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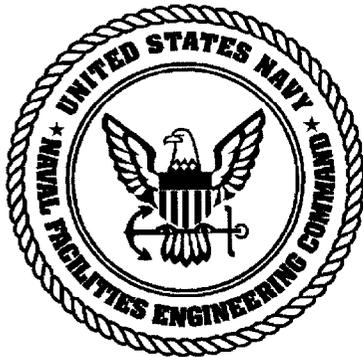
**Contract**

**N62470-89-D-4814**

**CTO-0353**

**April 2002**

**Action Memorandum  
for Metals Contaminated Soils  
Camp Allen Salvage Yard  
Site 22  
Naval Station Norfolk  
Norfolk, Virginia**



Prepared for:

**Department of the Navy  
Atlantic Division  
Naval Facilities  
Engineering Command  
Norfolk, Virginia**

Under the

**LANTDIV CLEAN Program**

**Comprehensive Long-Term  
Environmental Action Navy**

**Baker**

**FOSTER WHEELER**  
FOSTER WHEELER ENVIRONMENTAL RESPONSE, INC.

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MANAGERS DESIGNERS CONSULTANTS

02.06-4/1/02-

**FINAL**  
**ACTION MEMORANDUM**  
**SITE 22 - CAMP ALLEN SALVAGE YARD**  
**NAVAL STATION NORFOLK**

**DATE:** April 24, 2002

**SUBJECT:** Removal Action at Site 22 - Camp Allen Salvage Yard, Naval Station Norfolk, Norfolk, Virginia

**FROM:** Commander, Atlantic Division, Naval Facilities Engineering Command

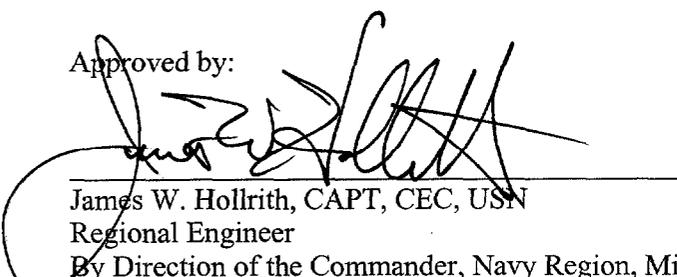
**TO:** James W. Hollrith, CAPT, CEC, USN  
Regional Engineer  
By Direction of the Commander, Navy Region, Mid-Atlantic

This Action Memorandum documents approval for the removal action as described herein for Site 22 - Camp Allen Salvage Yard at Naval Station Norfolk, Norfolk, Virginia. This Action Memorandum serves as the Decision Document for the Engineering Evaluation/Cost Analysis for Site 22 prepared under separate cover.

This decision document represents the selected removal action for Site 22 and was developed in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1990 as amended, and not inconsistent with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on the administrative record for the site.

Conditions at the site meet the NCP section 300.415(b)(2) criteria for removal and recommend approval of the proposed removal action. The total project ceiling if approved will be \$1,400,000. Response actions should commence as soon as practical due to the potential threat to human health and the environment from Site.

Approved by:

  
\_\_\_\_\_  
James W. Hollrith, CAPT, CEC, USN  
Regional Engineer  
By Direction of the Commander, Navy Region, Mid-Atlantic

26 April 2002  
Date

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## **ATTACHMENTS**

- A CASY Engineering Evaluation/Cost Analysis (EE/CA)
- B Responsiveness Summary

## LIST OF ABBREVIATIONS/ACRONYMS

ARAR	Applicable or Relevant and Appropriate Requirements
bgs	below ground surface
CAL	Camp Allen Landfill
CASY	Camp Allen Salvage Yard
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation and Liability Information System
CTO	Contract Task Order
cy	cubic yards
DERP	Defense Environmental Restoration Program
DoN	Department of the Navy
DRMS	Defense Reutilization and Marketing Services
EE/CA	Engineering Evaluation/Cost Analysis
FS	Feasibility Study
IAS	Initial Assessment Study
IR	Installation Restoration
NAS	Naval Air Station
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NFESC	Naval Facilities Engineering Services Center
NPL	National Priorities List
NSN	Naval Station Norfolk
PA	Preliminary Assessment
PCB	Polychlorinated Biphenol
ppm	parts per million
PRAP	Proposed Remedial Action Plan
RI	Remedial Investigation
SARA	Superfund Amendments and Reauthorization Act
SI	Site Inspection
TBC	To Be Considered
UCS	United States Code
USACE	US Army Corps of Engineers
USEPA	US Environmental Protection Agency
VDEQ	Virginia Department of Environmental Quality
XRF	X-ray Fluorescence Spectrometer

## **I. PURPOSE**

The purpose of this Action Memorandum is to document approval for the removal action as described herein for Site 22 - Camp Allen Salvage Yard (CASY) at Naval Station Norfolk, Norfolk, Virginia. This Action Memorandum serves as the Decision Document for the Engineering Evaluation/Cost Analysis (EE/CA) for Site 22 prepared under separate cover.

This Action Memorandum has been completed in accordance with the removal program requirements defined by the Comprehensive Environmental Response, Compensation and Liability Act of 1990 (CERCLA), the Superfund Amendments and Reauthorization Act of 1986 (SARA), the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), and the U.S. Environmental Protection Agency's (USEPA) Superfund Removal Procedures Action Memorandum Guidance (USEPA 1990).

The Department of the Navy (DoN) has broad authority under CERCLA Section 104 and Executive Order 12580 to carry out removal actions when the release is on, or the sole source of the release is from, the DoN installation. The Navy/Marine Corps Installation Restoration (IR) Program was initiated to identify, assess, characterize, and clean up or control contamination from past hazardous waste disposal operations and hazardous material spills at Navy and Marine Corps Activities. This Action Memorandum follows the guidelines published in the Navy/Marine Corps IR Manual dated February 1997 (NFESC, 1997). This document addresses a non-time-critical removal action for installing a one-foot soil cover over soils contaminated with metals at Site 22, the CASY.

## **II. SITE CONDITIONS AND BACKGROUND**

In 1997, Naval Station Norfolk (NSN) was placed on USEPA's National Priorities List (NPL) of Superfund sites and is identified in EPA's Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) as VA6170061463. The following section describes the CASY's features and history. This section also discusses previous site investigations, the current site investigation, and the detected contaminants that necessitated the preparation of the EE/CA.

## **A. Site Description**

The CASY was dedicated to the salvaging and disposal of scrap materials generated by the Navy in the Tidewater area. The Navy managed the facility from 1940 until 1972. The Defense Reutilization and Marketing Services (DRMS) managed the CASY From 1972 until 1995 when salvage operations were discontinued. The CASY contained buildings and areas where distinct salvage operations were conducted. After salvaging operations stopped, many structures were removed, including: two railroad spurs for loading and unloading scrap; a bailer/smelter/incinerator; a building that was used for general and transformer storage; a drum storage area located parallel to Ingersoll Street; a drum accumulation area in the northern portion of the site; an all white goods stockpile; and a general scrap stockpile. Antimony, arsenic, iron, and lead have been identified in concentrations exceeding regulated removal levels.

### **1. Removal Site Evaluation**

Site 22 was identified as a potential area of concern in an Initial Assessment Study conducted by the Navy in 1982. A Preliminary Assessment/Site Inspection (PA/SI) and a Remedial Investigation/Feasibility Study (RI/FS) have additionally been performed at the site (Baker, 1999/2000). An EE/CA was finalized and made available to the public in February 2002 (Baker 2002, see Attachment A). These documents contain information concerning the nature and extent of antimony, arsenic, iron, and lead contamination in the surface and subsurface soils, as well as a description of the objectives of the non-time-critical removal action and analysis of various removal alternatives that were considered for this site.

### **2. Physical Location**

The CASY facility is located in the Naval Station Norfolk, south of Chambers Field and Interstate 564, in an area known as Camp Allen. A location map is presented in Figure 2-1. The CASY consists of approximately 22 acres of level ground surrounded by chain-link and barbed-wire fencing. Facilities surrounding the CASY include the Naval Brig, heliport, Camp Allen Landfill (CAL) (areas A and B), the U.S. Marine Corps Camp Elmore, Norfolk Crossing military housing, the Camp Allen Elementary School, and a civilian community (Glenwood Park). The CASY lies between Areas A and B of the CAL (which was previously investigated under the IR Program, Site 1). A site plan of the CASY is shown on Figure 2-2.

### **3. Site Characteristics**

The CASY includes an area of approximately 22 acres of level ground. All of the site salvage or storage areas, structures, and buildings that were active during the salvaging process have been demolished and removed. A paved parking area and the remains of railroad tracks are still present in the southern portion of the site. Historically, the CASY area was covered with stands of hardwoods and vast areas of tidal marsh. Filling operations conducted by the Navy during development of the base has greatly altered the original terrain. The CASY had been an active salvage yard for over 50 years and provides limited habitat for wildlife. No major ecological features have been associated with the CASY. There is a storm water drainage basin, or "pond" that adjoins the eastern side of the site that discharges storm water to a storm sewer that crosses the site. In May 1999, the Navy asked the US Army Corps of Engineers (USACE) to verify that the pond is not a regulated wetland. The USACE inspected the site and verified that the pond area is considered upland property and therefore not within their wetland jurisdiction.

### **4. Release or Threatened Release into the Environment of a Hazardous Substance, Pollutant, or Contaminant**

The media of concern at this site is metals-contaminated surface and subsurface soil. This Action Memorandum addresses soils with concentrations of antimony above 73 parts per million (ppm), arsenic above 58 ppm, iron above 55,000 ppm, and lead above 400 ppm. These cleanup goals are based on the results of a focused risk assessment and were agreed to by the Naval Station Norfolk Partnering Team in October 2001 (see Baker 2001b for a detailed description). Of the four metals contaminants of concern, antimony, arsenic, and lead are each listed on the 2001 CERCLA Priority List of Hazardous Substances. This list represents contaminants common to NPL sites that have been "determined to pose the most significant potential threat to human health due to their known or suspected toxicity and potential for human exposure" (ATSDR, 2001). Compounds containing antimony, arsenic, and lead are additionally listed under the CERCLA designation of hazardous substances (40 CFR 302.4). The volume of soil remaining at the CASY exceeding the site cleanup goals for antimony, arsenic, iron, and lead (approximately 29,000 cubic yards) has been identified (OHM/IT, 2001a).

Metals contamination has been detected throughout the entire site in both surface and subsurface soils. This contamination poses risks to humans via dermal contact and/or ingestion. Additionally, storm water runoff for the site has the potential to transport contaminated soil to an unnamed tributary to Bousch Creek, that discharges into Willoughby Bay, approximately one mile north of the site.

## **5. National Priorities List Status**

In 1997, Naval Station Norfolk was placed on USEPA's National Priorities List (NPL) of Superfund sites. Remedial activities are in progress at the site, examining contamination to soils, sediments, and groundwater.

## **6. Maps, Pictures and Other Graphic Representations**

Figures 2-1 and 2-2 show a location map and site plan of the CASY, respectively. Figure 2-3 presents the status of the CASY's soils, including clean and/or previously remediated soils and those with metals concentrations exceeding the site cleanup goals for metals.

## **B. Other Action to Date**

### **1. Previous Actions**

The CASY was previously identified in the Initial Assessment Study (IAS) performed in 1982 as a site of potential concern. Several subsequent investigations and actions have taken place at the site. The previous actions, findings and recommendations can be found in the following reports:

- Initial Assessment Study for Naval Station Norfolk (NEESA, 1983)
- Preliminary Assessment/Site Inspection (Baker, 1993)
- Camp Allen Landfill Remedial Investigation (Baker, 1994a)
- Camp Allen Landfill Feasibility Study (Baker, 1994b)
- Camp Allen Landfill Decision Document (Baker, 1995)
- Camp Allen Salvage Yard PCB-Contaminated Soils Engineering Evaluation/Cost Analysis (Baker, 1997)
- Camp Allen Salvage Yard Remedial Investigation (Baker, 1999)

- Camp Allen Salvage Yard Feasibility Study (Baker, 2000)
- Camp Allen Salvage Yard Hot Spot Study (Baker, 2001a)
- Camp Allen Salvage Yard Proposal to Revise Preliminary Remediation Goals (Baker, 2001b)
- Camp Allen Salvage Yard Metals-Contaminated Soils Engineering Evaluation/Cost Analysis (Baker, 2002)

## **2. Current Actions**

The CASY is currently not active as a salvage area. It will be utilized as a recreation area in the future. In 2001, the Navy completed the removal of over 14,000 cubic yards of Polychlorinated Biphenol (PCB)-contaminated and concentrated metals contaminated soils (Hot Spots). A Proposed Remedial Action Plan (PRAP) addressing sediment and groundwater contamination at the CASY is currently in development. This PRAP will additionally address land use controls, which will document the final proposed remedial actions for soils, sediments, and groundwater at the site.

## **C. State and Local Authority's Role**

### **1. State and Local Actions to Date**

As previously stated, Federal Executive Order 12580 delegates to the DoD the President's authority to undertake CERCLA response actions. Congress further outlined this authority in the Defense Environmental Restoration Program (DERP) Amendments, under 10 United States Code (USC) Sections 2701 through 2705. CERCLA Section 120 requires the Navy to apply State removal and remedial action law requirements at its facilities.

### **2. Potential for Continued State/Local Response**

It is expected that the Navy will continue to be the lead agency, and that the Navy's environmental restoration program will continue to be the exclusive source of funding for this removal action. However, it is expected that the USEPA and the Virginia Department of Environmental Quality (VDEQ) will continue to be consulted during and until actions addressing the contaminated soil are determined complete.

### **III. THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES**

Section 300.415 of the NCP lists the factors to be considered in determining the appropriateness of a non-time-critical removal action. Paragraphs (b)(2)(i), (iv), and (v) of Section 300.415 apply to the conditions as follows:

300.451(b)(2)(i)        “Actual or potential exposures to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants.”

Antimony, iron, and lead are present in the soils at levels above the site cleanup goals. The CASY is inactive as a salvage yard but will be utilized as a recreational area in the near future. There is the potential for direct exposures to future users of the site through ingestion and dermal contact with the soil contaminants at unacceptable risk levels as determined by a human health risk assessment (Baker 1999/2002).

Although an ecological evaluation has not been performed for the site, it provides limited habitat for wildlife and can be characterized as highly disturbed. The salvage and storage activities as well as demolition activities have altered many of the habitats that may have existed previously when that area was part of the historic Bousch Creek drainage system. Historical contaminations of the Bousch Creek drainage system potentially associated with the CASY will be addressed by the Navy in a separate investigation and will be remediated as necessary.

300.451(b)(2)(iv)        “High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface, that may migrate.”

High levels of antimony (137 ppm), iron (156,780 ppm), and lead (5,268 ppm) have been detected in the CASY soils from 0 to 4 feet below ground surface (bgs). These levels are above the site cleanup goals and USEPA Region III's residential risk based concentration values. The site is mostly unvegetated, increasing contaminant migration potential via storm water runoff and infiltration to groundwater.

300.451(b)(2)(v)        “Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released.”

Because of the proximity to the coastline, the CASY is subject to storms throughout the late summer and early fall. Winter storms that move along the eastern seaboard are often associated with high winds and precipitation, which could cause the migration of contaminants from the site via fugitive dust or storm water runoff.

#### **IV. ENDANGERMENT DETERMINATION**

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action discussed in this Action Memorandum, may present an imminent and substantial endangerment to public health, welfare, or the environment.

#### **V. PROPOSED ACTIONS AND ESTIMATED COSTS**

##### **A. Proposed Actions**

##### **1. Proposed Action Description**

The proposed removal action at the CASY will include the installation of a compacted 1-foot soil cover consisting of approximately 32,600 cubic yards (cy) of clean fill underlying 13,000 cy of topsoil, covering the entire 22-acre CASY site. The majority of the fill material could be obtained from a nearby borrow area, "Monkey Bottoms," on Naval Station Norfolk property. Remaining fill requirements and topsoil may be supplied from an off-site source. The cover would be contoured to control erosion and sedimentation, and would be compacted and vegetated with native grasses.

The Navy would inspect the soil cover on an annual basis and after major storm events to ensure that integrity is maintained. Cover restoration would be performed, as needed, based upon inspection results. As contaminated soil that poses a potential human health risk would remain at the site, land use controls would be required following this action. These controls could include restricted intrusive activities at the site (e.g., excavation, installation of wells, construction), as approved by the Navy.

This action was chosen as it is cost effective, protective, easily implementable, and does not conflict with the future designated uses of the site. This removal option minimizes the potential for direct contact with metals contaminated soils and provides a reduction in the mobility of the remaining contaminants by minimizing storm water runoff and the infiltration of precipitation. No further sampling or investigative assessments will be required before the response action can be implemented as the nature and extent of the contamination has been identified and documented (see OHM/IT 2000/2001b). The Navy will comply with applicable State and Federal disposal requirements if any materials require removal and/or disposed off-site.

## **2. Contribution to Remedial Performance**

The soil cover removal action will mitigate the potential direct contact threat posed by metals-contaminated soil and the threat of contaminant release and migration. The removal action will provide a reduction in the mobility of contaminants contained in the subsurface soils by minimizing the infiltration of precipitation. The action will immediately address soil contamination and the potential human health risks and will not impede future responses for sediment and/or groundwater contamination. The soil cover is compatible with the planned future uses of the site, is consistent with accepted removal practices, and meets the NCP removal criteria.

## **3. Description of Alternative Technologies**

Three alternatives were qualitatively assessed and compared based on their effectiveness, implementability, and cost. The preferred removal action for this site is the most readily implementable, is cost-effective, and minimizes risks to human health and the environment by preventing direct contact with the remaining contaminated soil. This action would also provide a reduction in mobility of contaminants contained in the subsurface soil by minimizing infiltration of precipitation. Other alternative technologies evaluated included: 1) Excavation and Off-Site Disposal, and 2) In-situ Soil Stabilization. The EE/CA (see Attachment A) provides an in-depth discussion and comparison of the alternative removal options considered for the CASY soils.

#### **4. EE/CA**

As described above, an Engineering Evaluation/Cost Analysis (EE/CA) was completed to address the metals-contaminated soils non-time-critical removal action at the CASY. Comments were received from USEPA and VDEQ on the Draft EE/CA. The Final EE/CA addressed these comments and was made available to the public for comment on February 3, 2002. No comments were received from the public during the comment period, which ended March 4, 2002. Additional comments on the Final EE/CA were received from USEPA during the public comment period, and are addressed in the Revised Final EE/CA included as Attachment A to this document. Attachment B includes a written response to the USEPA's comments.

#### **5. Applicable or Relevant and Appropriate Requirements**

The NCP requires that removal actions attain applicable or relevant and appropriate Federal and State requirements (ARARs) with limited exception, to the extent practicable. ARARs are divided into three categories: chemical-specific, location-specific, and action-specific. Chemical-specific ARARs are particular to individual contaminants. Location-specific ARARs depend upon the location of the contamination and potential restrictions on activities conducted in these areas (i.e., wetlands, floodplains, etc.). Action-specific ARARs govern the remedial actions and are usually technology or activity-based directions or limitations that control actions taken at CERCLA sites.

The analysis of removal alternatives was performed and is presented in the CASY Final EE/CA under separate cover (see Attachment A). The removal action set forth in this action memorandum will comply with all applicable, relevant, and appropriate environmental and human health requirements, to the extent practicable considering the requirements of the situation.

#### **6. Project Schedule**

The proposed project schedule is:

Action Memorandum released:	March 2002
Design and Specifications:	March 2002
Preparation of Removal Action Work Plans:	April - May 2002
Removal Action:	May - August 2002

**B. Estimated Costs**

The estimated costs associated with the removal action are itemized below:

<b>Direct Capital Costs</b>	
• General	\$20,000
• Site Work	
❖ Site Preparation, Utility Work, Subcontractor Support	\$196,000
❖ Temporary Silt Fencing	\$4,300
❖ Clean Fill - materials, hauling and spreading	\$679,500
❖ Top Soil - materials, hauling, and spreading	\$227,500
❖ Surveyor	\$13,200
❖ Hydroseed and Mulch	<u>\$67,200</u>
<b>Direct Capital Costs Subtotal</b>	<b>\$1,207,700</b>
<b>Indirect Capital Costs</b>	
• Oversight Costs	\$17,600
• Contingency Allowance (15%)	<u>\$181,200</u>
<b>Indirect Capital Costs Subtotal</b>	<b>\$198,800</b>
<b>Total</b>	<b>\$1,406,500</b>

**VI. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN**

If no action is taken or the action is delayed, the potential for direct contact with the contaminants and the threat of migration of contaminants from the site will remain.

**VII. OUTSTANDING POLICY ISSUES**

There are no outstanding policy issues regarding this action.

**VIII. ENFORCEMENT**

The Navy can and will perform the proposed response promptly and properly.

## **IX. RECOMMENDATION**

This decision document represents the selected removal action for Site 22, the Camp Allen Salvage Yard, Naval Station Norfolk, Norfolk, Virginia, developed in accordance with CERCLA as amended, and not inconsistent with the NCP. This decision is based on the administrative record for the site.

Conditions at the site meet the NCP section 300.415(b)(2) criteria for removal and recommend approval of the proposed removal action. The total project ceiling if approved will be \$1,400,000. Response actions should commence as soon as practical due to the potential threat to human health and the environment from Site 22 - Camp Allen Salvage Yard.

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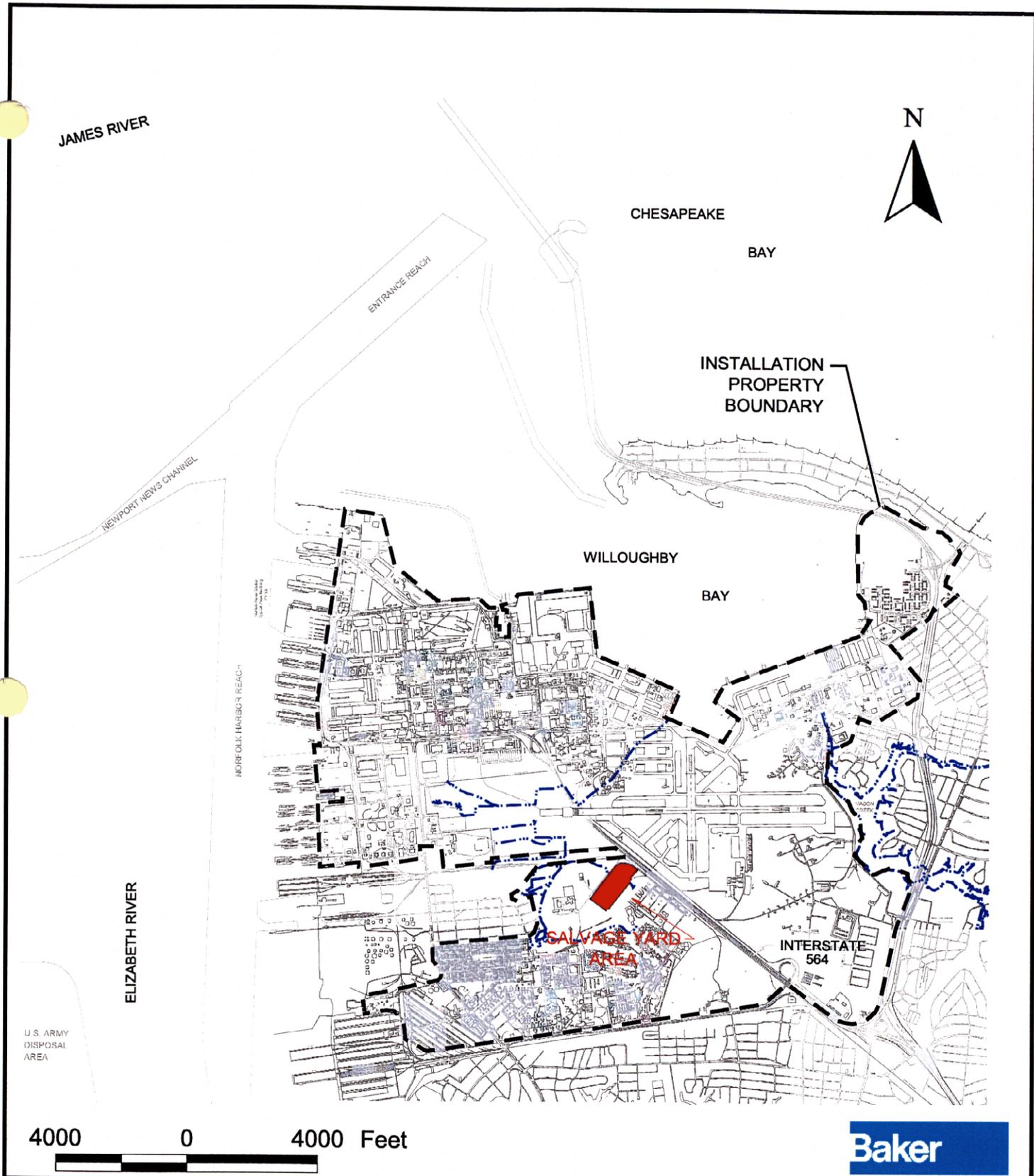
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**LEGEND**

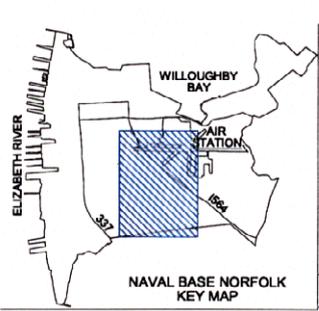
- Installation Property Boundary
- Surface Water

Source: U.S.G.S. Topographic Map, Norfolk North Quadrangle, VA Photoinspected 1989.

**Figure 2-1  
Site Location Map**

**Camp Allen Salvage Yard  
Naval Station Norfolk, Norfolk, Virginia**

00890 DBIY



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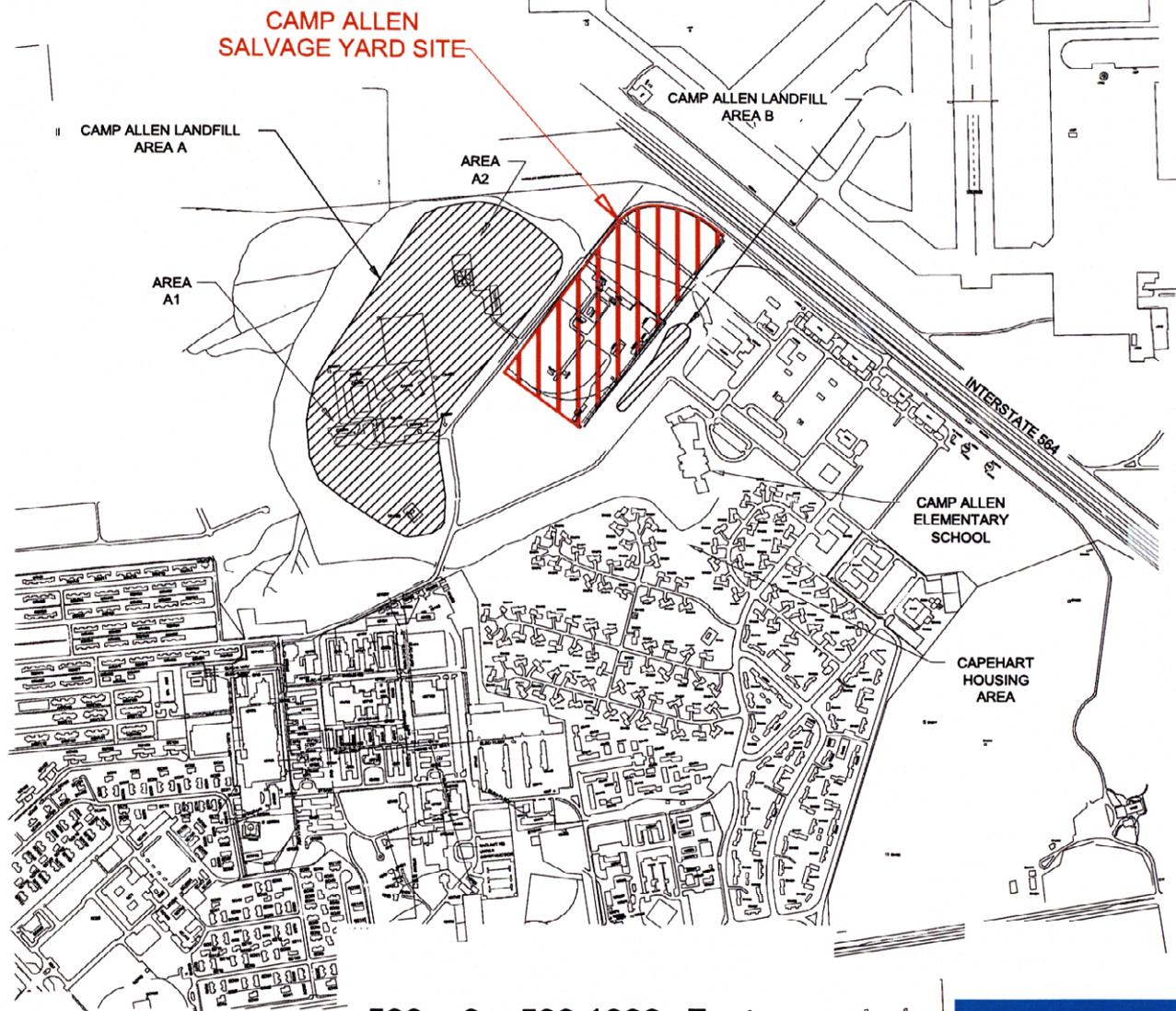


Figure 2-2  
Site Plan

Camp Allen Salvage Yard  
Naval Station Norfolk, Norfolk, Virginia



**Baker**

**Figure 2-3**  
**Extent of Metal Contaminated Soils**  
 Camp Allen Salvage Yard  
 Naval Station Norfolk, Norfolk, Virginia

**Legend**  
 Locations of Soils with Metals  
 Contamination Exceeding Clean Up Goals

- Clean or Remediated
- Lead and Iron Depth: 2-4'
- Lead Depth: 2-4'
- Iron Depth: 2-4'
- Antimony Depth 2-4'
- Lead and Iron Depth 0-2'
- Lead Depth 0-2'
- Iron Depth 0-2'

Metal	Clean up goal	Units
Iron	55,000	mg/kg
Lead	400	mg/kg
Arsenic	58	mg/kg
Antimony	73	mg/kg

Source: Sampling data and sampling grid locations provided by OHM/IT Corporation (2001)

Revised Final

**Engineering Evaluation/Cost Analysis (EE/CA)  
For Metals Contaminated Soils**

**Camp Allen Salvage Yard Site 22  
Naval Station Norfolk, Norfolk Virginia**



Prepared For:

**Department of the Navy  
Atlantic Division  
Naval Facilities Engineering Command  
*Norfolk, Virginia***

Under the

**LANTDIV CLEAN Program**

**Comprehensive Long-Term  
Environmental Action Navy**

Reference:  
Contract  
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April, 2002

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**WESTON**  
ENGINEERS ARCHITECTS ENVIRONMENTAL CONSULTANTS

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## LIST OF ABBREVIATIONS/ACRONYMS

ARAR	Applicable or Relevant and Appropriate Requirements
bgs	below ground surface
CAL	Camp Allen Landfill
CASY	Camp Allen Salvage Yard
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
COC	Contaminants Of Concern
COPC	Contaminants Of Potential Concern
CTO	Contract Task Order
DoN	Department of the Navy
DOT	Department of Transportation
DRMS	Defense Reutilization and Marketing Services
EE/CA	Engineering Evaluation/Cost Analysis
FS	Feasibility Study
HI	Hazard Index
HQ	Hazard Quotient
IAS	Initial Assessment Study
ILCR	Incremental Lifetime Cancer Risk
IR	Installation Restoration
LANTDIV	Atlantic Division Naval Facilities Command
NAS	Naval Air Station
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NFESC	Naval Facilities Engineering Services Center
NSN	Naval Station Norfolk
OSHA	Occupational Safety and Health Administration
PA	Preliminary Assessment
PCB	Polychlorinated Biphenol
ppm	parts per million
RAC	Removal Action Contractor
RAGS	Risk Assessment Guidance for Superfund
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act
SI	Site Inspection
SVOC	Semivolatile Organic Compounds
TCLP	Toxicity Characteristic Leaching Procedure
USC	United States Code
USEPA	U.S. Environmental Protection Agency
VAC	Virginia Administrative Code
VDEQ	Virginia Department of Environmental Quality
VHWMR	Virginia Hazardous Waste Management Regulations
VOC	Volatile Organic Compounds
VSWMR	Virginia Solid Waste Management Regulations
XRF	X-ray Fluorescence Spectrometer

## EXECUTIVE SUMMARY

This Engineering Evaluation/Cost Analysis (EE/CA) was performed to provide the basis for a non-time-critical removal action for metals contaminated soil at the Camp Allen Salvage Yard (CASY) located at the Naval Station Norfolk in Norfolk, VA. Studies conducted on the site include: a Preliminary Assessment/ Site Inspection (PA/SI) (Baker, 1993), a Remedial Investigation (RI) (Baker, 1996), a metals "hot spot" study (Baker, 2001a), and a contamination characterization investigation by OHM/IT Corporation (OHM/IT, 2001). The results of these investigations identified metals and Polychlorinated Biphenol (PCB) contamination in the surface and subsurface soils. This EE/CA addresses the remediation of the metals-contaminated soil. The Navy intends to prepare and execute a PRAP and ROD, which will include the final remedy for soils at the CASY.

The Navy identified the need for a non-time-critical removal action at the CASY following the completion of supplemental soil sampling conducted in the summer of 2001. This data demonstrated more extensive contamination at the CASY than was indicated by previous sampling events. The Navy plans to initiate this removal action to minimize potential exposures to this contamination in a rapid, effective, and readily implementable manner. The Naval Station Norfolk Partnering Group agreed to the cleanup levels for the removal action in October 2001. The cleanup goals were set at 73 parts per million (ppm) for antimony, 58 ppm for arsenic, 55,000 ppm for iron, and 400 ppm for lead. The goals are based on the results of a focused risk assessment on surface and subsurface soils, taking into account the reasonable anticipated future use of the site. Previous investigations indicated a volume of approximately 4,800 cubic yards of surface soil and subsurface soil above the metals remediation goals. The more recent investigation indicated a volume of approximately 29,000 cubic yards that requires remedial action.

Remedial action alternatives evaluated included: institutional controls, excavation and off-site disposal, on-site containment, and in-situ soil stabilization.

Each of the selected alternatives was evaluated based on effectiveness, implementability, and cost. The Navy recommends that Alternative 2, On-Site Containment, be implemented for a non-time critical removal action at the CASY.

## 1.0 INTRODUCTION

This report presents the Engineering Evaluation/Cost Analysis (EE/CA) of removal action options for the Camp Allen Salvage Yard (CASYS), Naval Station Norfolk, Norfolk, Virginia. Baker Environmental, Inc. (Baker) has prepared this EE/CA under contract to the Atlantic Division Naval Facilities Command (LANTDIV). The development of this EE/CA is based on a Scope of Work/Schedule Modification Request for Contract Task Order (CTO) 0353, under LANTDIV CLEAN Contract N62470-89-D-4814.

This EE/CA has been conducted in accordance with the removal program requirements defined by the Comprehensive Environmental Response, Compensation and Liability Act of 1990 (CERCLA), the Superfund Amendments and Reauthorization Act of 1986 (SARA), the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), and the U.S. Environmental Protection Agency's (USEPA) Guidance on Conducting Non-Time Critical Removal Actions Under CERCLA dated August 1993.

The Department of the Navy (DoN) has broad authority under CERCLA Section 104 and Executive Order 12580 to carry out removal actions when the release is on, or the sole source of the release is from, the DoN installation. The Navy/Marine Corps Installation Restoration (IR) Program was initiated to identify, assess, characterize, and clean up or control contamination from past hazardous waste disposal operation and hazardous material spills at Navy and Marine Corps Activities.

This EE/CA follows the guidelines published in the Navy/Marine Corps IR Manual dated February 1997 (NFESC, 1997). This document addresses a non-time-critical removal action for soil contaminated with metals from former operations at the CASYS.

A non-time-critical removal action is an analysis of removal alternatives for a site where action may be delayed for six months or more before cleanup is initiated. Potential remediation alternatives are evaluated for effectiveness in minimizing or stabilizing the threat to public health, consistency with anticipated final remedial actions, consistency with applicable or relevant and appropriate requirements (ARARs), and cost effectiveness. Non-time-critical removal actions may be interim or final action, they may be the first and only action at a site, or one of a series of

planned response actions. The NCP recognizes many appropriate removal action options, including site control measures, stabilization, drainage controls, capping, excavation, treatment, and disposal (40 CFR 300.415(e)). The scope of the non-time-critical removal action will address contaminated soils at the CASY only and will be determined in this EE/CA. This EE/CA is based on data presented in the following documents: a Preliminary Assessment/Site Inspection (PA/SI) conducted by Baker in 1993, a Remedial Investigation (RI) conducted by Baker in 1996, a metals "Hot Spot" study conducted by Baker in 2001, and a contamination characterization investigation conducted by OHM/IT Corporation in 2001.

The Navy identified the need for a non-time-critical removal action at the CASY following additional soil sampling conducted in the summer of 2001. This data demonstrated more extensive contamination at the CASY than was indicated by previous sampling events. Previous investigations indicated a volume of approximately 4,800 cubic yards of surface soil and subsurface soil above the remediation goals. The more recent investigation indicated a volume of approximately 29,000 cubic yards that requires remedial action. The Navy initiated this action in order to minimize potential exposures to this contamination in a rapid, effective, and readily implementable manner. The site-specific cleanup goals for this non-time-critical removal action were developed through a toxicological evaluation performed by Baker, were reviewed and approved by the Virginia Department of Environmental Quality's (VDEQ), and were agreed to by the Naval Station Norfolk Partnering Team, which includes representatives from the Navy, VDEQ, and USEPA.

The following sections are included in this EE/CA report:

- Section 1.0 - Introduction
- Section 2.0 - Site Characterization
- Section 3.0 - Streamlined Risk Evaluation
- Section 4.0 - Identification of Removal Action Objectives
- Section 5.0 - Identification of Removal Action Alternatives
- Section 6.0 - Analysis of Removal Action Alternatives
- Section 7.0 - Comparative Analysis
- Section 8.0 - Proposed Removal Action
- Section 9.0 - References

## **2.0 SITE CHARACTERIZATION**

The following section describes CASY's features and history. This section also discusses previous site investigations, the current site investigation, and the detected contaminants that necessitated the preparation of this EE/CA.

### **2.1 Site Description**

The CASY facility is located in the Naval Station Norfolk, south of Naval Air Station (NAS) Norfolk and Interstate 564, in an area known as Camp Allen. A location map is shown on Figure 2-1. The CASY consists of approximately 22 acres of level ground surrounded by chain-link and barbed-wire fencing. Facilities surrounding the CASY include the Naval Brig, heliport, Camp Allen Landfill (CAL) (areas A and B), the U.S. Marine Corps Camp Elmore, Norfolk Crossing military housing, the Camp Allen Elementary School, and a civilian community (Glenwood Park). The CASY lies between Areas A and B of the CAL (which was previously investigated under the IR Program). In the future the Navy plans to use the CASY as a recreational area. Figure 2-2 shows the boundary of the site and surrounding area.

### **2.2 Site Background**

The following paragraphs describe the setting and history of the CASY, and review the previous and current investigations conducted at the site.

#### **2.2.1 Setting**

##### **2.2.1.1 Climate**

The CASY is in the Tidewater area of Virginia, which is a low-lying peninsula in the Atlantic Coastal Plain Physiographic Province. The climate is classified as oceanic with typically mild winters and long, warm summers with high humidity. Precipitation averages 44 inches per year, with the heaviest precipitation occurring during July and August.

#### **2.2.1.2 Soil**

The soil at the CASY is classified as Urban Land-Udorthents. This soil consists of graded, cut, filled, or otherwise disturbed by construction and earth moving activities. This soil complex has an urban setting and occupies gentle slopes and areas of moderately well and poorly drained Udorthents soil.

#### **2.2.1.3 Surface Drainage**

The CASY is underlain by storm sewers and culverts that collect surface water through a series of catch basins. Water flows to the west from the pond at CAL Area B, through a culvert under the northern portion of the CASY where it intercepts the Bousch Creek drainage ditch.

#### **2.2.1.4 Geology**

Drilling was conducted at the CASY during the PA/SI (to four feet below ground surface [bgs]) and during the RI (to 20 feet bgs). Additional geological information has been obtained from borings conducted under the CAL investigation. Generally, the site is underlain by four strata: 1) fill materials from 0 to 18 feet bgs, 2) silt and sands from 0 or 18 feet to 27 feet or deeper bgs, 3) a confining clay layer (which may be scoured or breached in the vicinity of Camp Allen by historic Bousch Creek) ranging from 0 to 40 feet bgs, and 4) a silt/sand/shell hash unit ranging from 40 to 130 feet bgs.

#### **2.2.1.5 Hydrogeology**

The principle aquifers under the CASY are the unconfined water table aquifer (the Columbia Group) and the Yorktown aquifer. The water table aquifer consists primarily of silts and fine sands from the surface to approximately 25 to 30 feet bgs. Groundwater flow mirrors the surface topography of the area flowing to the north/northwest to the northern drainage area.

The Yorktown aquifer occurs at a depth of approximately 40 feet and is approximately 90 to 100 feet thick in the vicinity of the site. This aquifer consists of silt, fine to medium to coarse-grained sand, and shell fragments. Groundwater flow is toward the north/northeast.

#### **2.2.1.6 Groundwater**

The quality of water in the water table aquifer has been affected by the surrounding land use and the tidal impacts. Regionally, the water table aquifer exhibits low amounts of dissolved solids. Chlorides are generally low but can be high adjacent to tidal waters. Hardness ranges from hard to moderately hard. The water table aquifer typically shows low pH values and high iron contents. Generally, the water table aquifer is not suitable for domestic use, but can be used for lawn watering and other similar uses. The City of Norfolk prohibits the use of the water table aquifer as a potable water source.

#### **2.2.1.7 Natural Resources**

Historically, the CASY area was covered with stands of hardwoods and vast areas of tidal marsh. Filling operations conducted by the Navy during development of the base has greatly altered the original terrain. The CASY was formerly an active salvage yard for over 50 years and provides limited habitat for wildlife. No major ecological features have been associated with the CASY.

#### **2.2.2 History**

The CASY was dedicated to the salvaging and disposal of scrap materials generated by the Navy in the Tidewater area. The Navy managed the facility from 1940 until 1972. The Defense Reutilization and Marketing Services (DRMS) managed the CASY From 1972 until 1995. Salvage operations were discontinued in 1995. The CASY contained buildings and areas where distinct salvage operations were conducted. After salvaging operations stopped, the following structures were removed: two railroad spurs for loading and unloading scrap; a bailer/smelter/incinerator formerly located in Building CA220; Building CA193 that was used for general and transformer storage; Building CA194 (site of a 1989 PCB spill); Buildings CA195, CA205, CA212, and CA220; a drum storage area located parallel to Ingersoll Street; a drum accumulation area in the northern portion of the site; an all white goods stockpile; and a general scrap stockpile.

### 2.2.3 Previous Investigations

In April of 1982, an Initial Assessment Study (IAS) was conducted at the Naval Station. The IAS identified 18 sites of concern with regard to potential contamination. CASY (Site 22) was included as a potential area of concern. Baker performed a Preliminary Assessment/Site Inspection (PA/SI) at the CASY in January 1993 (Baker, 1993). The purpose of the PA/SI was to define the nature, extent, and concentrations of soil contamination within the Salvage Yard and to assess possible health risks to facility workers. No other media were sampled or evaluated. The PA/SI field program involved the collection and analyses of 20 surface (0 to 2 ft bgs) and 20 subsurface (2 to 4 ft bgs) samples, and concrete chip samples. The PA/SI concluded that subsurface soil had been adversely impacted by past facility operations and waste handling practices. Based on the results of the PA/SI, Site 22 was added to the list of sites of concern at the Naval Station.

A Remedial Investigation (RI) that characterized past disposal activities was performed in 1993 and 1994 at the Camp Allen Landfill (CAL) Areas A and B (Baker, 1994a). The RI investigation detected volatile organic compounds (VOCs) in both the soils and groundwater and indicated that the CASY may have contributed to the groundwater contamination detected at the landfill. Based on the results of the RI, the Navy completed a Feasibility Study (FS; Baker, 1994b) and Decision Document (Baker, 1995) that addressed the cleanup of contaminated soil and groundwater at CAL Areas A and B, which adjoin Site 22. Based on the results of the CAL RI/FS, the Navy completed a soil and debris removal action at CAL Area B in January 1995. Approximately 11,500 tons of contaminated soil and debris were removed from CAL Area B. In July 1997, a groundwater remediation system was placed in operation. This system collects and treats VOCs and metal contaminants in the groundwater underlying the CAL Areas A and B, and the Camp Allen Salvage Yard.

A RI was conducted for the CASY during the summer of 1996 (Baker, 1999). Data gathered from the RI was used to identify the types, quantities, and locations of contaminants at the site. The RI indicated that semivolatile organic compounds (SVOCs), pesticides, PCBs, and metals have impacted the surface and subsurface soils. Human health risks were identified from PCBs, antimony, arsenic, lead, and iron. PCB concentrations exceeding risk based screening values were found in both surface and subsurface soils, primarily in the southern half of the site.

In September 1997, the Navy performed an EE/CA addressing PCBs at CASY and issued a public notice of a proposed non-time-critical removal action (Baker, 1997). The intent of this action was to remove PCB contaminated soils from the site. A public information meeting was held and no additional comments were received. Beginning in August 1998, the Navy began a PCB removal action at the site. More than 2,700 cubic yards of PCB-contaminated soils were removed from the southern portion of the site.

In 2001, Baker conducted a metals contaminated soil investigation to further delineate and characterized the nature and extent of antimony, arsenic, iron, and lead contamination at the CASY. Six hot spot areas, a total of approximately 4,800 cubic yards of metals-contaminated soils, were identified (Baker, 2001a). As an interim measure, the Navy began removal of the hot spot soils in conjunction with the on-going PCB-removal action. As part of the confirmation sampling associated with the removal action, OHM/IT identified more extensive and widespread metals contamination throughout the CASY (OHM/IT, 2001a). Hot spot and PCB-contaminated soil removal continued through 2001; more than 16,000 cubic yards of soil have been removed from the site to date.

Figure 2-3 shows the sampling locations of PCB-contaminated areas, and metals "hot spots" identified during previous investigations at the CASY.

### **2.3 Source, Nature, and Extent of Contamination**

Soils contaminated with the metals antimony, arsenic, iron, and lead were found during each field investigation conducted at CASY. The contamination was the result of past disposal practices. Additional surface and subsurface soil analytical data collected by OHM/IT during the removal actions indicated that the areal extent of contamination was more widespread than previously estimated and that further remedial action would be required (OHM/IT, 2001b). Based on OHM/IT sampling data, an estimated 29,000 cubic yards of soil remain at the site exceeding cleanup goals. Figure 2-4 presents those soils identified by OHM/IT with metals concentrations exceeding the site cleanup goals as well as clean and remediated soils at the site.

## 2.4 Analytical Data

Previous investigations of the CASY soils have identified antimony, arsenic, iron, and lead in concentrations exceeding the cleanup goals. The following paragraphs discuss the analytical results of the most recent soil investigations.

### 2.4.1 Surface Soil

Surface soils (0 to 2 ft bgs) were sampled and analyzed during the PCB and "hot spot" removal actions performed in 2001. Over 650 surface soil samples were analyzed for iron and lead in the field using X-ray Fluorescence Spectrometer (XRF) technology. Three hundred and ten samples exhibiting lead and iron concentrations lower than the cleanup goals were verified analytically for each of the contaminants of concern (antimony, arsenic, iron, and lead). The range of metals concentrations detected in surface soils at the CASY is summarized in Table 2-1. Many of the samples exceeded the cleanup goals for both iron and lead together, though no other combinations of contaminants exceeding the cleanup goals were identified.

**TABLE 2-1**  
**RANGE OF SURFACE SOIL METALS CONCENTRATIONS**  
**CAMP ALLEN SALVAGE YARD**  
**NAVAL STATION NORFOLK, NORFOLK, VIRGINIA**

Contaminant	Cleanup Goal	Range of Positive Detections	Location of Maximum Detection*	Positive Detects Above Cleanup Goals
Antimony	73 ppm	1 - 26 ppm	Area 1	0
Arsenic	58 ppm	2 - 28 ppm	2SB20	0
Iron	55,000 ppm	4,780 - 156,780 ppm	Area 2	86
Lead	400 ppm	7 - 5,268 ppm	2SB16	309

\* See Figures 2-3 and 2-4

## 2.4.2 Subsurface Soil

Subsurface soils (2 to 4 ft bgs) were also sampled and analyzed during the PCB and hot spot removal actions in 2001. A total of 400 subsurface samples were analyzed for iron and lead. One hundred and ninety-five of these samples were verified analytically for antimony, arsenic, iron, and lead. The range of metals concentrations detected in subsurface soils at the CASY is summarized in Table 2-2. As in the surface soils, many of the samples exceeded the cleanup goals for both iron and lead together. No other combinations of contaminants exceeding the cleanup goals were identified.

**TABLE 2-2**  
**RANGE OF SUBSURFACE SOIL METALS CONCENTRATIONS**  
**CAMP ALLEN SALVAGE YARD**  
**NAVAL STATION NORFOLK, NORFOLK, VIRGINIA**

<b>Contaminant</b>	<b>Cleanup Goal</b>	<b>Range of Positive Detections</b>	<b>Location of Maximum Detection*</b>	<b>Positive Detects Above Cleanup Goals</b>
Antimony	73 ppm	1 - 137 ppm	Area 2	2
Arsenic	58 ppm	2 - 34 ppm	2SB10	0
Iron	55,000 ppm	3,210 - 98,740 ppm	Area 2	28
Lead	400 ppm	42 - 2,390 ppm	2SB10	134

\* See Figures 2-3 and 2-4

### **3.0 STREAMLINED RISK EVALUATION**

USEPA's guidance document on conducting non-time-critical removal actions (USEPA, 1993) requires that, as part of the EE/CA, a streamlined risk evaluation be performed. The goals of the streamlined risk evaluation are to: (1) identify contaminants of potential concern (COPCs) at the site, (2) identify potential current and future human exposures that should be prevented and (3) estimate potential human health risks associated with exposures to the COPCs if no remedial action is taken.

#### **3.1 Overview**

USEPA's guidance document recommends that a separate risk assessment is not required if a quantitative risk assessment (such as that performed in an RI) is available that "identifies pathways of concern and concentration of contaminants above standards." This type of quantitative risk assessment and documentation is available for the CASY in the RI (Baker, 1999) and in the Naval Station Norfolk Administrative Record. An update of this risk assessment was performed in 2000 and presented to the Naval Station Norfolk Partnering Team. The risk evaluation was performed following USEPA's Risk Assessment Guidance for Superfund (RAGS), Part A, Human Health Evaluation Manual (USEPA, 1989a). The streamlined risk assessment presented in this document represents a focused evaluation of the risks presented by CASY soils based on this revised risk assessment and the cleanup goals developed for soils in 2001. This streamlined evaluation takes into account the assessment already available for the site as well as the CASY's anticipated future land use.

#### **3.2 Summary of the Streamlined Risk Evaluation**

The revised RI risk assessment performed for the CASY examined potential risks to human health posed by the presence of chemical constituents detected in surface and subsurface soils, sediments, surface water, and groundwater following the 1996 sampling investigation. Although an ecological evaluation was not performed during the RI, the site can be characterized as highly disturbed. The storage and salvage activities as well as demolition activities have altered many of the habitats that may have existed previously when the area was part of the historic Bousch Creek drainage system. Historical contaminations of the Bousch Creek drainage system potentially

associated with the CASY will be addressed by the Navy in a separate investigation and will be remediated as necessary. This section only presents that portion of the revised RI risk assessment specifically addressing surface and subsurface soils in accordance with EPA's guidance recommending that the streamlined risk assessment use only those data specifically supporting the objectives of the non-time-critical removal action. This document does not address any potential groundwater or sediment contamination remaining at the site.

Surface and subsurface soil COPCs were identified previously in the CASY RI/FS and were based primarily on comparisons of maximum detected concentrations with USEPA Region III COPC screening values (USEPA, 1999) derived for industrial and residential soils. Antimony, arsenic, iron, and lead were identified as COPCs through this process and were validated as contaminants of concern (COCs) by agreement within the Naval Station Norfolk Partnering Team. Unacceptable human health risks were identified from exposures to surface and subsurface soils via ingestion and dermal contact for the following receptors: future adult construction/utility workers, future child recreational users, future adult groundskeepers, and future adult and child on-site residents.

Since the completion of the RI/FS, the anticipated future land use of the CASY has been identified. The CASY is projected to become a recreational area in the future; there are no plans for the development of the former CASY for residential land use. Therefore, based on this information, and following the guidance supporting streamlined risk assessments, the following potential human receptors and exposure pathways were focused and assessed in the risk evaluation for this EE/CA:

- Future Child (Ages 6-16 Years) Recreational Users
  - Accidental ingestion of surface soils
  - Dermal contact with surface soils
  - Inhalation of fugitive dusts emanating from surface soil
- Future Groundskeepers/ Maintenance Workers
  - Accidental ingestion of surface and subsurface soils
  - Dermal contact with surface soils and subsurface soils
  - Inhalation of fugitive dusts emanating from surface soil and excavated subsurface soils

- Future Construction Workers
  - Accidental ingestion of surface and subsurface soils
  - Dermal contact with surface soils and subsurface soils
  - Inhalation of fugitive dusts emanating from surface soil and excavated subsurface soils

Table 3-1 summarizes the combined total site risks identified from all exposures to surface and subsurface soils from the updated RI/FS risk assessment. Relative contributions to these total site risks by the four COCs are outlined in the table's notes section. Total carcinogenic (Incremental Lifetime Cancer Risk, ILCRs) and noncarcinogenic (Hazard Index, HIs) risks by area of concern were estimated for current and future receptors potentially exposed to surface and/or subsurface soil COPCs identified at the CASY site. All ILCRs and HIs were compared to USEPA's acceptable target risk range of  $1 \times 10^{-4}$  to  $1 \times 10^{-6}$ , and acceptable target HI value of 1.0, respectively. Exceedences of these criteria represent the potential for the occurrence of adverse health effects. The numerical risk results indicated that metals in surface and subsurface soils in the CASY were driving the site risks for the evaluated current and future receptors, should no remedial actions be undertaken. The Navy believes that based on these risk results, the removal of metals-contaminated soils from the CASY would be necessary, thereby establishing the need for an EE/CA.

### **3.3 Risk-Based Remediation Goals**

The results of this risk evaluation confirmed the need for such a non-time-critical removal action, thereby prompting the need for human health-protective, risk-based, metals soils remediation levels. These remediation levels were derived, using a multi-receptor approach, protective of the designated future land use of the CASY site as a recreation area. Therefore, remediation levels were calculated for the future child recreational user (protective of surface soil exposures), the future groundskeeper/ maintenance workers (protective of combined surface and subsurface soil exposures) and the future construction worker (protective of separate exposures to surface soil and subsurface soil, based on exposure frequency). Cleanup goals were developed for antimony, arsenic, and iron by calculating soil concentrations posing no risk to the most conservative, most sensitive receptor. Cleanup goals for lead were based on EPA's conservative residential action level for soils. As only iron and lead were found together in concentrations posing potential risks,

the cleanup goals were calculated based on individual, not cumulative effects. All exposure scenarios and associated assumptions were those applied during the risk evaluation, and agreed upon by the Partnering Team.

**TABLE 3-1**

**REVISED REMEDIAL INVESTIGATION SUMMARY OF TOTAL HUMAN  
HEALTH RISKS FROM SURFACE AND SUBSURFACE SOILS  
CAMP ALLEN SALVAGE YARD  
NAVAL STATION NORFOLK, NORFOLK, VIRGINIA**

Receptors	Total ILCR	Total HI
Future Adult Construction/Utility Workers <sup>(1)</sup>	1.2x10 <sup>-05</sup>	6.5
Future Young Child Recreational Users <sup>(2)</sup>	5.4 x10 <sup>-06</sup>	0.6
Future Adult Groundskeepers <sup>(3)</sup>	1.2x10 <sup>-04</sup>	2.4

Notes:

- ILCR = Incremental Lifetime Cancer Risks
  - HI = Noncancer Hazard Index
  - Shading indicates a risk level within or greater than USEPA acceptable action range of 1x10<sup>-04</sup> to 1x10<sup>-06</sup> (ILCR) or 1.0 (HI)
- <sup>(1)</sup> Arsenic contributed 29% of the ILCR risk (1.2x10<sup>-05</sup>) due to accidental ingestion and dermal exposures. Antimony contributed 8.9%, arsenic 11.6%, and iron 35.9% of the total HI value of 6.5 due to accidental ingestion and dermal exposures.
- <sup>(2)</sup> Arsenic contributed 67% of the ILCR risk (5.4x10<sup>-06</sup>) due to accidental ingestion and dermal exposures. Antimony contributed 7.0%, arsenic 15.8%, and iron 15.8% of the total HI value of 0.6 due to accidental ingestion and dermal exposures.
- <sup>(3)</sup> Arsenic contributed 42% of the ILCR risk (1.2x10<sup>-04</sup>) due to accidental ingestion and dermal exposures. Antimony contributed 8.8%, arsenic 12.8%, and iron 36.8% of the total HI value of 2.4 due to accidental ingestion and dermal exposures.

The Navy, USEPA Region III, and VDEQ agreed upon the cleanup goals of 73 ppm for antimony, 58 ppm for arsenic, 55,000 ppm for iron, and 400 ppm for lead for CASY soils during a conference call on November 14, 2001. Table 3-2 presents the resulting remediation levels estimated for all receptors of concern. A detailed explanation of the rationale behind the development of these goals can be found in The Camp Allen Salvage Yard Proposal to Revise Preliminary Remediation Goals (Baker, 2001b), which is available in the Naval Station Norfolk Administrative Record.

**TABLE 3-2**  
**SUMMARY OF RISK-BASED SOIL REMEDIATION LEVELS**  
**CAMP ALLEN SALVAGE YARD**  
**NAVAL STATION NORFOLK, NORFOLK, VIRGINIA**

Contaminant	Cleanup Goal (ppm)	Justification
Antimony	73	• Provides an HI of 1.0 for child recreational user
Arsenic	58	• Provides an HI of 1.0 and an ILCR of $3.9 \times 10^{-5}$ for child recreational user
Iron	55,000	• Upper 95 % UCL Background concentration; • Provides an HI of 1.0 for child recreational user
Lead	400	• EPA Residential Action Level

### 3.4 Conclusion

A removal action is warranted at the CASY under the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The following factors, which the NCP considers appropriate for consideration in removal actions, exist at the CASY:

- Actual or potential exposures to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants (40 CFR 300.415 (b)(2)(i));
- High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface, that may migrate (40 CFR 300.415 (b)(2)(iv)) and;
- Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released (40 CFR 300.415 (b)(2)(v)).

Based on the concentration, the frequency of detection, and the risk characterization results, antimony, arsenic, iron, and lead in surface and subsurface soils appear to warrant further actions to prevent or lessen the potential impact to human health and the environment. In order to be protective of human health and the environment, these contaminants should be remediated to levels within the risk based remediation goals presented in Table 3-2, which will achieve regulatory requirements for cleanup under 40 CFR 300.430 (e)(2)(i)(A)(2).

#### **4.0 IDENTIFICATION OF REMOVAL ACTION OBJECTIVES**

Previous and current investigations have identified widespread metals contamination in CASY soils. Therefore, the objective of the removal action for this site is to minimize the potential risks to public health and the environment associated with metals contaminated soil. This removal action will minimize potential exposures to metals contamination. Decisions regarding the implementation of any land-use controls associated with this removal action will be addressed in subsequent actions and documentation. Sediment and groundwater contamination that may require remediation as part of the complete response action for this site will additionally be addressed in future documents.

#### **4.1 Statutory Limits on Removal Actions**

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) 40 CFR Part 300.415 dictate statutory limits of \$2 million and 12 months on USEPA fund-financed removal actions, with statutory exemptions for emergencies and actions consistent with the remedial action to be taken. This removal action will not be EPA fund-financed. The Management Guidance for the Defense Environmental Restoration Program (DERP) (ODUSD (I&E), Sept 2001) recommends that "all response alternatives must meet the threshold requirement of protectiveness of human health and the environment". A time limit is not specified. The Navy/Marine Corps IR Manual does not limit the cost or duration of the removal action; however, cost effectiveness is a recommended criterion for evaluation of the removal action alternatives.

#### **4.2 Removal Action Scope**

The scope of the removal action to be initiated at the CASY includes the remediation of all metals-contaminated soil with concentrations in excess of the selected risk-based concentrations which are 73 ppm for antimony, 58 ppm for arsenic, 55,000 ppm for iron, and 400 ppm for lead. This removal action will be designed to ensure that exposures from surface and subsurface soils contaminated with metals above the action levels are addressed. The estimated quantity of soil from 0-4 feet bgs above action levels is 29,000 cubic yards.

The NCP recognizes capping or covering of contaminated soils as an appropriate removal alternative for consideration under non-time-critical removal actions (40 CFR 300.415(e)(4)). Therefore, in this document, Alternative 2, "On-Site Containment," will be referred to as a "removal action," which is consistent with the NCP.

#### **4.3 Removal Action Schedule**

Upon finalization, the EE/CA will be placed in the Administrative Record. A public notice will be published, along with a brief summary of the site, to notify the public that this document is available for review. The EE/CA is then subject to a 30-day public comment period. Following the public comment period, an Action Memorandum describing the proposed removal action will be issued along with an attached responsiveness summary that contains the Navy's response to any comments that were received on the EE/CA. The Action Memorandum will substantiate the need for the removal action, identify the proposed action, and explain the rationale for the selected removal action.

The scheduled objective for the Removal Action is to complete the action within 12 months of the approved and signed Action Memorandum. The start date will be determined by completion and review times necessary to prepare the final EE/CA and the final Action Memorandum.

The schedule will follow this general outline:

- Preparation of design following the approval of the Action Memorandum - 1 to 2 months
- Preparation of Removal Action Contractor (RAC) workplans - 2 months
- Mobilization - 1 month
- Removal Action - 4 months

#### **4.4 Applicable or Relevant and Appropriate Requirements (ARARs)**

##### **4.4.1 Chemical-Specific ARARs**

- Site Specific Cleanup Goals for Soil - The Naval Station Norfolk Partnering Team has agreed upon the risk-based cleanup levels provided below.

<b>Chemical of Concern</b>	<b>Cleanup Goal (ppm)</b>
Antimony	73
Arsenic	58
Iron	55,000
Lead	400

- Identification and Listing of Hazardous Waste Under RCRA (40 CFR 261) - The criteria for identifying the characteristics of hazardous waste and for listed hazardous wastes are provided in 40 CFR Part 261. Any wastes found to be RCRA hazardous wastes will be stored, treated and/or disposed according to the applicable regulations.
- Federal Ambient Water Quality Criteria (33 USC 1314(a) and 42 USC 9621(d)(92)) - The objective of the Federal Ambient Water Quality Criteria is to restore and maintain the chemical, physical, and biological integrity of the nation's waters. This EE/CA and the proposed removal action do not include the remediation of any surface water; therefore, no surface water criteria will be required. The RAC should take all measures necessary to protect surface water from degradation during the removal action.
- Virginia Water Quality Standards (9 VAC 25-260-5 to 540) - The Virginia Surface Water Standards are those standards set by the Commonwealth of Virginia similar to those standards given by the Clean Water Act. As stated previously, this EE/CA does not include the remediation of surface water. Necessary precautions will be taken to prevent surface water degradation during the removal action.
- Virginia Ambient Air Quality Standards (9 VAC 5-30-10 to 80) - Provides for the control of sources emitting toxic air pollutants into the atmosphere, it requires best available control technology for toxics, emissions quantification, and human health and safety protection demonstration. Based on these regulations, air at and around the CASY will be monitored to ensure compliance with these standards during the remediation process.
- Virginia Hazardous Waste Management Regulations (9 VAC 20-60) - The criteria for identifying the characteristics of hazardous waste and for listed hazardous wastes are provided in these regulations. Any wastes found to be RCRA hazardous wastes will be stored, treated and/or disposed according to the applicable regulations.

- National Ambient Air Quality Standards (40 CFR 50-The Clean Air Act) - The Clean Air Act gives the criteria and requirements for ambient air quality monitoring and the requirements for reporting ambient air quality data and information. Based on these regulations, air at and around the CASY will be monitored to ensure compliance with these standards. The Virginia Department of Environmental Quality implements the National Ambient Air Quality Standards through the Virginia Air Pollution Control Regulations.

#### **4.4.2 Location-Specific ARARs**

- Fish and Wildlife Coordination Act (16 USC 661, et. seq.) - The Fish and Wildlife Coordination Act requires action to protect fish and wildlife from actions modifying streams or areas affecting streams. At this time, there are no plans to disturb or modify any streams in the area.
- Endangered Species Act (16 USC 153; Code of Virginia Sections 29.1-563 through 568, 4 VAC 15-20-130 to 140) - The Endangered Species Act requires action to avoid jeopardizing the continued existence of listed endangered or threatened species or modifications to their habitat. The United States Department of the Interior has been contacted and it has been determined that the Peregrine Falcon, a federally endangered species, has been observed regularly at the site. The appropriate state agencies will be contacted by the Virginia Department of Environmental Quality to determine if there are any other threatened or endangered species in the area and how this act will affect the removal action.
- Coastal Zone Management Act (Section 307(c) of 16 USC 1456(c); 15 CFR 930 and 923.45) - The Coastal Zone Management Act requires activities impacting land or water uses in a coastal zone to certify noninterference with coastal zone management. It has been determined that the site lies within the Virginia coastal zone. The Virginia Coastal Zone Management Office will be contacted by the Virginia Department of Environmental Quality to determine what, if any, effect the removal action will have on the Virginia coastal zone, and what actions will have to be taken to be in compliance with this act.

- National Historic Preservation Act (16 USC 469, 36 CFR 469; Code of Virginia 10.1-2200 et seq., 10.1-2300 et seq.) - It is believed that there are no buildings listed on the National Register of Historic Places at the CASY. The Virginia Office of Historic Places has been contacted to obtain a list of Historic Places to determine and identify any historic landmarks/places in the general area of the site.
- Clean Water Act, Section 404 (40 CFR 230, 40 CFR 231) - Section 404 of the Clean Water Act regulates the discharge of dredged or fill material into certain waters (including wetlands). Dredge or fill material should not be discharged into an aquatic ecosystem unless it can be demonstrated that the discharge will not have an adverse impact on the ecosystem. There are no plans to discharge fill material from the removal action into the adjacent wetlands.
- Virginia Wetlands Act, Title 62.1 - This act states that it is public policy of the Commonwealth of Virginia to preserve the wetlands and prevent their despoliation and destruction and to accommodate necessary economic development in a manner consistent with wetlands preservation. This act sets standards that apply to the use and development of wetlands. The Army Corps of Engineers has inspected the site and has verified that the pond area is considered upland property and therefore not within wetlands jurisdiction. There are no other jurisdictional wetlands at the site; the ditch adjacent to the site is manmade.
- Executive Order 11998, Protection of Floodplains - Federal activities in floodplains must reduce the risk of flood loss, minimize the impact of floods on human safety, health, and welfare, and preserve the natural and beneficial values served by floodplains. Any activities associated with the removal action will comply with these requirements.
- Migratory Bird Treaty Act of 1972 (16 USC Section 703 ) - Protects almost all species of native birds in the U.S. from unregulated "taking" which can include poisoning at hazardous waste sites. Migratory birds have been seen near the CASY. The requirements of this regulation will be incorporated into the response action. The construction

sequence will be modified if any migratory birds species are identified in need of protection.

- Virginia Endangered Plant and Insect Species Act (Code of Virginia Sections 3.1-1020 to 1030) - Requires actions to conserve endangered or protected plant and insect species. The Virginia Department of Agriculture and Consumer Services will be notified of this project. The Navy will request a determination if the proposed activities will affect endangered plants or insects.
- Virginia Natural Areas Preservation Act (Code of Virginia Sections 10.1-209 through 217) - Requires actions to conserve natural preserve areas and restricts certain activities in these areas. The Virginia Department of Conservation and Recreation will be notified of this project. The Navy will request a determination if the proposed activities will threaten natural heritage resources.

#### **4.4.3 Action-Specific ARARs**

- RCRA Land Disposal Restrictions (40 CFR 268) - 40 CFR Part 268 identifies those RCRA hazardous wastes that are restricted from land disposal. RCRA hazardous wastes are not anticipated. Waste that is land-disposal-restricted will be shipped off site for disposal with the proper labels, manifests, and notification forms indicating that the waste is land-disposal-restricted.
- OSHA (29 CFR 1910, 1926, 1940) - These regulations provide occupational safety and health requirements applicable to workers engaged in on site field activities, including construction and operation of remedial activities. All workers will be made aware of the regulations. The Site Health and Safety Officer will enforce the regulations during all remedial activities.
- DOT Rules for Hazardous Materials Transport (49 CFR 107, 171.1 - 172.558) - Wastes from the remedial activities will be classified for transportation based on the chemicals present in the material. Shipping papers (including hazardous waste manifests) will be prepared that describe the hazardous material offered for transportation and will include

the contents, shipper's name, proper shipping name, hazard class, identification number, total quantity, and certification that the material is presented according to DOT regulations.

- Virginia Solid Waste Regulations (9 VAC 20-80) - The purpose of these regulations is to establish standards and procedures pertaining to the construction, operation, maintenance, closure and post-closure of solid waste management facilities in the Commonwealth of Virginia in order to protect the public health, public safety, the environment, and natural resources. All Virginia Solid Waste Regulations will be strictly adhered to during disposal of uncontaminated rubble from the CASY.
- Virginia Hazardous Waste Management Regulations (9 VAC 20-60) - Because Virginia administers an authorized State RCRA program, the Virginia Hazardous Waste Management Regulations (VHWMR) may serve as the governing ARAR in place of the RCRA regulations contained in the 40 CFR Parts, except for the Land Disposal Restrictions of 40 CFR Part 268. Although hazardous wastes are not anticipated, on-site activity will be conducted in accordance with the regulations in order to provide additional environmental and worker protection during the removal action. Any wastes found to be RCRA hazardous wastes will be stored, treated and/or disposed according to the applicable regulations.
- Virginia Stormwater Management Act, Section 10.1 - 603.1 et seq.; Virginia Stormwater Management Regulations (4 VAC 3-20-10 to 251), the Virginia Erosion and Sediment Control Law, Code of Virginia Sections 10.1 - 560 et seq., the Virginia Erosion and Sediment Control Regulations (4 VAC 50-30-10-110), and local stormwater management and sediment and erosion control programs administered by the City. Design plans concerning land disturbing activities will be submitted by the Virginia Department of Environmental Quality - Waste Division to the locality for review before any land disturbing activity.
- Criteria for Classification of Solid Waste Disposal Facilities and Practices, Solid Waste Disposal (40 CFR 257.3-4) – This regulation requires that a facility or practice shall not cause nonpoint source pollution of waters of the U.S. that violates applicable legal

substantive requirements or statewide water quality management plans. The response action may include the disposal of wastes in a solid waste disposal facility. Substantive requirements would be applicable to an onsite disposal facility for nonhazardous wastes.

#### 4.5 Disposal Requirements

In order to identify appropriate technologies for the removal action alternatives, it is necessary to classify material encountered for this removal action into one of three waste categories:

- (1) recyclable or recoverable materials
- (2) wastes restricted from land disposal under RCRA
- (3) all CERCLA wastes not otherwise restricted, and all RCRA wastes not included in Categories 1 and 2.

Category 1 wastes encountered during the removal action, including some scrap and debris that can be decontaminated, will generally be recycled. Non-recyclable debris will be decontaminated and disposed of as a Category 3 waste. Category 2 wastes will require a treatment other than land disposal or some type of pre-treatment prior to land disposal. If the proposed removal action entails off-site disposal of Category 3 materials, the following action-specific ARARs are applicable:

1. Excavation/Off-Site Disposal of Soils is regulated under Virginia Waste Management Act, Code of Virginia Sections 10.1-1400 et seq.; VHWMR (9 VAC 20-60-124 to 1505); Virginia Solid Waste Management Regulations (VSWMR) (9 VAC 20-80), as well as the Resource Conservation and Recovery Act (RCRA) 42 U.S.C. 6901, and the applicable regulations contained in Title 40 of the Code of Federal Regulations; and the U. S. Department of Transportation Rules for Transportation of Hazardous Materials, 49 CFR Parts 107, 171.1-172.558.
  - a. If the removal response contemplated involves storage, treatment or disposal of a VHWMR/RCRA hazardous waste, various VHWMR/RCRA requirements may need to be complied with as specified in VHWMR and/or the applicable 40 CFR Parts. Because Virginia administers an authorized

state RCRA program, the VHWMR will serve as the governing ARAR in place of the RCRA regulations contained in the 40 CFR Parts, except for the Land Disposal Restrictions of 40 CFR Part 268.

- b. The transportation of hazardous waste must be conducted in compliance with VHWMR (9 VAC 20-110-10 to 130), Regulations Governing the Transportation of Hazardous Materials, and 49 CFR Parts 107. 171.1-172.558.
  
- c. The deposits of any soil, debris, sludge or any other solid waste from a site must be done in compliance with VSWMR (9 VAC 20-80-260 to 270). Contaminated material from the site that is not classified as hazardous may be classified as a special waste under Part VIII of VSWMR. Specific authorization from Virginia Department of Environmental Quality is required before a landfill operator in Virginia can accept special wastes.

## **5.0 IDENTIFICATION OF REMOVAL ACTION ALTERNATIVES**

The following section presents a discussion of potential removal action technologies for the CASY. Current EE/CA guidance does not require initial screening of alternatives, but a brief evaluation of a focused list of potential technologies is presented to provide a cost-effective evaluation of the remediation alternatives.

The "No Action" alternative that is typically evaluated as part of a Feasibility Study (FS) does not meet the objectives of the removal action for the CASY. Therefore, in accordance with current EE/CA guidance, the "No Action" alternative will not be evaluated. The general response actions that are applicable to the metals-contaminated soil are discussed in the following paragraphs.

### **5.1 Institutional Controls**

Institutional controls, which are non-engineering solutions to prevent public access to the site or contaminated media, may be considered when identifying removal action alternatives. These controls may include deed restrictions, easements, purchases of land, and access restrictions. They may also include periodic monitoring and analysis of soils, sediment, surface water, or groundwater to determine, when or if, a remedial action may be required to protect public health or the environment.

The objective of the removal action for this site has been identified as the elimination of risk associated with metals-contaminated soils. Institutional controls such as groundwater usage restrictions currently exist at the CASY. For further protection of human health and the environment, the Navy and regulatory agencies have determined that the metals-contaminated soil must be addressed beyond these measures. For the purposes of this removal action, institutional controls do not meet the stated objective and will not be retained for further evaluation as a removal action alternative.

## **5.2 Excavation and Off-Site Disposal**

This alternative involves the removal and off-site disposal of all soils (approximately 29,000 cubic yards) exceeding the cleanup goals. This volume includes removal beyond the previously identified "hot spot" areas and focuses on those contaminated soils identified by OHM/IT in the summer of 2001. Excavation activities would involve the physical removal of contaminated soil by using conventional heavy construction equipment such as backhoes, bulldozers, and loaders. Metals-contaminated soils would be stabilized to prevent leaching and then disposed of at an appropriate landfill. Any wastes found to be RCRA hazardous wastes would be stored, treated and/or disposed according to the applicable regulations. The excavated areas would then be backfilled with clean soil, graded, and landscaped. All necessary soil characterization and confirmation sampling would additionally be performed.

## **5.3 On-Site Containment**

The NCP recognizes capping of contaminated soils as an appropriate removal alternative for consideration under non-time-critical removal actions (40 CFR 300.415(e)(4)). Under this containment response, the threat to public health would be removed using soil coverage and surface controls, which prevent direct exposure to and migration of contaminants. The cover would prevent direct contact with the contaminated soil, would help minimize surface water from infiltrating through the contaminated soil, and would be protective of human health and the environment. The containment option applicable to the CASY site includes coverage of the entire 22-acre site in the form of 8 inches of clean fill material underlying 4 inches of topsoil. Grading and landscaping would additionally be performed. As PCB-contaminated soils have already been addressed at the CASY and metals contamination is the only concern within the soils at the site, a soil cover remains compatible with future remedial actions at the CASY.

## **5.4 In-situ Soil Stabilization**

This alternative would involve the solidification and stabilization of all soils (approximately 29,000 cubic yards) exceeding the cleanup goals. This volume would include removal beyond the previously identified "hot spot" areas and focuses on those contaminated soils identified by OHM/IT in the summer of 2001. This process would include the mixing or injection of a

hardening agent (e.g., cement) into the soil to “fix” the inorganic contaminants, effectively reducing their mobility. Introduction of the binding agent would involve spreading and mixing of hardening agents by conventional earth-moving equipment such as draglines, backhoes, and clamshell buckets. Stabilization of the soil would prevent surface water from infiltrating through the contaminated soil, but would not reduce the toxicity or volume of the soil remaining at the site.

## 5.5 Summary

A summary of the identification and screening of the general response actions for the CASY is presented in Table 5-1. Based upon the evaluation conducted in this section, the following response actions were retained for further consideration:

- Excavation and Off-Site Disposal
- On-Site Containment
- In-situ Soil Stabilization

**TABLE 5-1**

**PRELIMINARY SCREENING OF REMOVAL ALTERNATIVES  
CAMP ALLEN SALVAGE YARD  
NAVAL STATION NORFOLK, NORFOLK, VIRGINIA**

<b>Response Action</b>	<b>Technology</b>	<b>Screening Comment</b>
No Action	None	Not retained. Does not meet action objectives.
Institutional Controls	Access Restrictions Monitoring Deed Restrictions	Not retained. Does not meet action objectives.
Excavation and Off-Site Disposal	Virginia licensed industrial or special waste landfill	Retained
On-Site Containment	Earth-moving equipment	Retained
In-situ Soil Stabilization	Earth-moving equipment	Retained

## **6.0 ANALYSIS OF REMOVAL ACTION ALTERNATIVES**

This section provides a detailed analysis of the general response actions retained from Section 5.0. This analysis provides information to compare the alternatives, select an appropriate removal action for the site, and demonstrate that the CERCLA removal selection requirements to be specified in the Action Memorandum have been met. Each alternative was evaluated individually based on the following criteria listed in the EPA guidance:

- Effectiveness
  - Protectiveness
  - Use of land disposal alternatives
- Implementability
  - Technical Feasibility
  - Availability
  - Administrative Feasibility
- Cost
  - Capital Cost
  - Operation and Maintenance Cost
  - Other Cost

Paralleling the EPA guidance, the DERP Guidance (ODUSD (I&E), Sept 2001) and the Navy/Marine Corps IR Manual recommend that criteria for evaluating removal alternatives include effectiveness to minimize the threat to public health, consistency with anticipated final remedial action, consistency with ARARs, and cost effectiveness. These three guidance documents formed the basis for this evaluation. Total net present worth costs were based on an annual 5% interest rate.

### **6.1 Alternative 1 - Excavation and Off-Site Disposal**

#### **6.1.1 Description of Alternative**

This alternative includes the excavation of all soils from 0 to 4 feet bgs with metals concentrations over the cleanup goals of 73 ppm for antimony, 58 ppm for arsenic, 55,000 ppm

for iron, and 400 ppm for lead. These areas, as delineated by the OHM/IT soil confirmation sampling, are shown on Figure 6-1. The excavated soil is estimated to be 29,000 cubic yards. The soil would be stabilized, loaded into trucks, and hauled by a licensed hauler to a landfill permitted to accept special waste. All equipment would be decontaminated prior to leaving the site. Any debris encountered during excavation activities would be decontaminated and recycled or disposed.

Confirmation sampling would be conducted along the perimeter and bottom of each excavation using XRF field meters and analytical laboratories to verify that all metals-contaminated soil above remediation goals had been excavated. Following confirmation sampling, the excavated areas would be backfilled with certified clean soil. The excavated areas would be graded to the approximate original contours and vegetated. The existing and temporary fencing would be used to limit access to the site during the remediation process. However, fencing of the site would not be required following this action.

### **6.1.2 Effectiveness**

#### Protectiveness

Excavation activities would pose a short-term exposure to construction workers from inhalation of dust. The potential impacts could be reduced by implementation of a site-specific health and safety plan and by using dust control techniques during the excavation.

Removal of the metals-contaminated soil would permanently reduce the possible threat to human health and the environment by eliminating the potential for direct contact with contaminated soil, surface runoff, and groundwater seepage. An immediate reduction in the contaminant levels potentially migrating from the source area would be anticipated.

#### Use of Alternatives to Land Disposal

If landfilling is selected as the remedial alternative, the off-site disposal alternative would not meet the NCP preference of treatment over land disposal.

### **6.1.3 Implementability**

#### Technical Feasibility and Availability

The implementation of the excavation and off-site disposal alternative would include the use of standard earth moving and hauling equipment. Excavation and material handling are common construction activities. Excavation would be most readily implemented for shallow soil contamination, which is easily accessible. Excavated soils might require screening, shredding, and/or crushing in order to remove any debris prior to treatment and/or disposal.

Conventional erosion and sediment controls would be maintained during the removal activities. Site access is readily available. Because the site is level and partially paved, no temporary roads would be required for machinery access. Transportation loads would require manifests prepared by licensed waste haulers.

#### Administrative Feasibility

The source of metals contamination would be removed from the site. Therefore, it is likely that the public would accept this alternative. All public comments would be addressed during the public comment period to assure public acceptance.

### **6.1.4 Cost**

The total estimated present worth cost of implementation of this alternative is approximately \$3,100,000. Table 6-1 presents the costs used in preparing this estimate and the assumptions that were made.

**TABLE 6-1  
COST ESTIMATE: ALTERNATIVE 1 - EXCAVATION AND OFF-SITE LANDFILL DISPOSAL  
CAMP ALLEN SALVAGE YARD, NAVAL STATION NORFOLK, NORFOLK, VIRGINIA**

Cost Component	Unit	Quantity	Unit Cost	Subtotal Cost	Total Cost	Source	Basis/Comments
<b>DIRECT CAPITAL COSTS</b>							
General							
Pre-Construction	LS	1	10,000	10,000		Engr. Est.	Work, E&S, H&S, & QC Plans; Permits; Shop Drawings Includes mob/demob for excavation equipment Record drawings, etc.
Mobilization/Demobilization	LS	1	5,000	5,000		Engr. Est.	
Post-Construction Submittals	LS	1	5,000	5,000		Engr. Est.	
General Subtotal					20,000		
Site Work							
Temporary Silt Fencing	LF	4,337	1	2,299		Means 2001, 02370-550-1000	Revegetation over all excavation area
Hydroseed and mulch	MSF	263	70	18,526		Means 2000, 02920-510-0200	
Haul Monkey Bottom Materials to Site	CY	29,200	12	357,116		RAC Contractor's Field Experience	
Surveyor	DY	22	600	13,200		Engineering Estimate	
Site Work Subtotal					391,140		
Soil Excavation							
Excavation/Disposal/Confirmatory Sampling	CY	29,200	50	1,459,886		RAC Contractor's Field Experience	use Monkey Bottom materials = \$0.0
Backfilling and Top Soil Over Excavation Areas	CY	29,200	17	485,305		RAC Contractor's Field Experience	
Soil Excavation/Backfill Subtotal					1,945,192		
<b>DIRECT CAPITAL COSTS - TOTAL</b>					<b>2,356,332</b>		
<b>INDIRECT CAPITAL COSTS</b>							
Engineering and Design	LS	1	117,817	117,817		Engineering Estimate	5% of Remediation Cost Assume 10% of Direct Cost 16 hrs @ \$50/hr 15% of Direct Cost
Remedial Action Contractor Fee	LS	1	235,633	235,633		Engineering Estimate	
Oversight Costs	WK	11	800	8,800		Engineering Estimate	
Contingency Allowance	LS	1	353,450	353,450		Engineering Estimate	
Subtotal					715,700		
<b>INDIRECT CAPITAL COSTS - TOTAL</b>					<b>715,700</b>		
<b>CAPITAL COSTS (DIRECT AND INDIRECT)</b>					<b>3,072,031</b>		
<b>ANNUAL OPERATION AND MAINTENANCE COSTS</b>							
Landscape Maintenance	MSF	963	1	1,107		Engr. Est.; Means Site Work, 1999, 029-730-4175	Assumes grass cut 4 times/year in Area B Includes progress reports etc.
Miscellaneous Expenses	Event	2	200	400		Engineering Estimate	
Subtotal					1,507		
<b>ANNUAL O&amp;M COSTS - 30 Years of Maintenance</b>					<b>1,507</b>		
<b>TOTAL NET PRESENT WORTH: Alternative 1 (interest rate=5%)</b>					<b>3,095,204</b>	By: PSV      Chk: DPJ	Date Completed: December 2001/Revised January 2002

## **6.2 Alternative 2 - On-Site Containment**

### **6.2.1 Description of Alternative**

This alternative includes the installation of a 1-foot soil cover consisting of approximately 24,000 cy (8 inches) of clean fill and 12,000 cy (4 inches) of topsoil, covering the entire 22-acre CASY site. Fill material could be obtained from an on-site borrow area, "Monkey Bottoms," on Naval Station Norfolk. Topsoil could be purchased from an off-site source. The cover would be contoured to control erosion and sedimentation, and would be compacted and vegetated with native grasses. The cover would be inspected on an annual basis and after major storm events to ensure that integrity is maintained. Cover restoration would be performed, as needed, based upon inspection results. For costing purposes, it was assumed that annual inspections and maintenance would be conducted for 30 years.

The purpose of the soil cover would be to provide a reduction in the mobility of contaminants contained in the subsurface soils by minimizing the infiltration of precipitation. The soil cover would also prevent exposure (i.e., ingestion, inhalation, and dermal contact) to metals contamination within CASY soils. A cross-section of the soil cover option and future use of the CASY is presented in Figure 6-2. Because contaminated soil that poses a potential human health risk would remain at the site, land use controls would be required with this alternative. These controls could include restricted intrusive activities at the site (e.g., excavation, installation of wells, construction), as approved by the Navy, EPA, and VDEQ. The existing and temporary fencing would be used to limit access to the site during the remediation process. However, fencing of the site would not be required following this action.

### **6.2.2 Effectiveness**

#### Protectiveness

As in Alternative 1, construction activities could pose a short-term exposure to construction workers from inhalation of dust, which can be reduced by implementation of a health and safety plan and the use of dust control procedures.

Containment of the metals-contaminated soils would effectively reduce the potential threat to human health and the environment. The cover would provide an immediate elimination in exposures via direct contact with the metal-contaminated soil. This alternative would also provide a reduction in the mobility of contaminants contained in the subsurface soil by minimizing the infiltration of precipitation. The cover would also help to reduce potential off-site migration of contaminants by controlling surface water runoff and erosion. Any releases to groundwater would be contained and treated by the Camp Allen Groundwater Treatment Plant that encompasses the CASY.

This alternative would not provide an immediate reduction in the toxicity or volume of contaminants in the CASY soils. There might be a gradual reduction in the toxicity, mobility, or volume of contaminants, however, through the natural processes such as biodegradation and dispersion. As the proposed future use of the site is for recreational ballfields, the additional fill above the existing grade will reduce the exposure pathway of terrestrial organisms to contaminants.

#### Use of Alternatives to Land Disposal

As in Alternative 1, the off-site disposal of CASY soils would not meet the NCP preference of treatment over land disposal.

### **6.2.3 Implementability**

#### Technical Feasibility and Availability

Similar to Alternative 1, Alternative 2 would use technologies that are demonstrated and commercially available. Established erosion and sediment controls would also be maintained during the covering activities. Site access is readily available and no temporary roads would be required for implementation.

### Administrative Feasibility

Though contained, metals-contaminated source material would remain at the CASY. The public may not prefer this alternative to disposal. All public comments would be addressed during the public comment period to assure public acceptance.

#### **6.2.4 Cost**

The total present worth estimated cost of implementation of this alternative is approximately \$1,400,000. Table 6-2 presents the costs used in preparing this estimate and the assumptions that were made.

**TABLE 6-2**  
**COST ESTIMATE: ALTERNATIVE 2 - ON-SITE CONTAINMENT**  
**CAMP ALLEN SALVAGE YARD, NAVAL STATION NORFOLK, NORFOLK, VIRGINIA**

Cost Component	Unit	Quantity	Unit Cost	Subtotal Cost	Total Cost	Source	Basis/Comments
<b>DIRECT CAPITAL COSTS</b>							
<b>General</b>							
Pre-Construction	LS	1	10,000	10,000		Engr. Est.	Work, E&S, H&S, & QC Plans; Permits; Shop Drawings Includes mob/demob for excavation equipment Record drawings, etc.
Mobilization/Demobilization	LS	1	5,000	5,000		Engr. Est.	
Post-Construction Submittals	LS	1	5,000	5,000		Engr. Est.	
General Subtotal					20,000		
<b>Site Work</b>							
Temporary Silt Fencing	LF	4,337	1	2,299		Means 2001, 02370-550-1000	Revegetation over all excavation area
Hydroseed and mulch	MSF	963	70	67,408		Means 2000, 02920-510-0200	
Haul Monkey Bottom Materials to Site	Acre	22	16534	363,750		RAC Contractor's Field Experience	
Surveyor	Day	22	600	13,200		Engineering estimate	
Site Work Subtotal					446,657		
Cover salvage yard -1foot( fill + topsoil)							Assume top soil 4" deep 8" Monkey Bottom fill (fill cost =0)
Grade/Top Soil/Spread Backfill Material	Acre	22	27,342	601,520		RAC Contractor's Field Experience	
Soil Excavation/Backfill Subtotal					601,520		
<b>DIRECT CAPITAL COSTS - TOTAL</b>					1,068,177		
<b>INDIRECT CAPITAL COSTS</b>							
Engineering and Design	LS	1	53,409	53,409		Engineering Estimate	5% of Remediation Cost Assume 10% of Direct Cost 16 hrs @ \$50/hr 15% of Direct Cost
Remedial Action Contractor Fee	LS	1	106,818	106,818		Engineering Estimate	
Oversight Costs	WK	22	800	17,600		Engineering Estimate	
Contingency Allowance	LS	1	160,227	160,227		Engineering Estimate	
Subtotal					338,053		
<b>INDIRECT CAPITAL COSTS - TOTAL</b>					338,053		
<b>CAPITAL COSTS (DIRECT AND INDIRECT)</b>					1,406,230		
<b>ANNUAL OPERATION AND MAINTENANCE COSTS</b>							
Landscape Maintenance	MSF	963	1	1,107		Engr. Est.; Means Site Work, 1999, 029-730-4175	Assumes grass cut 4 times/year in Area B Includes progress reports etc.
Miscellaneous Expenses	Event	2	200	400		Engineering Estimate	
Subtotal					1,507		
<b>ANNUAL O&amp;M COSTS - 30 Years of Maintenance</b>					1,507		
<b>TOTAL NET PRESENT WORTH: Alternative 2 (interest rate=5%)</b>					1,429,403	By: PSV	Chk: DPJ
							Date Completed: December 2001/Revised January 2002

### **6.3 Alternative 3 - In-situ Soil Stabilization**

#### **6.3.1 Description of Alternative**

This alternative would involve the solidification and stabilization of all soils contaminated with metals exceeding the cleanup goals. Stabilization of the soil would prevent surface water from infiltrating through the contaminated soil, but would not reduce the toxicity or volume of the soil remaining at the site. Approximately 29,000 cy of soil to a depth of 2-4 ft bgs would be "fixed" with a hardening agent to address inorganic contamination. Following stabilization, the existing site fencing would be removed and the area would be covered with topsoil and revegetated.

A treatability study would not be required to determine the effectiveness of soil stabilization/solidification at the CASY. Previous studies have been performed at the site and could be referenced during the design of the action. These studies have shown that stabilization is a viable alternative at the CASY and have additionally identified the appropriate additive mixtures for CASY soils.

For costing purposes, it was assumed that annual inspections and maintenance would be done once per year for thirty years. Land-use controls, as described under Alternative 2, would be required under this alternative because contaminated soil would remain on site. As with Alternative 2, these controls are beyond the scope of this removal action and would be addressed in the future.

#### **6.3.2 Effectiveness**

##### Protectiveness

Stabilization can be an effective treatment for controlling the migration potential of inorganic contamination in soils. The stabilization process would produce a granular material that would pass the TCLP test, indicating that inorganic contaminants would not leach from the material when exposed to water. The addition of topsoil would be necessary, as this end material would not support plant growth. The long-term effects of weather on the stabilized soil are unknown and might reduce the effectiveness over time.

As in Alternative 1, construction activities could pose a short-term exposure to construction workers from inhalation of dust, which could be reduced by the implementation of a health and safety plan and the use of dust control procedures. Stabilization would not reduce the toxicity or volume of the metals-contaminated soil and so would not be fully protective of human health, as complete exposure pathways would remain at the site.

#### Use of Alternatives to Land Disposal

This Alternative meets the NCP preference of treatment over land disposal. Though the soils would be replaced following stabilization, the contamination would be bound in a form with a greatly reduced potential to migrate.

### **6.3.3 Implementability**

#### Technical Feasibility and Availability

This Alternative would use standard earth moving equipment and technologies that are readily available. Conventional erosion and sediment controls would be maintained during the removal activities. Site access is readily available. Because the site is level and partially paved, no temporary roads would be required for machinery access.

#### Administrative Feasibility

Though stabilized, metals-contaminated source material would remain at the CASY. The public might not prefer this alternative to outright disposal. All public comments would be addressed during the public comment period to assure public acceptance.

### **6.3.3 Cost**

The total estimated present worth cost of implementation of this alternative is approximately \$1,800,000. Table 6-3 presents the costs used in preparing this estimate and the assumptions that were made.

**TABLE 6-3**  
**COST ESTIMATE: ALTERNATIVE 3 - IN-SITU SOIL STABILIZATION**  
**CAMP ALLEN SALVAGE YARD, NAVAL STATION NORFOLK, NORFOLK, VIRGINIA**

Cost Component	Unit	Quantity	Unit Cost	Subtotal Cost	Total Cost	Source	Basis/Comments
<b>DIRECT CAPITAL COSTS</b>							
<b>General</b>							
Pre-Construction	LS	1	10,000	10,000		Engr. Est.	Work, E&S, H&S, & QC Plans; Permits; Shop Drawings Includes mob/demob for excavation equipment Record drawings, etc.
Mobilization/Demobilization	LS	1	5,000	5,000		Engr. Est.	
Post-Construction Submittals	LS	1	5,000	5,000		Engr. Est.	
General Subtotal					20,000		
<b>Site Work</b>							
Temporary Safety Fencing	LF	4,337	1	4,337		Means 2001, 02370-550-1000	Revegetation over all excavation area Revegetation over all excavation area
Hydroseed and mulch	MSF	263	70	18,411		Means 2000, 02920-510-0200	
Surveyor	DY	22	600	13,200		RAC Contractor's Field Experience	
Site Work Subtotal					35,948		
<b>Metals Contaminated Soil Excavation/Backfill</b>							
Grade/Top Soil	CY	29,200	11	335,667		RAC Contractor's Field Experience	
Soil Stabilization	CY	29,200	33	959,798		RAC Contractor's Field Experience	
Soil Excavation/Backfill Subtotal					1,295,465		
<b>DIRECT CAPITAL COSTS - TOTAL</b>					<b>1,351,412</b>		
<b>INDIRECT CAPITAL COSTS</b>							
Engineering and Design	LS	1	67,571	67,571		Engineering Estimate	5% of Remediation Cost Assume 10% of Direct Cost 16 hrs @ \$50/hr 15% of Direct Cost
Remedial Action Contractor Fee	LS	1	135,141	135,141		Engineering Estimate	
Oversight Costs	WK	19	800	15,200		Engineering Estimate	
Contingency Allowance	LS	1	202,712	202,712		Engineering Estimate	
Subtotal					420,624		
<b>INDIRECT CAPITAL COSTS - TOTAL</b>					<b>420,624</b>		
<b>CAPITAL COSTS (DIRECT AND INDIRECT)</b>					<b>1,772,036</b>		
<b>ANNUAL OPERATION AND MAINTENANCE COSTS</b>							
Landscape Maintenance	MSF	963	1	1,107		Engr. Est.; Means Site Work, 1999, 029-730-4175B	Assumes grass cut 4 times/year in Area Includes progress reports etc.
Miscellaneous Expenses	Event	2	200	400		Engineering Estimate	
Subtotal					1,507		
<b>ANNUAL O&amp;M COSTS - 30 Years of Maintenance</b>					<b>1,507</b>		
<b>TOTAL NET PRESENT WORTH: Alternative 3 (interest rate=5%)</b>					<b>1,795,209</b>	By: PSV      Chk: DPJ	Date Completed: December 2001/Revised January 2002

## **7.0 COMPARATIVE ANALYSIS**

Three alternatives were qualitatively assessed and compared based on the criteria described in Section 6.0: effectiveness, implementability, and cost. A summary of the comparative analysis is shown on Table 7-1.

### **7.1 Effectiveness**

#### Protectiveness

With respect to the site and the adjacent properties, Alternative 1 would provide the greatest level of protection to human health and the environment. This alternative includes excavation of all soils exceeding the cleanup goals and then removing them from the site. Alternative 1 therefore provides a permanent remedy. Though Alternative 2 would remove the potential for direct exposures to contamination, it would reduce, but not eliminate, the potential for migration of contaminants. Alternative 3 would more effectively reduce the potential for migration than Alternative 2 but would not completely eliminate the potential for exposures to human and ecological receptors. Neither Alternative 2 nor 3 would provide the permanence of Alternative 1.

Based on this discussion, excavation and disposal would be the most protective alternative.

#### Use of Alternatives to Land Disposal

Only Alternative 3 meets the NCP's preference for treatment over land disposal.

Based on this discussion, in-situ stabilization would be the most appropriate alternative.

### **7.2 Implementability**

#### Technical Feasibility and Availability

All of the alternatives are similar in their technical administration as they are all based on earth-moving activities. Excavation, hauling, backfilling, and grading are all common construction

activities that are easily implemented and readily available. Transportation and disposal feasibility issues are unique to Alternative 1. Though none of the alternatives would be technically difficult to implement, installation of the soil cover would require the least amount of site work and equipment.

Based on this discussion, installation of a soil cover would be the easiest alternative to implement.

#### Administrative Feasibility

Though it is likely that the public would be most in favor of Alternative 1 due to its permanence, all public comments would be addressed to assure acceptance of the chosen remedy.

### **7.3 Cost**

The estimated total net worth costs for Alternatives 1, 2, and 3 are listed below. Capital as well as operation and maintenance costs associated with the alternatives are included in the total cost estimates. Total net present worth costs were based on an annual 5% interest rate.

- Alternative 1 - Excavation and Off-Site Disposal: \$3,100,000
- Alternative 2 - On-Site Containment: \$1,400,000
- Alternative 3 - In-site Soil Stabilization: \$1,800,000

**TABLE 7-1**

**SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES  
CAMP ALLEN SALVAGE YARD  
NAVAL STATION NORFOLK, NORFOLK, VIRGINIA**

<b>Evaluation Criteria</b>	<b>Alternative 1: Excavation and Off-Site Disposal</b>	<b>Alternative 2: On-Site Containment</b>	<b>Alternative 3: In-site Soil Stabilization</b>
<b>Effectiveness</b>			
<ul style="list-style-type: none"> <li>• <b>Protectiveness</b></li> </ul>	<ul style="list-style-type: none"> <li>• Permanently reduces threat to human health and environment by eliminating potential for direct contact with soil. Source of metals contamination is being removed from the site.</li> <li>• Possibility of short-term exposure to construction workers from dust inhalation.</li> </ul>	<ul style="list-style-type: none"> <li>• Provides immediate elimination in exposures via direct contact with soil. Also reduces mobility of contaminants contained in subsurface soil by minimizing rainwater infiltration, and reduces off-site migration of contaminants through runoff and erosion.</li> <li>• Possibility of short-term exposure to construction workers from dust inhalation.</li> </ul>	<ul style="list-style-type: none"> <li>• Provides reduction in the mobility of contaminants contained in the soils by minimizing and reducing off-site migration of contaminants through runoff and erosion.</li> <li>• Would not reduce the toxicity or volume of the metals-contaminated soil and so would not be as protective of human health</li> <li>• Possibility of short-term exposure to construction workers from dust inhalation.</li> </ul>
<ul style="list-style-type: none"> <li>• <b>Use of Alternative to Land Disposal</b></li> </ul>	<ul style="list-style-type: none"> <li>• Does not meet the NCP preference of treatment over land disposal.</li> </ul>	<ul style="list-style-type: none"> <li>• Does not meet the NCP preference of treatment over land disposal.</li> </ul>	<ul style="list-style-type: none"> <li>• Meets the NCP's preference of treatment.</li> </ul>
<b>Implementability</b>			
<ul style="list-style-type: none"> <li>• <b>Technical Feasibility</b></li> <li>• <b>Availability</b></li> <li>• <b>Administrative Feasibility</b></li> </ul>	<ul style="list-style-type: none"> <li>• Excavation and disposal are common construction activities and are easily implemented.</li> <li>• Site access and disposal facilities are readily available. No temporary roads are required.</li> <li>• Public acceptance is anticipated. Comments will be addressed during the public comment period.</li> </ul>	<ul style="list-style-type: none"> <li>• On-site containment technology is demonstrated and commercially available.</li> <li>• Site access is readily available and no temporary roads are required for implementation.</li> <li>• Public may not accept contaminants remaining on site. Comments will be addressed during the public comment period.</li> </ul>	<ul style="list-style-type: none"> <li>• Uses standard earth moving equipment and technologies that are readily available.</li> <li>• Site access is readily available and no temporary roads are required for implementation.</li> <li>• Public may not accept contaminants remaining on site. Comments will be addressed during the public comment period.</li> </ul>
<b>Cost</b>			
<ul style="list-style-type: none"> <li>• <b>Capital Cost</b></li> <li>• <b>Operation and Maintenance Costs</b></li> <li>• <b>Net Present Worth</b></li> </ul>	<ul style="list-style-type: none"> <li>• \$3,072,031</li> <li>• \$1,507</li> <li>• \$3,095,204</li> </ul>	<ul style="list-style-type: none"> <li>• \$1,406,230</li> <li>• \$1,507</li> <li>• \$1,429,403</li> </ul>	<ul style="list-style-type: none"> <li>• \$1,772,036</li> <li>• \$1,507</li> <li>• \$1,795,209</li> </ul>

## 8.0 PROPOSED REMOVAL ACTION

The Navy recommends that Alternative 2, On-Site Containment, be implemented for a non-time critical removal action at the CASY. The main features of this alternative include:

- Mobilization of construction equipment and trailers.
- Clearing and removing any fencing and surface debris.
- Installing erosion and sediment control.
- Covering the 22-acre site with 8" of clean fill and 4" of topsoil.
- Landscaping and vegetating all disturbed areas.

Alternative 2 is preferred because it is more cost effective than Alternatives 1 while remaining protective and easily implementable. Alternative 3 is not as protective of human health and does not meet the needs of the reasonably anticipated future land use of the CASY. Alternative 2 would minimize risks to human health and the environment by preventing direct contact with the remaining contaminated soil. This alternative would also provide a reduction in mobility of contaminants contained in the subsurface soil by minimizing infiltration of precipitation. As part of this action, the Navy will implement an appropriate institutional control to maintain the removal action construction and to assure that unacceptable exposure scenarios do not occur. The final remedy for the Camp Allen Salvage Yard will be selected in a Record of Decision. As metals contamination is the only remaining concern within the soils at the site, a soil cover remains compatible with future sediment and groundwater remedial actions and future recreational land use at the CASY.

## 9.0 REFERENCES

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- Baker. 1994b. Final Feasibility Study. Norfolk Navy Base, Norfolk, Virginia. Contract N62470-89-D-4814. CTO-084.
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- NFESC. 1997. Navy/Marine Corps IR Manual. 324pp.
- Office of the Deputy Under Secretary of Defense (Installations and the Environment) ODUSD (I &E). 2001. Management Guidance for the Defense Environmental Restoration Program. September 2001.

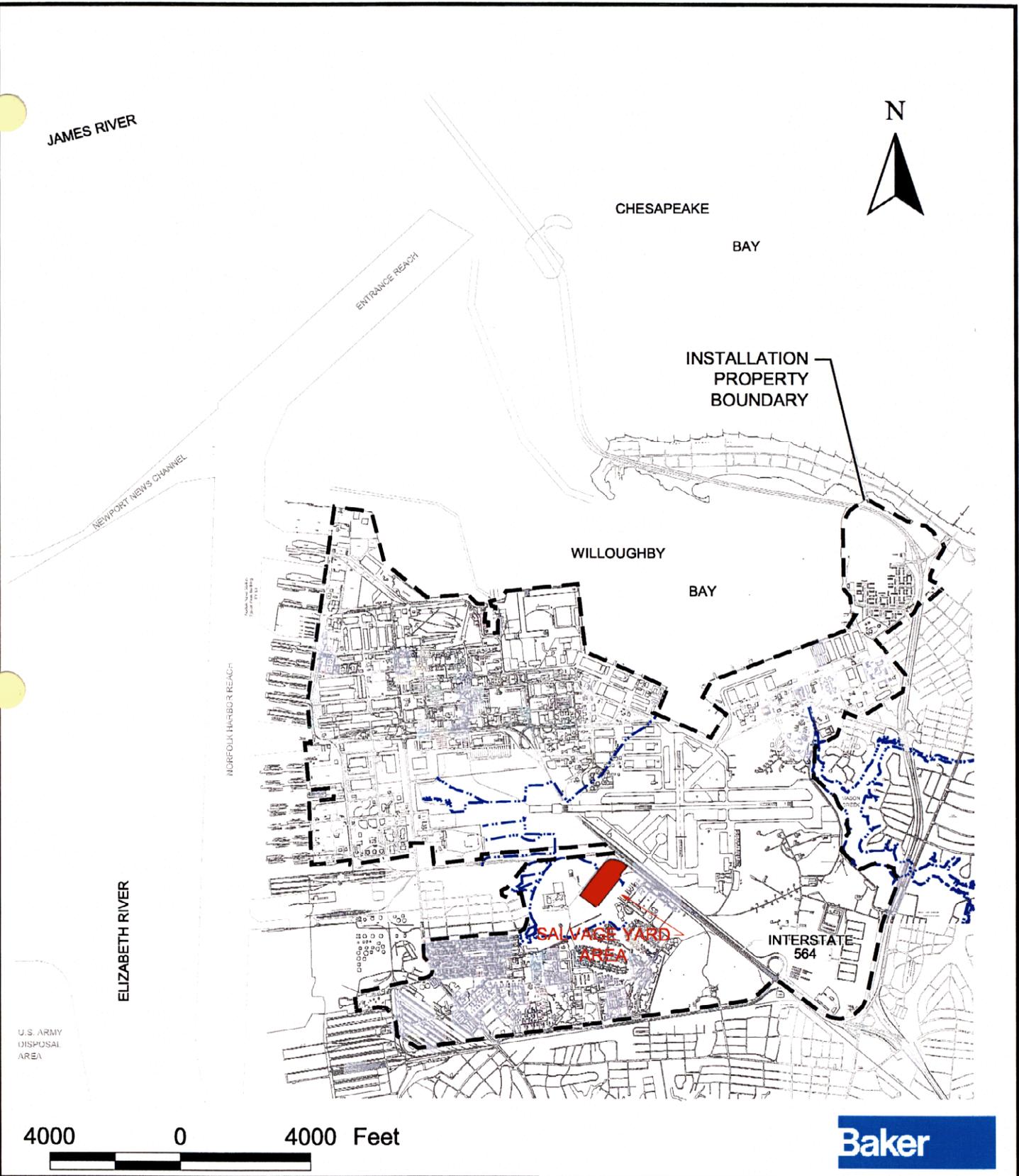
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USEPA, 1993. Guidance on Conducting Non-Time-Critical Removal Actions Under CERCLA.

USEPA, 1989a. Risk Assessment Guidance for Superfund, Volume I. Human Health Evaluation Manual (Part A). Interim Final. EPA/540/1-89/002. December 1989.



**LEGEND**

- Installation Property Boundary
- - - - - Surface Water

**Figure 2-1  
Site Location Map**

**Camp Allen Salvage Yard  
Naval Station Norfolk, Norfolk, Virginia**

Source: U.S.G.S. Topographic Map, Norfolk North Quadrangle, VA Photoinspcted 1989.

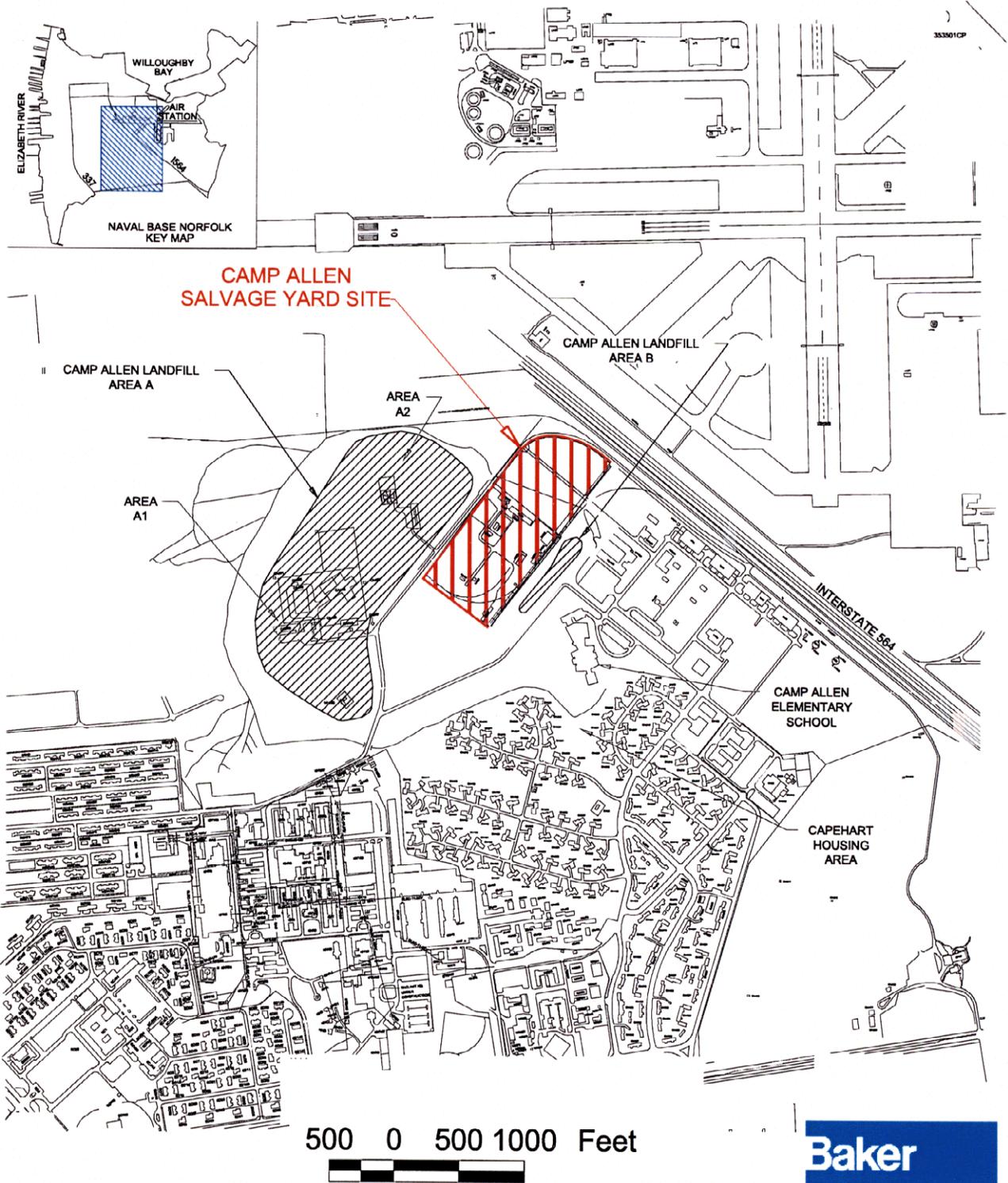
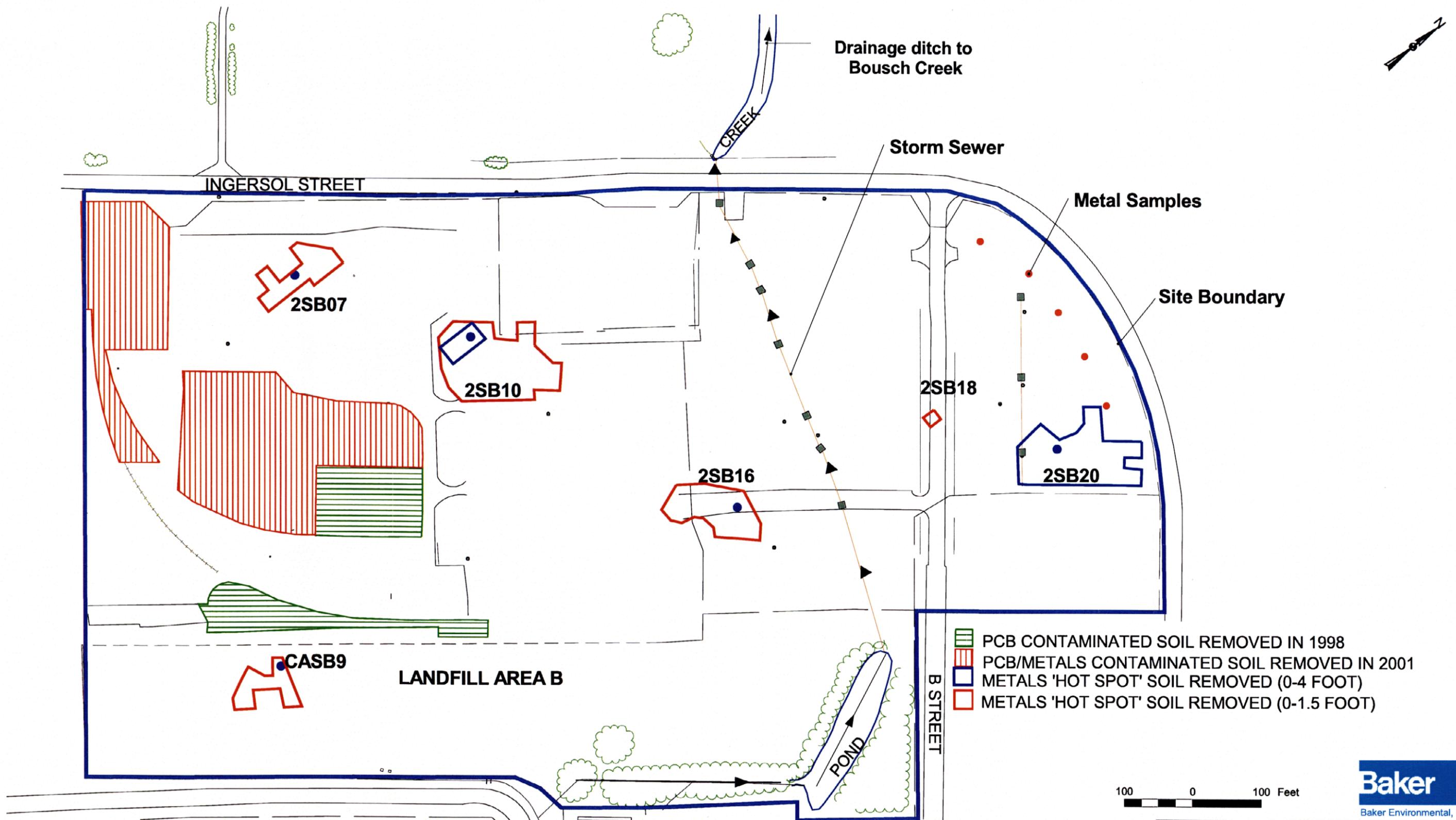


Figure 2-2  
Site Plan

Camp Allen Salvage Yard  
Naval Station Norfolk, Norfolk, Virginia



- PCB CONTAMINATED SOIL REMOVED IN 1998
- PCB/METALS CONTAMINATED SOIL REMOVED IN 2001
- METALS 'HOT SPOT' SOIL REMOVED (0-4 FOOT)
- METALS 'HOT SPOT' SOIL REMOVED (0-1.5 FOOT)

100 0 100 Feet



FIGURE 2-3  
SOIL CONTAMINATION IDENTIFIED  
IN PREVIOUS INVESTIGATIONS

CAMP ALLEN SALVAGE YARD  
NAVAL STATION NORFOLK, NORFOLK, VIRGINIA



**Baker**

Figure 2-4 Soil Contamination Identified in Supplemental 2001 Investigation

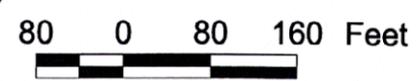
Camp Allen Salvage Yard  
Naval Station Norfolk, Norfolk, Virginia

**Legend**

Locations of Soils with Metals Contamination Exceeding Clean Up Goals

-  Clean or Remediated
-  Lead and Iron Depth: 2-4'
-  Lead Depth: 2-4'
-  Iron Depth: 2-4'
-  Antimony Depth 2-4'
-  Lead and Iron Depth 0-2'
-  Lead Depth 0-2'
-  Iron Depth 0-2'

Metal	Clean up goal	Units
Iron	55,000	mg/kg
Lead	400	mg/kg
Arsenic	58	mg/kg
Antimony	73	mg/kg



Source: Sampling data and sampling grid locations provided by OHM/IT Corporation (2001)



Figure 6-1 Extent of Metals-Contaminated Soil Removal Action Alternative 1

Camp Allen Salvage Yard  
Naval Station Norfolk, Norfolk, Virginia

- Legend
-  Remediated or Clean Soil
  -  Metals Contaminated Soil Requiring Removal - Depth 0-2 Feet Below Ground Surface
  -  Metals Contaminated Soil Requiring Removal - Depth 0-4 Feet Below Ground Surface

100 0 100 200 Feet

Source: Sampling data and sampling grid locations provided by OHMIT Corporation (2001)

# Camp Allen Salvage Yard Conceptual Recreational Use Cross-Section

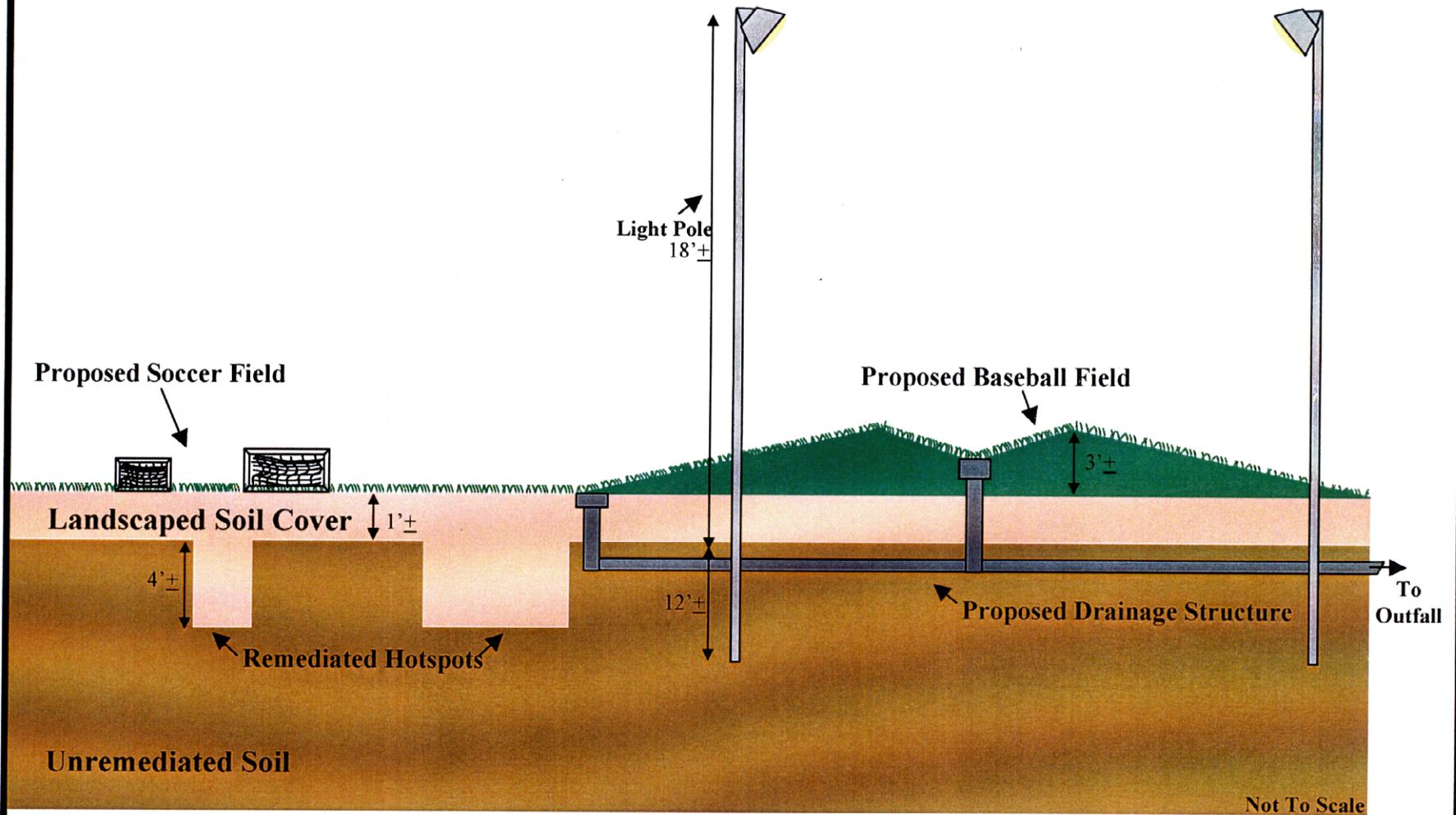


Figure 6-2  
Cross-Section of CASY Following Alternative 2

Camp Allen Salvage Yard  
Naval Station Norfolk, Norfolk, Virginia



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION III  
1650 Arch Street  
Philadelphia, Pennsylvania 19103

26 February 2002

Commander, Atlantic Division  
Naval Facilities Engineering Command  
Environmental Quality Division, Code: 1822  
1510 Gilbert Street  
Norfolk, Virginia 23511-2699  
Attn.: Winoma Johnson

Re: *Engineering Evaluation/Cost Analysis For Metals Contaminated Soil  
Camp Allen Salvage Yard - Site 22*  
Naval Station Norfolk  
Norfolk, VA

Dear Ms. Johnson:

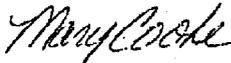
The above referenced document has been reviewed by the Environmental Protection Agency. The following comments are offered.

1. Executive Summary: It is the understanding of the EPA from previous discussions and project team meetings that even though a non-time-critical removal is being proposed for this site, ultimately a PRAP and ROD will be done. EPA would like this spelled out in this document.
2. Section 1.0 - Introduction, paragraph 3, 3<sup>rd</sup> line: there should be a comma after from ("...the release is from, the DoN installation.").
3. Section 1.0 - Introduction, paragraph 3: EPA also has authority under section 120 of CERCLA to review and concur on remedial actions at federal facility sites on the NPL, such as NSN.
4. Section 1.0 - Introduction, paragraph 3: Last 2 sentences ("This EE/CA...operations at the CASY") should be a separate paragraph.
5. Section 8.0 - Proposed Removal Action: EPA recommends the addition of a paragraph, elaborating on section 6.5, that reads, "The Navy recognizes that because contaminated soil that poses a potential human health risk would remain at the site, land

use controls will be required with this alternative. As part of this action, the Navy shall propose an Institutional Control plan to maintain the removal action construction and to assure that unacceptable exposure scenarios do not occur. The final remedy for the Camp Allen Salvage Yard will be selected in a Record of Decision."

If you have any questions concerning any of these comments, please-call me (215) 814-5129.

Sincerely,



Mary T. Cooke  
Remedial Project Manager

cc: Randy Sawyer, WNSTN  
Devlin Harris, VDEQ  
John Tomik, CH2M HILL

## Response to Comments

### Engineering Evaluation/Cost Analysis For Metals Contaminated Soils

#### Camp Allen Salvage Yard Naval Station Norfolk

The Final Engineering Evaluation/Cost Analysis (EE/CA) for Metals Contaminated Soils for the Camp Allen Salvage Yard (CASY), Site 22, was submitted on January 31, 2002. Ms. Mary Cooke of USEPA Region III, provided the following comments in a letter dated February 26, 2002.

1. **Comment:** Executive Summary: It is the understanding of the EPA from previous discussions and project team meetings that even though a non-time-critical removal is being proposed for this site, ultimately a PRAP and ROD will be done. EPA would like this spelled out in this document.

**Response:** The Revised Final EE/CA text will indicate that the Navy intends to prepare and execute a PRAP and ROD for the site.

2. **Comment:** Section 1.0 - Introduction, paragraph 3, 3<sup>rd</sup> line: there should be a comma after from ("...the release is from, the DoN installation.").

**Response:** The Revised Final EE/CA text will be updated to state "...the release is from, the DoN installation."

3. **Comment:** Section 1.0 - Introduction, paragraph 3: EPA also has authority under section 120 of CERCLA to review and concur on remedial actions at federal facility sites on the NPL, such as NSN.

**Response:** While this statement is applicable to remedial actions, the EE/CA addresses a removal action described under 40 CFR 300.415. As lead agency, DOD can implement removal actions without prior EPA approval under Executive Order 12580. EPA does have the authority to review and concur on remedial actions addressed in the future ROD for this site. Therefore, the comment is noted, but no change will be made to the EE/CA

4. **Comment:** Section 1.0 - Introduction, paragraph 3: Last 2 sentences ("This EE/CA...operations at the CASY") should be a separate paragraph.

**Response:** The Revised Final EE/CA text will be updated to separate these sentences into a new paragraph.

5. **Comment:** Section 8.0 - Proposed Removal Action: EPA recommends the addition of a paragraph, elaborating on section 6.5, that reads, "The Navy recognizes that because contaminated soil that poses a potential human health risk would remain at the site, land use controls will be required with this alternative. As part of this action, the Navy shall propose an Institutional Control plan to maintain the removal action construction and to assure that unacceptable exposure scenarios do not occur. The final remedy for the Camp Allen Salvage Yard will be selected in a Record of Decision."

**Response:** The Revised Final EE/CA text will be updated to include the phrase: "As part of this action, the Navy will implement an appropriate institutional control to maintain the removal action construction and to assure that unacceptable exposure scenarios do not occur. The final remedy for the Camp Allen Salvage Yard will be selected in a Record of Decision."