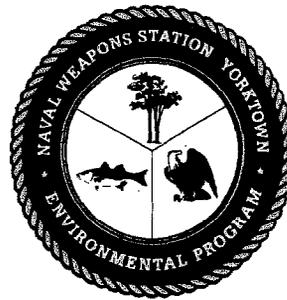


6/1/04-01592

Final  
Action Memorandum  
Time-Critical Removal Action  
Site 7N-Old DuPont Disposal Area  
Naval Weapons Station Yorktown  
Cheatham Annex Site  
Williamsburg, Virginia



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

Contract No. N62470-02-D-3052  
CTO-046

**June 2004**

Prepared by

**CH<sub>2</sub>M HILL**

Federal Group, Ltd.

**Baker**  
Environmental, Inc.

ACTION MEMORANDUM  
SITE 7N—OLD DUPONT DISPOSAL AREA  
NAVAL WEAPONS STATION YORKTOWN  
CHEATHAM ANNEX SITE

DATE: July 1, 2004

SUBJECT: Time-Critical Removal Action at Site 7N, Old DuPont Disposal Area, Naval Weapons Station Yorktown, Cheatham Annex Site

FROM: Commander, Atlantic Division, Naval Facilities Engineering Command

TO: G.E. Eichert, CAPT, CEC, USN  
Regional Engineer  
By Direction of the Commander, Navy Region, Mid-Atlantic

This Action Memorandum, which serves as the Decision Document for the Time-Critical Removal Action (TCRA) for Site 7N, documents approval for the removal action as described herein for Site 7N, Old DuPont Disposal Area, at Naval Weapons Station Yorktown, Cheatham Annex Site (CAX), York County, Virginia. The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, as amended, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) define removal actions to include "the cleanup or removal of released hazardous substances from the environment, such actions as may be necessary to monitor, assess, and evaluate the release or threat of release of hazardous substances, the disposal of removed material, or the taking of such other actions as may be necessary to prevent, minimize, or mitigate damage to the public health or welfare or to the environment, which may otherwise result from a release or threat of release (USEPA, 1993)."

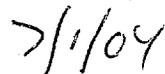
Based on the administrative record for the site, this Decision Document was developed in accordance with CERCLA (USEPA, 1986), and is consistent with the NCP (USEPA, 1990a).

Conditions at Site 7N meet the NCP Section 300.415(b)(2) criteria for removal. The Naval Facilities Engineering Command recommends approval of the proposed removal action. The total project ceiling is estimated to be \$425,000. Response actions should commence as soon as practical due to Site 7N's potential threat to human health and the environment.

Approved by:



G.E. Eichert, CAPT, CEC, USN  
Regional Engineer  
By Direction of the Commander, Navy Region, Mid-Atlantic



Date

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## ACRONYMS AND ABBREVIATIONS

ARAR	Applicable or Relevant and Appropriate Requirement
CAPT	Captain
CAX	Cheatham Annex
CEC	Civil Engineer Corps
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation and Liability Information System
MLW	Mean Low Water
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NEESA	Naval Energy and Environmental Support Activity
TCRA	Time-Critical Removal Action
USEPA	United States Environmental Protection Agency
USN	United States Navy

## **I. PURPOSE**

This Action Memorandum documents approval for the removal action as described herein for Site 7N, Old DuPont Disposal Area, at Naval Weapons Station Yorktown, CAX, Williamsburg, Virginia. This Action Memorandum serves as the Decision Document for the TCRA for Site 7N.

This Action Memorandum has been completed in accordance with the removal program requirements defined by CERCLA (USEPA, 1986), the NCP (USEPA, 1990a), and the U.S. Environmental Protection Agency's (USEPA's) Superfund Removal Procedures Action Memorandum Guidance (USEPA, 1990b).

The Department of the Navy has broad authority under CERCLA Section 104 and Executive Order 12580 to carry out removal actions when the release is located on or the sole source of the release is from the Navy installation. The Navy/Marine Corps Installation Restoration Program was initiated to identify, assess, characterize, and clean up or control contamination from past hazardous waste disposal operations and hazardous material spills (prior to 1986) at Navy and Marine Corps installations. This Action Memorandum follows the guidelines published in the Navy/Marine Corps Installation Restoration Manual dated February 1997 (Naval Facilities Engineering Service Center, 1997) and addresses a TCRA for stabilizing the shoreline along the York River at Site 7N.

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

In 2000, Cheatham Annex was placed on USEPA's National Priorities List of Superfund Sites and is identified in USEPA's Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) as VA3170024605. The following sections describe the features and history of Site 7N. This section also discusses previous site investigations, the current site investigation, and the contaminants that necessitated the preparation of this Decision Document.

### **A. Site Description**

CAX was established in June 1943 as a satellite unit of the Naval Supply Depot to provide bulk storage facilities. Prior to 1943, CAX had been the location of the Penniman Shell Loading Plant, which was a large powder- and shell-loading facility operated by DuPont under a contract to the United States Government during World War I. The contract stipulated that part of the shell-loading plant was to be completed by April 1918, with the entire plant to be fully operational by December 1918. When the Armistice was signed on November 11, 1918, the Penniman shell-loading facility began to shut down,

without becoming fully operational. By 1926, when DuPont disposed of the property, most of the buildings associated with the plant had been removed. From 1926 to 1943 the land was used for farming. Since 1943, CAX has been used for receiving, storing, packaging, and shipping materials to federal facilities on the East Coast and to major distribution centers in Europe. In July 1987, CAX was designated as the Hampton Roads Navy Recreational Complex. Today the mission of CAX includes supplying Atlantic Fleet ships and providing recreational opportunities to military and civilian personnel.

At inception in 1943, CAX occupied 3,349 acres. Several portions of the original base have since been declared surplus and transferred to other government jurisdictions, including the National Park Service, the Commonwealth of Virginia, and York County. CAX is currently comprised of 1,578 acres. Figure 1 shows its location.

As shown in Figure 2, Site 7N is located near recreational cabins 169 and 170 along the York River. The surface of the site is level with the eastern edge of the site, which is clearly defined by steep banks rising to an estimated 10 to 20 feet in elevation. Site 7N received wastes from the City of Penniman and from the DuPont facility. Wastes were reported to be non-hazardous and/or inert; however, specific information documenting the types and quantities of wastes is not available. As a result of Hurricane Isabel in September 2003, debris from the disposal area is eroding onto the beach and into the York River. Photographs of Site 7N are included in Appendix A.

## **1. Removal Site Evaluation**

Site 7N was identified as a potential area of concern in the Initial Assessment Study conducted in 1984 (Naval Energy and Environmental Support Activity [NEESA], 1984) and was scheduled for future investigation. However, during a routine field visit in October 2003 (following Hurricane Isabel), the exposed debris was discovered and actions taken to minimize impact. In February 2004, trenching with limited sampling of the site adjacent to Cabin 169 was conducted to delineate the extent of debris. Additional sampling was conducted in April 2004 to further delineate the extent of debris near Cabin 170. The trenching report identified potential soil contamination adjacent to and encompassing Cabins 169 and 170 (Baker, 2004). In addition, a volume of ash and debris was identified in the southwestern portion of the site where erosion of the slope has occurred. This area is highly vulnerable to further erosion into the York River by surface water runoff and intense wave action. This Action Memorandum addresses a removal action to mitigate further erosion of the disposal area into the York River. The Navy intends to remove the area of debris and contaminated soil under a separate removal or remedial action.

## **2. Physical Location**

Located on the south bank of the York River within York County, Virginia (Figure 1), CAX is situated northeast of Interstate 64, approximately one to two miles northeast of Williamsburg, Virginia. Site 7N, located along the York River, is illustrated in Figure 2.

## **3. Site Characteristics**

The former disposal area is adjacent to recreational cabins 169 and 170 and occupies approximately one acre. The areas surrounding the former disposal area are wooded with trees and shrubs except along the river. Along the York River, the edge of the site is extremely steep (nearly vertical in areas) and has lost most of its vegetation. The York River is located approximately 10-20 feet below the disposal area at the bottom of the steep slope, which is subject to erosion due to slope soil characteristics and wave action of the York River. Continued erosion of the slope may cause the exposure and migration of debris, ash, and contaminated soil.

Based on results of test trenching, it appears that much of the debris, consisting of glass bottles, large pieces of stoneware, bricks, munitions loading eyelets, and metal, is located to the east of the existing fence and within the steep slope to the York River. A thick layer of debris was identified east of recreational cabin 169. The presence of ash, melted and misshaped bottles, and charred pieces of metal suggests that much of the waste was incinerated. The trenching report estimated this primary area of debris to be approximately 650 cubic yards (Baker, 2004); however, subsequent soil sampling indicates that the debris is more widespread, extending as far north as recreational cabin 170. An ash layer is present throughout most of the site.

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

The eastern slope of the disposal area is exposed and eroding into the York River. Shoreline erosion and Hurricane Isabel have exposed various types of debris, mainly incinerator waste, and some of this debris has fallen onto the beach. Without shoreline protection, the disposal area contents will continue to erode onto the beach and into the York River.

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

In 2000, Cheatham Annex was placed on USEPA's National Priorities List of Superfund Sites. Remedial activities are in progress at CAX and include examining contamination to soil, sediment, and groundwater.

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

Figures 1 and 2 show a location map of CAX and Site 7N, respectively. Figure 2 also shows the approximate extent of the shoreline to be stabilized.

## **B. Other Actions to Date**

### **1. Previous Actions**

Investigations and studies related to Site 7N are listed below:

- Initial Assessment Study of Naval Supply Center, Cheatham Annex and Yorktown Fuels Division. NEESA. February 1984.
- Aerial Photographic Analysis. United States Navy Supply Center—Cheatham Annex, Williamsburg, Virginia. USEPA, Region III. May 1998.
- Trenching and Limited Field Investigation Report—Site 7N. Baker. June 2004.

### **2. Current Actions**

The Site 7N disposal area is currently inactive. Site 7N is situated around recreational cabins 169 and 170. Cabins 169 and 170 are closed to recreational visitors. Bhat Environmental removed surface debris on the beach the week of 03 May 2004. This Action Memorandum addresses only shoreline stabilization along the York River at Site 7N, as the Navy intends to remove the area of debris and contaminated soil under a separate removal or remedial action.

## **C. State and Local Authorities' Roles**

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

As previously stated, Executive Order 12580 delegates to the Department of Defense the President's authority to undertake CERCLA response actions. Congress further outlined this authority in the Defense

Environmental Restoration Program Amendments, under 10 United States Code 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. The USEPA and the Virginia Department of Environmental Quality will continue to be consulted during and until actions addressing the removal action 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 TCRA. Paragraphs (b)(2)(i), (ii), (iv), and (v) of Section 300.415 apply to the conditions as follows:

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

There is the potential for exposure to the human population, animals, and the food chain because the pollutants or contaminants, namely disposal area debris, are eroding into the York River.

300.415(b)(2)(ii) "Actual or potential contamination of drinking water supplies or sensitive ecosystems."

The York River is a sensitive ecosystem that is a nursery for important commercial and recreational fisheries.

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

The eastern perimeter of the disposal area is exposed and debris, ash, and contaminated soil will continue to migrate into the York River.

300.415(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 York River, Site 7N is subject to hurricanes throughout the late summer and early fall. Winter storms that move along the eastern seaboard, known commonly as northeasters, are often associated with high winds and precipitation; the resulting shoreline erosion could cause the migration of debris, ash, and contaminated soil from the site.

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

The preliminary evaluation of the ash and debris at Site 7N demonstrates that current site conditions present potential threats to public health, welfare, or the environment. Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the action discussed herein, 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 TCRA at Site 7N addresses shoreline stabilization. The eastern slope of the disposal area along the York River will be stabilized to prevent further erosion of the disposal area contents into the York River. Shoreline stabilization will include the installation of sand-filled geotextile tubes (Geotubes<sup>®</sup>) which will be placed against the toe of the eroding slope and will protect approximately 240 feet of the shoreline. As shown in Figure 2, the geotextile tubes will protect the area of debris, ash, and contaminated soil south of Cabin 169 and will extend to Cabin 170. Design specifications for the placement of the geotextile tubes will be provided to the removal contractor prior to initiation of work activities. Appendix B provides a typical cross-section of a Geotube<sup>®</sup>. In addition, excavation and off-site disposal of contaminated soil and debris will be necessary to access the shoreline from the site and to stabilize the existing slope.

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

The proposed TCRA, developed as a short-term response to mitigate risk at the site, will diminish the potential direct contact threat posed by the eroding disposal area debris, ash, and contaminated soil as

well as threat of contaminant release and migration. A long-term remedial action for all environmental media has not yet been evaluated. This action, as proposed, will not impede future responses based on available information and will immediately address the stabilization of shoreline contamination and a potential human health and environmental hazard. The proposed action is consistent with accepted practices and is expected to mitigate the imminent threats that meet the NCP removal criteria.

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

Because this is a TCRA, no Engineering Evaluation/Cost Analysis or Feasibility Study was conducted. However, the proposed action is an accepted method for providing temporary shoreline stabilization.

### **4. 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 (USEPA, 1990a). 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 ARARs applicable to this removal action are presented in Tables 1 through 3.

The removal action set forth in this Memorandum will comply with all applicable, relevant, and appropriate environmental and human health requirements to the extent practicable considering the requirements of the situation.

### **5. Project Schedule**

The proposed project schedule is shown in the following table.

<b>Task</b>	<b>Proposed Schedule</b>
Approval of Action Memorandum	June 2004
Preparation of Work Plans and Design Specifications	June 2004
Shoreline Stabilization	July 2004

**B. Estimated Costs**

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

<b>Direct Capital Costs</b>	
General (Submittals, Mobilization, Site Preparation, Demobilization)	\$230,000
Shoreline Stabilization	\$195,000
<b>Total</b>	<b>\$425,000</b>

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

Debris, ash, and contaminated soil along the slope at the site will continue to erode onto the beach and into the York River.

**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 7N, Old DuPont Disposal Area, Naval Weapons Station Yorktown, Cheatham Annex Site, York County, Virginia, developed in accordance with CERCLA, as amended, and is consistent with the NCP.

Conditions at the site meet the NCP Section 300.415(b)(2) criteria for removal. The Naval Facilities Engineering Command recommends approval of the proposed action. The total project ceiling is estimated to be \$425,000. Response actions should commence as soon as practical due to the potential threat to human health and the environment from Site 7N, Old DuPont Disposal Area.

## X. REFERENCES

Baker, 2004. Trenching and Limited Field Investigation Report, Site 7N, Naval Weapons Station Yorktown, Yorktown, Virginia, Cheatham Annex Site. June 2004.

NEESA, 1984. Initial Assessment Study of Fleet and Industrial Supply Center (Norfolk) Cheatham Annex and Yorktown Fuels Division. Naval Energy and Environmental Support Activity (NEESA). February 1984.

Naval Facilities Engineering Service Center, 1997. Navy/Marine Corps Installation Restoration Manual.

USEPA, 1998. Aerial Photographic Analysis. USN Supply Center – Cheatham Annex. Williamsburg, Virginia. United States Environmental Protection Agency, TS-PIC-980336 4S. May 1998.

USEPA, 1993. Guidance on Conducting Non-Time-Critical Removal Actions Under CERCLA. EPA540-R-93-057.

USEPA, 1990a. National Oil and Hazardous Substances Pollution Contingency Plan; Final Rule. Federal Register, 40 CFR 300, March 8, 1990.

USEPA, 1990b. Superfund Removal Procedures Action Memorandum Guidance. OSWER Directive 9360.3-01. EPA/540/P-90/004.

USEPA, 1986. Comprehensive Environmental Response, Compensation and Liability Act. 40 CFR 302. Amended by Superfund Amendments and Reauthorization Act, October 17, 1986.

**TABLES**

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**TABLE 1**

**POTENTIAL CHEMICAL-SPECIFIC ARARS  
SITE 7N—OLD DUPONT DISPOSAL AREA  
NAVAL WEAPONS STATION YORKTOWN, CHEATHAM ANNEX SITE**

Citation	Requirement	ARAR Criteria Determination	Comments
<b>FEDERAL/CHEMICAL-SPECIFIC</b>			
Toxic Substances Control Act (40 CFR Part 761.60)	Regulates the storage and disposal of PCB wastes.	Not applicable	PCBs were not detected in the disposal area ash.
Resource Conservation and Recovery Act; Identification and Listing of Hazardous Waste (40 CFR Part 261)	Defines those solid wastes which are subject to regulation as hazardous waste.	ARAR. Applicable to remedial actions involving off-site transport and disposal of hazardous waste.	Some debris and contaminated soil may be hazardous. Further waste identification would be required if wastes are excavated for off-site disposal.
<b>STATE/CHEMICAL-SPECIFIC</b>			
Virginia Hazardous Waste Management Regulations (9 VAC 20-60)	Regulates the treatment, storage, and disposal of hazardous waste.	ARAR. Applicable to remedial actions involving treatment, storage, or disposal of hazardous waste.	Some debris and contaminated soil may be hazardous. Further waste identification would be required if wastes are excavated for off-site disposal.

**TABLE 2**

**POTENTIAL LOCATION-SPECIFIC ARARS  
SITE 7N—OLD DUPONT DISPOSAL AREA  
NAVAL WEAPONS STATION YORKTOWN, CHEATHAM ANNEX SITE**

Citation	Requirement	ARAR Criteria Determination	Comments
<b>FEDERAL/LOCATION-SPECIFIC</b>			
The Endangered Species Act of 1973 (16 USC 1531) (40 CFR Part 502)	Requires action to conserve endangered and threatened species and their critical habitats.	ARAR	Bald eagles (threatened species) have been sighted in the vicinity of Site 7N.
National Historic Preservation Act (32 CFR Parts 229 and 229.4; 43 CFR Part 171; and 36 CFR Part 800)	Develops procedures for the protection of archaeological and historical resources.	Not applicable	Interviews with LANTDIV's Cultural Resources specialist indicate that Site 7N is not culturally or historically significant since the area is highly disturbed.
Executive Order 1988; Protection of Floodplains; 40 CFR 6, Appendix A; excluding Sections 6(a)(2), 6(a)(4), 6(a)(6); 40 CFR 6.302	Actions taken should avoid adverse effects, minimize potential harm, restore and preserve natural and beneficial values.	ARAR	Any actions at Site 7N should not adversely impact the value of the floodplain.
Clean Water Act, Section 404; 40 CFR 230.10; 40 CFR 231 (231.1, 231.2, 231.7, 231.8)	Action to prohibit discharge of dredged or fill material into wetland without permit.	Not applicable	The remedial response action does not include discharge of dredged or fill material to a wetland.
<b>STATE/LOCATION-SPECIFIC</b>			
Virginia Endangered Species Act and Virginia Board of Game and Inland Fisheries; Code of Virginia Sections 29.1-563 <i>et seq.</i> and 29-100 <i>et seq.</i>	Action to conserve endangered species or threatened species, including consultation with the Board of Game and Inland Fisheries.	ARAR	Bald eagles (threatened species) have been sighted in the vicinity of Site 7N.

**TABLE 3**

**POTENTIAL ACTION-SPECIFIC ARARS  
SITE 7N—OLD DUPONT DISPOSAL AREA  
NAVAL WEAPONS STATION YORKTOWN, CHEATHAM ANNEX SITE**

Citation	Requirement	ARAR Criteria Determination	Comments
<b>FEDERAL/ACTION-SPECIFIC</b>			
DOT Rules for Hazardous Materials Transport (49 CFR Parts 107 and 171.1-500)	Regulates the transport of hazardous waste materials including packaging, shipping, and placarding.	ARAR	Remedial action may include off-site disposal.
USACE Permits for Structures or Work in or Affecting Navigable Waters of the U.S. (33 CFR Part 322)	Regulates structures affecting navigable waters.	Not applicable	Shoreline stabilization will not include below mean low water (MLW) structures.
<b>STATE/ACTION-SPECIFIC</b>			
Virginia Solid Waste Management Regulations (9 VAC 20-80)	Regulates the identification, management, and disposal of solid wastes.	ARAR	Remedial action may include off-site disposal of non-hazardous waste.
Virginia Regulations Governing the Transportation of Hazardous Materials (9VAC 20-110)	Regulates the transport of hazardous waste materials including packaging, shipping, and placarding.	ARAR	Remedial action may include off-site disposal of hazardous waste.
Virginia Hazardous Waste Management Regulations (9 VAC 20-60)	Regulates the treatment, storage, and disposal of hazardous waste.	ARAR	Remedial action may include off-site disposal of hazardous waste.
Identification and Listing of Hazardous Waste (9 VAC 20-60, Part III)	Regulations concerning determination of whether or not a waste is hazardous based on characteristics or listing.	ARAR	Remedial action may include off-site disposal of hazardous waste.
Manifest Systems, Recordkeeping, and Reporting (9 VAC 20-60, Part VII)	Regulates manifest systems related to hazardous waste treatment, storage, and disposal.	ARAR	Remedial action may include off-site disposal of hazardous waste.
Virginia Stormwater Management Regulations (VR 215-02-00) and Virginia Erosion and Sediment Control Regulations (VR 625-02-00)	Regulates stormwater management and erosion/sedimentation control practices that must be followed during land disturbing activities.	ARAR. Applicable for remedial actions involving land disturbing activities greater than one acre.	Activities during construction will comply with the Virginia Storm Water Management Program. A sediment and erosion control plan will be submitted to LANTDIV for approval.

**FIGURES**

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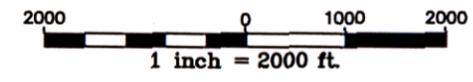


CHEATHAM ANNEX PROPERTY BOUNDARY

SITE 7N  
OLD DUPONT DISPOSAL AREA  
(APPROXIMATE LOCATION)

CHEATHAM ANNEX  
PROPERTY BOUNDARY

YORK RIVER  
EBB  
FLOOD

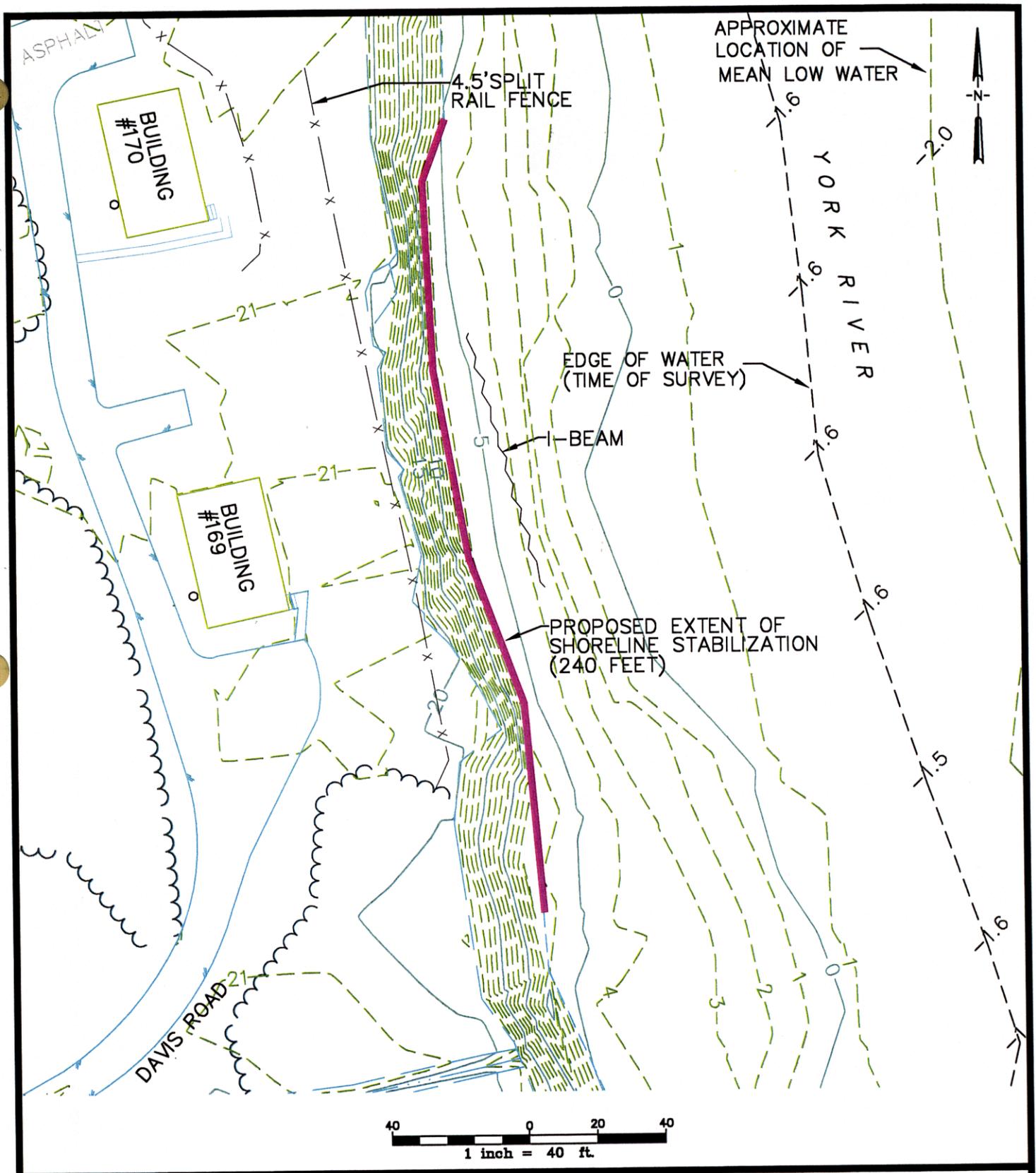


SOURCE: CLAY BANK, VA AND WILLIAMSBURG, VA  
U.S.G.S. 7.5 MINUTE TOPOGRAPHIC QUADRANGLES.

**Baker**

FIGURE 1  
CHEATHAM ANNEX LOCATION MAP

NAVAL WEAPONS STATION YORKTOWN  
CHEATHAM ANNEX SITE



**NOTES:**

1. HORIZONTAL DATUM—BASED ON VIRGINIA STATE PLANE COORDINATE SYSTEM—SOUTH ZONE (NAD 83)(CORS 96)
2. VERTICAL DATUM—ELEVATIONS SHOWN ARE IN FEET (NAVD 88)
3. THIS PLAN IS BASED ON A FIELD SURVEY PREPARED BY PATTON HARRIS RUST AND ASSOC. ON APRIL 29, 2004 AT 12:00 PM.
4. MEAN LOW WATER APPROXIMATELY -2.0 NAVD 88

**FIGURE 2**  
**SITE 7N LAYOUT MAP**  
 NAVAL WEAPONS STATION YORKTOWN  
 CHEATHAM ANNEX SITE

**APPENDIX A**  
**SITE 7N PHOTOGRAPHS**

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Photo 1: View of eroded shoreline (looking north)



Photo 2: View of shoreline with debris (looking north)



Photo 3: View of shoreline with debris (looking northwest)

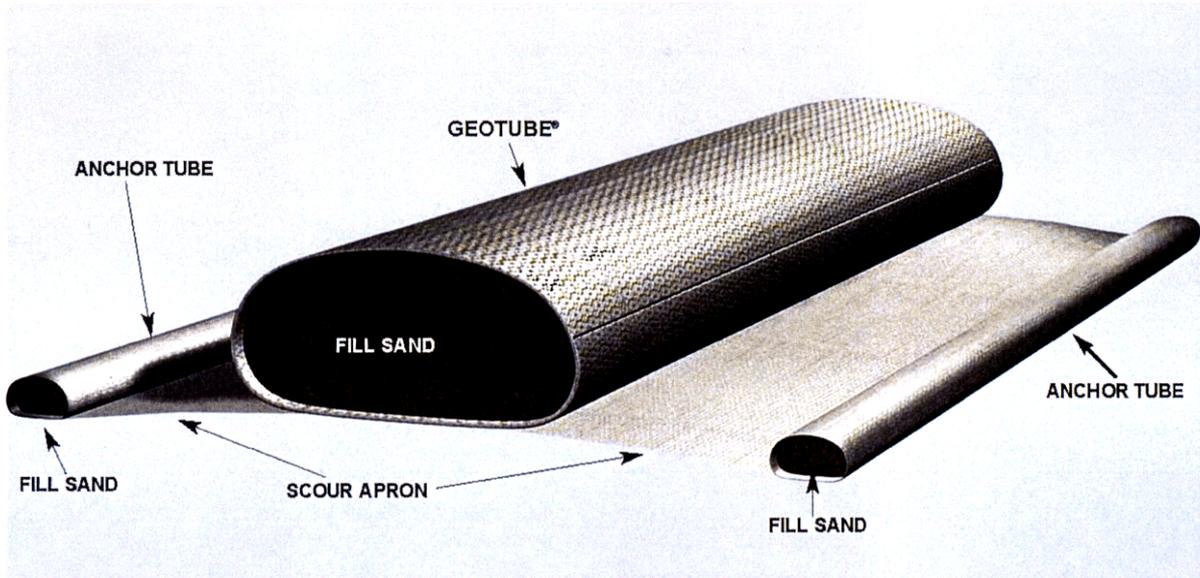


Photo 4: View of shoreline with debris (looking west)

**APPENDIX B**  
**TYPICAL GEOTUBE<sup>®</sup> CROSS-SECTION**

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Typical cross-section showing the relationship between the Mirafi<sup>®</sup> **Geotube**<sup>®</sup> and the Scour Apron. The intent of the apron is for the anchor tubes to bury themselves and protect the **Geotube**<sup>®</sup> from scour.