NAVAL SHIPYARD
KITTERY, MAIN

Medium or Activity	Requirement	Status	Requirement Synopsis	Evaluation/Action to Be Taken
FEDERAL				
Water	Clean Water Act (CWA); Federal Ambient Water Quality Criteria (AWQC); (33 USC §§1251 et seq, 40 CFR § 122.44; 40 CFR Part 131)	Relevant and Appropriate	CWA AWQC are health-based criteria developed for carcinogenic and noncarcinogenic compounds and water quality parameters. AWQC are set at levels that are guidelines for pollutants in surface water. AWQC are available for the protection of human health from exposure to contaminants in drinking water as well as from ingestion of aquatic biota and for the protection of freshwater and saltwater aquatic life.	AWQCs for the protection of freshwater and saltwater aquatic life will be used to develop PRGs, as appropriate.
Water	U.S. Food and Drug Administration (FDA) Action Levels (21 U.S.C. §§301 et seq)	TBC	Under Section 408 of the Federal Food, Drug, and Cosmetic Act, FDA action levels are established above which the FDA can take legal action to remove a food product from the market.	FDA action levels for fish and shellfish will be used to develop PRGs, as appropriate.
Sediment	EPA Proposed Sediment Quality Criteria, 59 Fed. Reg. 2652 (Jan. 18, 1994)	TBC	These sediment quality criteria for the protection of benthic organisms are proposed for acenaphthene, dieldrin, endrin, fluoranthene, and phenanthrene.	These criteria will be used to develop PRGs, as appropriate.
Sediment	National Oceanographic Atmospheric Administration (NOAA) Incidence of Adverse Biological Effects within Ranges of Chemical Concentration in Marine and Estuarine Sediments.	TBC	This document provides chemical concentration effects distributions that describe the observed or predicted chemical concentrations associated with biological effects. Effects range low (ER-L) and effects range median (ER-M) represent the tenth and fiftieth percentile of reported effects.	ER-L and ER-M concentrations will used to develop PRGs, as appropriate.
Other Natural Resources	NOAA National Status and Trends Program Approach, Informal Guidelines Mussel Watch Data (1991).	TBC	Chemical concentrations in blue mussel tissues located in coastal waters of the US are monitored under this program. Data from the program have been compiled to characterize the national distribution of chemical concentration levels (O'Connor, 1990).	Data will be considered in PRG development as appropriate.
STATE				
Water	Maine Surface Water Toxics Control Program (06-096 CMR 530)	Relevant and Appropriate	The regulations implementing this program set Statewide ambient water quality criteria for toxic pollutants and procedures necessary to control levels of toxic pollutants in surface water are identified. Statewide criteria are set at Federal AWQC levels.	Federal AWQCs, which have been adopted as state criteria, will be used to develop PRGs, as appropriate.

TABLE C-2

LOCATION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS, ADVISORIES, AND GUIDANCE
PORTSMOUTH NAVAL SHIPYARD
KITTERY, MAINE

Medium or Activity	Requirement	Status	Requirement Synopsis	Evaluation/Action to Be Taken
FEDERAL				
Wetlands	Protection of Wetlands – Executive Order 11990 (40 CFR Part 6, Appendix A)	Applicable	Requires Federal agencies to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance natural and beneficial values of wetlands.	Wetlands are located in various locations around PNS. Monitoring activities will meet the requirements of 11990.
Wetlands	Coastal Zone Management Act (16 USC 1451 et seq.)	Applicable	This act provides for the preservation and protection of coastal zone areas. Coastal zone development must be managed in such a way as to minimize the effects on coastal zone resources. Activities in coastal zone areas must be consistent to the maximum extent practicable with a Federally approved state management program.	Monitoring activities will be in compliance with this act.
Other Natural Resources	Fish and Wildlife Coordination Act (16 USC 661 et seq.; 40 CFR § 6.302)	Relevant and Appropriate	This act requires any federal agency proposing to modify a body of water, must consult with the U.S. Fish and Wildlife Service, National Marine Fisheries Services, and other related state agencies.	Notification is not required for actions taken on-site at a CERCLA site. However, monitoring activities will be conducted so as to minimize impacts to wetlands.
Other Natural Resources	Endangered Species Act (16 USC 1531 et seq; 50 CFR Parts 200, 402)	Relevant and Appropriate	Federal agencies are required to consider the impacts on endangered and threatened species and their critical habitats (listed in 50 CFR Part 17).	No known endangered threatened or protected species or critical habitats are located on the site; however, Clark's Island is used by nesting birds. Monitoring activities will be in compliance with this act.

TABLE C-2

LOCATION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS, ADVISORIES, AND GUIDANCE
PORTSMOUTH NAVAL SHIPYARD
KITTERY, MAINE

Medium or Activity	Requirement	Status	Requirement Synopsis	Evaluation/Action to Be Taken
STATE				
Water	Water Classification Program (38 MRSA §§ 464-470)	Relevant and Appropriate	Establishes a water quality classification system to allow the State to manage its surface waters so as to protect the quality of those waters.	Monitoring activities will be in compliance with this law.
Wetlands	Maine Natural Resources Protection Act Permit by Rule Standards (38 MRSA 480-A et seq.; 06-096 CMR 305)	Relevant and Appropriate	These Standards require a permit for any activity conducted in, on, or over any protected natural resource or any activity conducted adjacent to and operated in such a way that material or soil may be washed into any coastal wetland, great pond, river, stream or brook, and some freshwater wetlands.	Monitoring activities will not require a permit, but will comply with the substantive requirements of these standards.
Wetlands	Maine Wetland Protection Rules (06-096 CMR 310)	Applicable	These standards are provided for wetlands protection. Activities that have an unreasonable impact on the wetlands are prohibited.	Monitoring activities will be in compliance with these rules.
Other Natural Resources	Maine Endangered Species Act (12 MRSA §§ 775)	Relevant and Appropriate	The State of Maine has authority to research, list, and protect any species deemed endangered or threatened. The Maine Department of Inland Fisheries and Wildlife determines appropriate use(s) of various habitats on a case-by-case basis. The Maine lists may differ from the federal lists of endangered species.	No known endangered or threatened species or critical habitat is located on the site; however, Clark's Island is used by nesting birds. Monitoring activities will be in compliance with this act.
Other Natural Resources	Maine Significant Wildlife Habitat Rules (06-096 CMR 335)	Relevant and Appropriate	These rules outline the requirements associated with a Natural Resources Protection Act permit for an activity impacting significant wildlife habitat, including certain seabird nesting islands.	No significant wildlife habitat is located on the site; however, Clark's Island is used by nesting birds. Monitoring activities will be in compliance with these rules.

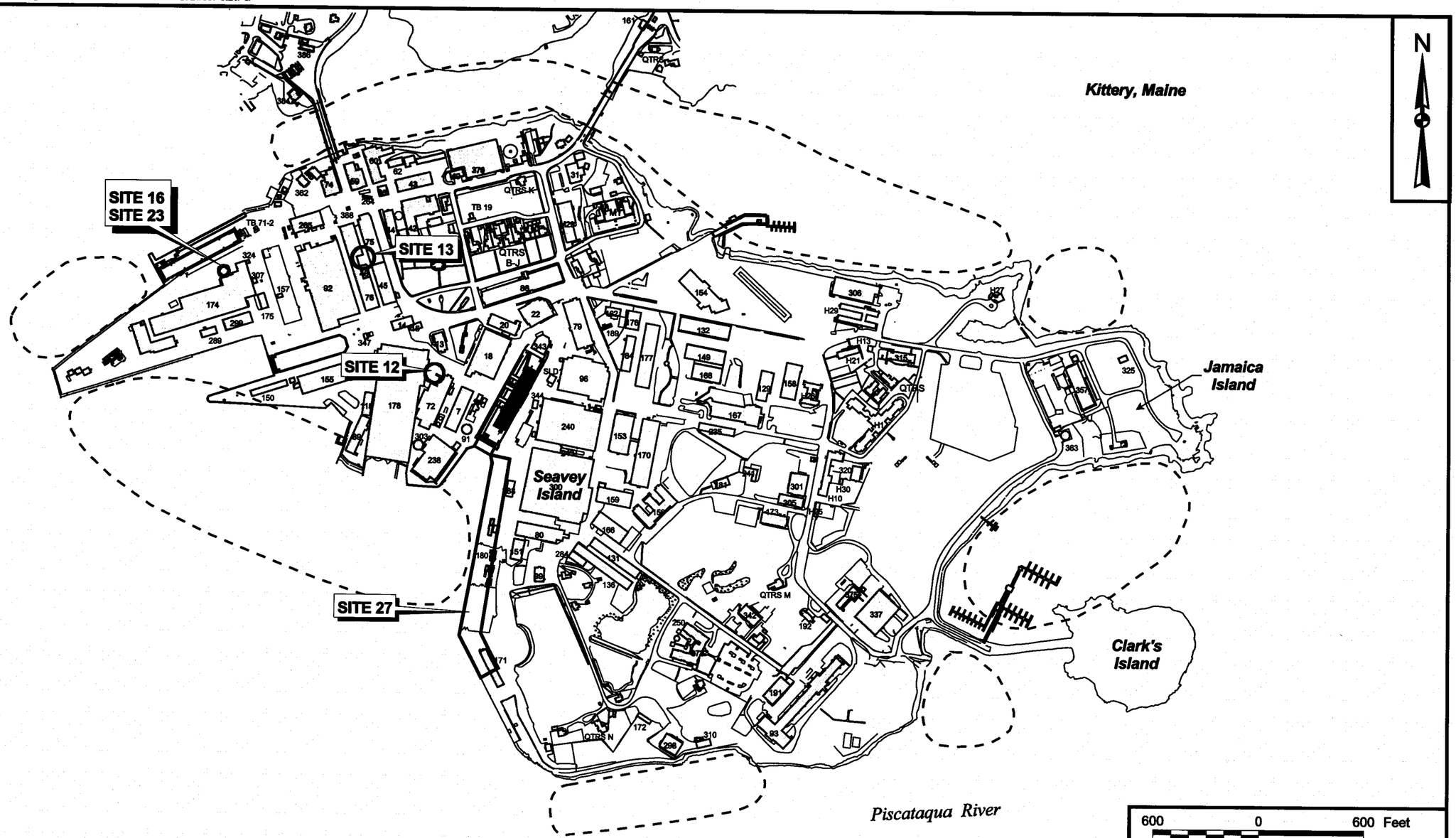
TABLE C-3

ACTION-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS, ADVISORIES, AND GUIDANCE
PORTSMOUTH NAVAL SHIPYARD
KITTERY, MAIN

Medium or Activity	Requirement	Status	Requirement Synopsis	Evaluation/Action to Be Taken
STATE				
Water/Sediment	Regulations Relating to Sampling Procedures and Analytical Procedures (06-096 CMR 580)	Relevant and Appropriate	Establishes standards whereby all sampling and analysis will be performed according to accepted technical procedures for chemical and biological analysis.	Monitoring activities will be in compliance with this law.
Other Natural Resources	Special License (12 MRSA 6074)	Applicable	Special license for research issued by Maine Department of Marine Resources that exempts holder from one or more marine resources' laws as to the time, place, length, condition, amount, and manner of taking or possessing a marine organism.	Monitoring activities will not require a permit but will comply with the substantive requirements.

A.6 NO FURTHER ACTION SITE LOCATIONS

P:\GIS\PORTSMOUTH_NSY\APR\INTERIM_OFFSHORE_MONITORING.APR NO FURTHER ACTION SITES LAYOUT 4/02/07 SP



NOTE:
SITE 26 IS NOT INDICATED BECAUSE THE TANKS ARE/WERE USED WHERE NECESSARY ALONG THE BERTHS AND DRY DOCKS OF PNS.

DRAWN BY J. LAMEY	DATE 4/20/04	Tetra Tech NUS, Inc.	CONTRACT NUMBER 1291 / OWNER NUMBER CTO 022
CHECKED BY D. COHEN	DATE 4/02/07	LOCATION OF NO FURTHER ACTION SITES FIVE-YEAR REVIEW REPORT PORTSMOUTH NAVAL SHIPYARD KITTERY, MAINE	APPROVED BY — / DATE —
COST/SCHEDULE-AREA			APPROVED BY — / DATE —
SCALE AS NOTED			DRAWING NO. FIGURE A6 - 1 / REV 0

APPENDIX B

PHOTOGRAPHS

- **OU1**
- **OU2**
- **OU3**
- **OU7**
- **OU9**
- **SITE 30**

OU1

Photograph of OU1: Crawlspace under Building 238 showing area of depression where pipeline ran from lead-acid battery operations inside building to tank (formerly located outside building). The shovel is located at the southern end of depression and white material is located at the northern end of depression.

OU2

Photograph of OU2: Portion of OU2 shoreline stabilized in November 2005, south of Building 298 and along western end of seawall.

Photograph of OU2: Portion of OU2 shoreline stabilized in June 2006, along eastern end of seawall.

Photograph of OU2: Area on eastern side of Site 29 where debris removed and gravel placed in June 2006.

Photograph of OU2: Portion of OU2 shoreline stabilized in 1999, south of the DRMO.

OU3

Photograph of OU3: View of landfill cap facing south showing Clark Cove, channel chute, and vent with bird screen.

Photograph of OU3: View northeastern portion of landfill cap facing southwest towards parking lot showing sign and trailers.

Photograph of OU3: View of southeastern portion of landfill cap facing southeast toward Clark Cove showing trash racks in channel chute.

Photograph of OU3: View of channel chute on southwestern side of landfill showing cattails have been removed.

Photograph of OU3: View of sign posted on southwestern side of landfill near Building 320 (Automotive Hobby Shop). Signs are posted around the landfill perimeter.

Photograph of OU3: View of Clark Cove at low tide; facing south.

Photograph of OU3: View of Jamaica Cove at low tide, facing west.

OU7

Photograph of OU7: Stabilized shoreline (in June 2006) between boat ramp near Topeka Pier to past Building 306 at eastern end of OU7 shoreline.

Photograph of OU7: Eastern portion of shoreline by Building 306 at low tide, showing shoreline controls to approximate mid tide level.

Photograph of OU7: OU7 shoreline facing north toward Topeka Pier, at low tide.

OU9

Photograph of OU9: OU9 shoreline facing east, at low tide, showing approximate high to low tide area at bottom of steep slope. (Outfall 49 piping is west of Outfall 50 pipe.)

SITE 30

Photograph of Site 30: Crystaline growth along wall of Building 184 before crystals removed in June 2006.

Photograph of Site 30: Area where crystalline growth was removed in June 2006 after placement of vinyl covering.

APPENDIX C

RESPONSES TO COMMENTS

RESPONSES TO USEPA COMMENTS DATED FEBRUARY 5, 2007
DRAFT FIVE-YEAR REVIEW REPORT
PORTSMOUTH NAVAL SHIPYARD, KITTERY, MAINE

General Comments

There are two 2005 EPA risk guidance that need to be considered in the 5-year review. These risk guidance are being incorporated into all new RODs, so should be some text in the 5-year review that explains that these new standards will be used in future 5-year reviews:

Guidelines for Carcinogen Risk Assessment EPA/630/P-03/001F (March 2005)

Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens EPA/630/R-03/003F (March 2005)

> **Response:** Changes to the screening levels for the OU3 post-remedial groundwater monitoring program were made based on these risk guidance. The changes were for the human health screening levels for several PAHs (the screening numbers were lowered by a factor of 2). The changes to the human health action levels will be reflected in Table 4-1 and a footnote will be added to indicate which numbers were changed based on the EPA 2005 guidance documents.
>
> The text in the last paragraph of Section 1.4 will also be revised to indicate that risk assessments, PRG development, and/or clean-up level development will also use the most current risk assessment guidance.

Specific Comments

1. **Comment:** Page iv, Recommendations and Required Actions - There's no discussion of groundwater restrictions, just restrictions on digging and excavation at IR sites.

   Response: For OU3, in accordance with the Record of Decision (ROD), the Navy is preparing a Land Use Control Plan, which includes restrictions for use of fresh groundwater at OU3 for drinking and restrictions on disturbance of the landfill cap. Groundwater at PNS is not used for drinking or any other purposes (irrigation, industrial processes, firefighting, etc.) at OU3 or elsewhere at PNS. Groundwater sampling activities are addressed by the Quality Assurance Project Plan (QAPP) and Health and Safety Plan (HASP) prepared as part of the investigation. Excavation and groundwater management at IR sites are handled through the excavation permit and associated HASP.

   Text to clarify uses and management of groundwater at IR sites will be added to the Five-Year Review Report (including Pages iv, ES-1, 1-3, and 4-17, Section 1.2.1, and as part of the site technical assessment as appropriate).

2. **Comment:** Page iv, 1st paragraph - Is the "Shipyard's Solid Waste Operations Manual" comparable to the "Base Instruction" used to enforce institutional controls at the New London Subase? Does it include groundwater restrictions? If not, this paragraph should discuss groundwater restrictions.

   Response: Please see the Navy's response to USEPA Comment No. 1 regarding groundwater use at PNS. The text will be clarified regarding groundwater use at PNS.

   Chapter 12 of the Shipyard's Solid Waste Operations Manual, Control of Excavation Activities, provides instructions requiring authorization and approval from the PNS Environmental Division for all excavation through use of a permit. The instructions appear to be comparable to New London's SOPA (Admin) New London Instruction 5090.18C (dated December 14, 2006) that provide IR site use restrictions. However, groundwater restrictions, included in New London's instructions, are not required for the Shipyard because groundwater is not used at the Shipyard.

3. **Comment:** Page ES-1, first paragraph - In the sixth sentence capitalize "Act" and add the citation "(CERCLA), 42 U.S.C. §§ 9601 *et seq.*"

   Response: The text will be corrected to include "Act." The Navy prefers to include the citation for CERCLA in Section 1.1 (second paragraph), where more information on the requirements for the Five-Year Review is discussed.

4. **Comment:** Page ES-1, third paragraph - Regarding the last sentence, see comment 2 above, concerning whether the Operations Manual address groundwater restrictions.

   Response: Please see the Navy's response to USEPA Comment No. 1.

5. **Comment:** Page ES-2, first paragraph - In the third sentence change "will be presented" to "was presented". In this paragraph there is no mention of the publication of any announcement about the 5-year review in the local press.

   Response: The text throughout the document will be updated to reflect the status of as of January 31, 2007.

   Announcement of the Five-Year Review was made through the Restoration Advisory Board (RAB) process. RAB announcements are made to RAB members by letter and to the general public through RAB update fact sheets that are mailed to the PNS general mailing list and through announcements published in two local newspapers. The September 2006 RAB Update fact sheet indicated that the review was going to be conducted and that the draft Five-Year Review would be presented at the December 7, 2006 RAB meeting. A public notice was placed in the two local newspapers announcing the presentation for the December 7, 2006 RAB meeting. The December 2006 RAB Update fact sheet provides a summary of the presentation. Announcements for the availability of the final document will be provided in the two local newspapers. The text on page ES-2 and in the second paragraph of Section 1.3 will be updated appropriately

6. **Comment:** Page ES-2, fourth paragraph - Describe the interim remedy.

Response: The interim remedy is monitoring and this will be indicated in the text.

7. **Comment:** Page ES-2, 5th paragraph - In the third sentence is groundwater just restricted from drinking or is it restricted for all uses (irrigation, industrial processes, etc.)?

Response: Please see the Navy's response to USEPA Comment No. 1.

8. **Comment:** Page 1-1, 1st paragraph - In the last sentence don't need to spell out "Comprehensive Environmental Response, Compensation, and Liability Act" again.

Response: Based on Navy style guidance, acronyms used in the Executive Summary are repeated the first time the acronym is used in the main document. Therefore, CERCLA is spelled out the first time it is used in Section 1.0 even though it is spelled out in the Executive Summary.

9. **Comment:** Page 1-1, 5th paragraph - Add after "(NCP)" the citation "40 C.F.R. Part 300."

Response: The citation will be included.

10. **Comment:** Page 1-1, last paragraph - Change to "The NCP, 40 C.F.R. 300.430(f)(4)(ii) states..."

Response: The citation will be included.

11. **Comment:** Page 1-2 & 1-3 - Sentence crossing both pages - Is institution control compliance monitoring included in the monitoring data? This has been added in the New London Subase 5-year review.

Response: Institutional controls for OU3 will be outlined in the Land Use Control Plan, currently being finalized, and the routine inspections as part of the OU3 Operation and Maintenance Program provides for verification that the institutional controls are being conducted.

12. **Comment:** Page 1-3, first paragraph - Last sentence, see comment 2 as to whether the instruction includes groundwater restrictions.

Response: Please see the Navy's response to USEPA Comment No. 1.

13. **Comment:** Page 1-3, second paragraph - For OU2, where EPA has previously commented on the draft FS, the Hazardous Waste Standards should be followed. Have

the hazardous waste standards been used in establishing the maintenance and land use restriction standards?

Response: OU2 is still in the Remedial Investigation (RI)/Feasibility Study (FS) stage; therefore, maintenance and/or land use restrictions have not been established for OU2. The Navy will be conducted additional investigation at OU2 before finalizing the FS. Maintenance and land use restrictions for OU2 will be determined as part of the remedy selection and implementation process.

The second paragraph on Page 1-3 is discussing sites that are undergoing remedial or site screening investigations. The site inspections and maintenance items discussed in this paragraph were conducted as part of the Five-Year Review. As discussed in the previous paragraph on Page 1-3, the Shipyard maintains an excavation restriction, which requires authorization and approval for any excavation, including at IR sites.

14. **Comment:** Page 1-3, 4th paragraph - For the sites with NFA decision documents - Do these sites meet unrestricted use (residential) standards? If they were cleaned up to industrial standards, then additional action may be required to establish institutional controls and monitoring (and their status needs to be discussed in more detail in this 5-year review - in which case delete the last sentence of the paragraph).

Response: The sites with NFA decision documents were for underground storage tanks that were located in the controlled industrial area until they were removed and determined to require no further action for the protection of human health and the environment. Site 12 was determined to have no hazardous materials and no further investigation was required; therefore, no restrictions are required for this site. The tanks at Sites 13, 16, and 23 were removed intact, there was no evidence of contamination from the tanks to the fill material, and the excavation areas were backfilled and asphalted. Investigation of groundwater was not required for these sites. Because the sites were located in the controlled industrial area, these sites were closed using industrial standards. However, the Navy believes that no restrictions are required for these sites because:

- The sites consisted of underground storage tanks with either no evidence of hazardous material storage or no evidence of leakage from the tanks.
- There was no evidence of a surface release (tanks were under ground, beneath asphalted areas); therefore, surface soil is not considered a concern for these sites.
- Risks for exposure to subsurface soil were considered acceptable.

Because no restrictions are required for these sites, the Navy believes that institutional controls and monitoring are not necessary. The Navy will provide additional information in the text in Section 1.1 related to uses of the sites, closure activities, and support for unrestricted closure for the NFA sites. A map showing the locations of the NFA sites will be included in Appendix A.

15. **Comment:** Page 1-3, 4th paragraph - In the third sentence what does "NFA under CERCLA documents" mean? Should it say "findings" or "determinations" rather than "documents?"

Response: Decision documents were signed by the Navy, USEPA, and MEDEP for no further action under CERCLA for Sites 26 and 27. The text will be revised to indicate "decision document."

16. **Comment:** Page 1-8, 2nd paragraph - In the fourth sentence change "will be presented" to "was presented". In this paragraph there is no mention of the publication of any announcement about the 5-year review in the local press.

    Response: Please see the Navy's response to USEPA Comment No. 5. In addition, the text will be revised to indicate that a public notice of the availability of the final Five-Year Review will be provided.

17. **Comment:** Page 1-10, first paragraph - Remove the second sentence since a change in a RfD or CSF could change the protectiveness of a remedy.

    Response: Only the monitoring component would be impacted by changes in RfD or CSF, as well as changes in risk assessment guidance (which affects development of risk-based action levels). The second sentence will be revised as follows:

    "Except for monitoring, the components of the remedial action for OU3 (capping, shoreline controls, and institutional controls) are not chemical specific and therefore any updates to ***risk assessment guidance,*** RfDs***,*** and***/or*** CSFs would not impact the protectiveness of the**se components of the OU3** remedy."

18. **Comment:** Page 4-10, first paragraph - Does the O&M manual address the condition of the playing fields to make sure waste cap components are not damaged from the recreational use (such as maintaining a minimal depth of cover over the liner)?

    Response: The O&M manual (Appendix D of the Post-Remedial Operation, Maintenance & Monitoring Plan) includes inspection items to ensure that the cap components are not damaged. The inspection items are discussed in Section 3.0 and an inspection checklist is provided in Attachment D.

    Section 3.0 mentions erosion, differential settlement, ponded water, area of saturation, bare spots in vegetation, and animal burrows as vegetated cap inspection items. In addition, Attachment D lists exposed cap components. Inspections are to be performed both on a routine, scheduled basis and following severe weather events. Section 3.0 states that softball field maintenance is not generally part of cap O&M, although issues that could affect the integrity of the cap, such as a scoreboard footer penetrating the geomembrane, would be a cap O&M issue. Therefore, although condition the playing fields for recreational use is not an O&M item, condition of the playing fields as a portion of the cap is included. Measurement of cover thickness is normally performed only during construction, as it would require excavation of the completed cover to confirm during O&M. However, reduced soil thickness would be evident as bare soil, erosion, and/or ponded water, and thus would be identified indirectly during inspection. In this way, damage to the cover by recreational use and maintaining minimal depth of cover are adequately addressed.

19. **Comment:** Page 4-13, first paragraph - The hazardous waste landfill post-closure standards also impose monitoring requirements.

Response: The text in Section 4.4.2 will be revised to also include the regulations and guidance associated with the monitoring program as provided in Section 1.6.2 – Related Regulations and Guidance for the OU3 OM&M Program of the OU3 Post-Remedial OM&M Plan (TtNUS, June 2006). These include the hazardous waste landfill post-closure standards.

20. **Comment:** Page 4-17, third bullet - See comment #2 concerning whether groundwater use restrictions have been incorporated into the Shipyard dig policy.

Response: Please see the Navy's response to USEPA Comment No. 1 regarding groundwater use. For OU3, groundwater use restrictions are required for fresh groundwater at the site and these restrictions will be provided in the Land Use Control Plan. There are no current or planned future use of groundwater at OU3 (or else where at PNS). Also, there have been no authorized or unauthorized disturbance of the cap that included placement of groundwater wells for use of groundwater at OU3. The only wells at OU3 are monitoring wells that were placed before completion of the cap at OU3 and these wells are only used for sampling and analysis purposes.

21. **Comment:** Page 4-20 - Add ARARs Tables for the remedy.

Response: The ARARs table from the OU3 ROD will be included in an appendix of the Five-Year Review Report.

22. **Comment:** Page 5-10, Sec 5.4.2 - Change first sentence to: "A final remedy has not been selected and a Final ROD...."

Response: The text will be corrected.

23. **Comment:** Page 5-13, First bullet - No human health risks from consumption of fish, shellfish, lobster?

Response: There are no changes in exposure pathways. Human health risks are discussed on Page 5-3.

24. **Comment:** Page 5-25 - Add ARARs Tables for the interim remedy.

Response: The ARARs table from the OU4 Interim ROD will be included in an appendix of the Five-Year Review Report.

25. **Comment:** Page 8-4, Sec. 8.4.2 - What ARARs were identified in the EE/CA?

Response: ARARs for the removal action are identified in the EE/CA. This OU is still in the RI stage; a ROD has not been signed. Therefore, the Navy does not believe the ARARs should be discussed or provided in the Five-Year Review Report. The text will be revised to indicate that ARARs have not been identified for a remedial action for OU9.

26. **Comment:** Page 9-5, Sec. 9.4.2 - What ARARs were identified in the EE/CA?

Response: ARARs for the removal action are identified in the EE/CA. This site is still in the site screening stage; a ROD has not been signed. Ttherefore, the Navy does not believe the ARARs should be discussed or provided in the Five-Year Review Report. The text will be revised to indicate that ARARs have not been identified for a remedial action for Site 30.

27. **Comment:** Page 10-1, third bullet - See comment #2 as to whether the "no dig" policy including groundwater restrictions.

Response: Please see the Navy's responses to USEPA Comment Nos. 1 and 2.

28. **Comment:** Page 10-2 - Add a bullet for finalizing the Land Use Control Plan.

Response: The first bullet will be revised to include finalizing the Land Use Control Plan for OU3.

RESPONSES TO MEDEP COMMENTS DATED DECEMBER 20, 2006
DRAFT FIVE-YEAR REVIEW REPORT
PORTSMOUTH NAVAL SHIPYARD, KITTERY, MAINE

1. **Comment:** 1.4 ARARs, p. 1-10: The list of chemical-specific ARARs for OU4 should also include the Clean Water Act.

   Response: The National Recommended Water Quality Criteria are part of the Clean Water Act. The ARAR references in Section 1.4 will be revised as follows to provide more detail for the ARARs references:

   - First OU3 ARAR bullet – "***Clean Water Act, Section 304(a),*** National Recommended Water Quality Criteria (Relevant and Appropriate ARAR) and Main Surface Water Toxics Control Program, ***Chapter 530.5***, Statewide Water Quality Criteria (Applicable ARAR).
   - First OU4 ARAR bullet – "***Clean Water Act, Section 304(a),*** National Recommended Water Quality Criteria (Relevant and Appropriate ARAR) and Main Surface Water Toxics Control Program, ***Chapter 530.5***, Statewide Water Quality Criteria (Applicable ARAR).

2. **Comment:** 1.4 ARARs, p. 1-10: Have any new sediment criteria (as opposed to changes in existing criteria) been developed since the OU4 Interim ROD was signed?

   Response: The Navy does not believe there any new sediment criteria; however, there may be new guidelines for screening levels. Because the OU4 Interim Remediation Goals (IRGs) are based on facility-specific toxicity testing, these new guidelines would not change the IRGs for the interim remedy. However at the time of the OU4 FS, the IRGs, ARARs, and TBCs should be reevaluated.

   The last two sentence in the paragraph after the bullets for OU4 will be revised to read as follows:

   "The ER-L and ER-M concentrations have not changed, and there is no new sediment guidance that would affect the PRGs. At the time the FS for OU4 is conducted, ARARs and TBCs should be re-evaluated and changes to the PRGs made as necessary for use in the FS."

3. **Comment:** 3.2 Background, p. 3-3: "Building 298 was built in 1975 and was used as an industrial waste treatment facility."

   Is there documentation regarding these operations? What happened with the waste that was treated there?

   Response: Information regarding the operations is provided in the Initial Assessment Study (IAS) (Weston, June 1983) and in the RCRA Facility Assessment (RFA) (Kearney & Baker/TSA, July 1986). The RFA indicated that spill prevention and control methods were in place, there were no reported releases from the unit that would affect soil or

water, and this unit was not investigated further. The treated effluent from the system was discharged to the Shipyard's sanitary sewer system (and then to the Kittery Municipal Treatment Plant). Sludge from the Industrial Waste Treatment Facility was disposed by a private contractor. Use of the facility ended in the 1980s. Clean closure under RCRA was documented in May 1997 and accepted by the MEDEP in November 1997.

The text in Section 3.2 will be updated to provide this information.

4. **Comment:** 3.2 Background, p. 3-4: "Except for possibly just north of the DRMO fenceline, the DRMO Impact Area does not appear to have been impacted by operations at Sites 6 and 29."

   This statement should be revised to indicate that this is based on present information and the upcoming soil investigation should help to better determine any potential impact there.

   Response: Based on the soil data for OU2, the only portion of the DRMO Impact Area possibly impacted from OU2 operations is immediately adjacent to the DRMO fenceline. Data for the rest of the DRMO Impact Area does not show an impact. The upcoming soil investigation will include the area adjacent to the north of the DRMO. The planned investigation is discussed further in the paragraph on Page 3-4. The text will be revised as follows:

   "The Navy is currently preparing a QAPP for the additional investigation at OU2 ***(including the area adjacent to the north of the DRMO fenceline)***."

5. **Comment:** 3.4.3 Site Inspection, p. 3-6: The OU2 inspection occurred at high tide. Future inspections of all shoreline OUs/Sites should be done at low tide in order to observe any changes or other issues in the intertidal zone.

   Response: In January 2007, the Navy and TtNUS conducted additional shoreline inspections of OU2, OU7 (Site 32), and OU9 (Site 34) to support the offshore evaluations (as part of the Additional Scrutiny Report) and the preparation of the QAPPs for investigations at OU2 and OU7. Observations of the intertidal areas at low tide were made and the Five-Year Review Report text will be updated appropriately. A site inspection list will be prepared for the additional inspection and the list will be included in Appendix A of the Five-Year Review Report. Additional photographs from the inspection will be included in Appendix B, as appropriate.

   OU3 was observed at low tide, as discussed in the Five-Year Review Report. OU1 and OU8 do not have intertidal areas.

6. **Comment:** 3.4.3 Site Inspection, p. 3-6: "Asphalt in the DRMO area was not in good condition."

   As discussed at the December 7, 2006 RAB please provide more information regarding the condition of the asphalt. Would it be possible for the asphalt to come loose via foot

traffic, thereby exposing contaminated soil? How secure is that specific location? Also, if possible, please include photos of this asphalt.

Response: The Navy will conduct additional inspection of the asphalt at the DRMO as part of the additional OU2 investigation; however, based on the inspection in August/September 2006, there were no areas of exposed soil. The asphalt was in the secured, locked, DRMO, which is restricted to DRMO personnel. Non-DRMO personnel need to arrange with the DRMO to access the area. Foot traffic is minimal; most personnel working in the DRMO are using motorized equipment.

In January 2007, the Navy and TtNUS personnel conducted additional site inspections; however, because of icy conditions at the DRMO, they were not allowed to access the DRMO.

7. **Comment:** 4.1 History and Site Chronology, p. 4-2: The table indicates that the Post-remedial OM&M plan for OU3 has been finalized. The Land Use Control plan has not yet been approved and therefore, as we have previously stated, the MEDEP does not consider the entire OM&M plan for OU3 finalized. This could be corrected in the 5-Year Review report with a footnote indicating that the LUC plan has not been finalized.

   Response: The text will be revised to indicate that the Post-Remedial OM&M plan was finalized without the Land Use Control Plan.

8. **Comment:** 9.1 History and Site Chronology, p. 9-1: The table should also indicate other past crystal removals. There was at least one other such event.

   Response: The text will be revised as follows:

   "***Periodic removal of crystalline material by Shipyard – 1997 to 2006***
   "***Most recent removal of c***rystalline material ~~removed and;~~ affected area covered – June 2006"

9. **Comment:** 9.2 Background, p. 9-3: "The Site Screening Investigation Report indicated that soil and groundwater sampled outside the building [184] were not impacted by any potential environmental releases from the pit inside the building."

   The MEDEP continues to doubt that the three existing monitoring wells near Building 184 are appropriately located or screened properly to intercept a plume of contamination in groundwater that the pit might have created. The review report should indicate that this issue has not yet been resolved. For further details please refer to MEDEP's letter to Mr. Fred Evans, USN, dated May 28, 2004, re: the April 2004 Draft EE/CA for Site 30, Comment 2.

   Response: Based on the comments and comment responses on the EE/CA (provided in Appendix C of the EE/CA, TtNUS, August 2005), it was agreed that more discussion among the Navy and regulators was needed regarding the regulatory groundwater concerns for Site 30. However, based on discussion with the regulators regarding prioritization of work for IR sites, it was determined that Site 30 was a low priority

compared to other IR sites at PNS. Therefore, further discussion on the groundwater concern for Site 30 has not been held. The following text revisions will be made to the last paragraph on Page 9-3 to provide the current status of groundwater at Site 30:

"***Based on regulatory concerns regarding the investigation of groundwater at Site 30, it was determined that more discussion among the Navy and regulators was needed to resolve the concerns. Although it was determined that further work for Site 30 was a low priority compared to other IRP sites at PNS,*** ~~Based on test pitting results,~~ the Navy determined that a non-time-critical removal action ***for the former acid pit was warranted*** ~~was necessary~~ to abate potential exposure to nearby human populations and to mitigate the potential threat of a release to the environment of hazardous substances associated with the former acid pit within Building 184."

In addition, the following text change will be made to Section 9.4.1:

"Based on conditions at Site 30, the Navy determined that a non-time-critical removal action is appropriate for the site before determining whether an RI/FS is necessary. ***Following completion of the removal action, additional evaluation will be needed to determine whether further investigation or action is needed for Site 30."***

10. **Comment:** 9.6 Recommendations and Follow-Up Actions, p. 9-6: In Section 9.4.3 the Navy mentions that, "Some crystalline growth was observed emerging from under the vinyl liner…" The Navy must monitor the growth of these crystals and if necessary remove them. This is noted in Appendix A, Inspection List, p. 4, last bullet.

    Response: A proposed schedule for conducting follow-up actions (including Site 30) will be included in Appendix A (after the Inspection List). Please see the Navy's response to MEDEP Comment No. 11 for additional information.

11. **Comment:** App. A, Inspection List, p. 1: The Navy must submit a schedule for making the repairs noted in the list. A general schedule is sufficient (month/year).

    Response: Agree. A proposed schedule for maintenance items will be included after the inspection list in Appendix A. References to the proposed schedule in Appendix A will be included in the Recommendations and Follow-up Actions section for each OU/Site.

    As shown in the attached table, various maintenance activities at OU3 were conducted in October 2006 as part of the Round 1 OM&M maintenance activities. The text in Section 4.0 will be updated. The following provides the proposed text revisions for Section 4.0:

    - Section 4.3.3.2, add the following sentence to the end of the second to last paragraph: "***The Round 1 inspection of OU3 was conducted in July 2006. Based on the results of the inspection, maintenance activities were conducted in October 2006. The Round 1 inspection and maintenance are discussed in Section 4.4.1.***"
    - Section 4.3.3.3, add the following sentence to the end of the section: "***Based on the Round 1 inspection of OU3, maintenance activities were conducted in***

October 2006. The Round 1 inspection and maintenance activities are discussed in Section 4.4.1."

- Section 4.4.1: The text will be revised as follows: "OU3 ***post-remedial*** OM&M was initiated in 2006. The tidal study was performed in March 2006, groundwater and landfill gas sampling and OM&M inspection for Round 1 were performed in July 2006, ***and wetlands inspection and OU3 maintenance activities for Round 1 were conducted in October 2006.***

  Landfill gas was not detected during Round 1 sampling of the gas probes. Several minor maintenance items were noted during the Round 1 inspection. The wetlands evaluation for Jamaica Cove and Clark Cove did not indicate any concerns. Maintenance activities conducted in October 2006 included the following:
  - ***Removal of the stone check dam at the upgradient end of the vegetated portion of Ditch 5 to reduce the ponding of water at the base of Channel Chute 2.***
  - ***Removal of cattails within the channel.***
  - ***Removal of trash and debris from all culvert trash racks.***
  - ***Repairs at monitoring wells JW-7, JW-7B, JW-13DB, and JW-20***
  - ***Filling of three rodent burrows.***
  - ***Placement of bird screens in all exposed gas vents.***

  The results of the tidal study and Round 1 activities will be provided in the OU3 Post-Remedial OM&M Round 1 Data Package.

  The Land Use Control Plan, which will be included as Appendix E of the OU3 Post-Remedial OM&M Plan, has not been finalized, and all verification activities were not conducted as part of the Round 1 inspection. Therefore, additional activities to verify land use controls were conducted as part of the Five-Year site inspection as discussed in Section 4.4.3."

12. **Comment:** App. A, Inspection List, OU3, p. 2: Please provide the MEDEP with a copy of the drawings that are requested under the first bullet of this page (that clearly show all numbered construction vents, etc.).

    Response: The Navy will provide the MEDEP with a copy of the drawings when available. The drawings will also be included in the OU3 OM&M plan.

13. **Comment:** App. A, OU3 Inspection Form, Institutional Controls, p. 5 of 12: This section should indicate that while there are some existing ICs, the Land Use Controls for OU3 have not been finalized.

    Response: Agree. The following will be added under "Other problems or suggestions:" "The Land Use Control Plan for OU3 needs to be finalized."

14. **Comment:** App. A, OU3 Inspection Form, Landfill Cover - Holes, p. 6 of 12: The Navy has indicated that holes in the cover are not evident. However, p. 8 of the inspection

form, Cover Penetrations, indicated “Groundhog hole near Gas Vent #14.” In addition this hole is noted on Sheet C2 of this section. Please correct the statement regarding holes on p. 6.

Response: Agree. The following information on the groundhog hole will also be included under item A4. (Holes) on page 6 of 12: “Groundhog holes noted near gas vent #14.”

RESPONSES TO MEDEP COMMENTS DATED MAY 16, 2007
DRAFT FINAL FIVE-YEAR REVIEW REPORT
PORTSMOUTH NAVAL SHIPYARD, KITTERY, MAINE

1. **Comment:** 1.4, pp. 1-10 and 1-1 1: Clean Water Action should be changed to Clean Water Act.

   Response: The text will be corrected.

2. **Comment:** Response to Comment 4: "Based on the soil data for OU2, the only portion of the DRMO Impact Area possibly impacted from OU2 operations is immediately adjacent to the DRMO fence line."

   The MEDEP's primary concern with the 2004 Draft FS for OU2 was that it was based on a series of studies with varying data quality objectives instead of an overall RI. In the draft FS the Navy stated in Section 3.1.3 Nature and Extent of Contamination at Site 6, p. 3-4/34, "..:the extent of impacted soil, particularly the extent of areas with high concentrations, is not well defined." Therefore, the MEDEP maintains that further investigation of the DRMO impact area may be necessary. However, we do not believe text changes in the Five Year Review are necessary to address this issue.

   Response: The Navy agrees that no change is needed for this Five-Year Review Report. Further, the Navy agrees that the extent of contamination from the DRMO operations needs to be investigated and the extent of impact will be further evaluated after the investigation. The Quality Assurance Project Plan will discuss the planned additional investigation at OU2. The Navy plans to use field analysis as part of the investigation so that field decisions can be made to locate and analyze additional samples as part of the investigation so that sufficient data will be collected to determine the extent of contamination.

3. **Comment:** Response to Comment 11: "Therefore, additional activities to verify land use controls were conducted as part of the Five-Year site inspection.. ."

   To avoid confusion with the statement that the LUC Plan has not been finalized, please add "existing" before "land use controls."

   Response: Existing and proposed controls were verified. The text, on page 4-13, will be revised by adding “existing and proposed” before “land use controls.”