6/30/06-01940

FINAL

SITE 1 – LANDFILL NEAR INCINERATOR WORK PLAN ADDENDUM

FOR SHORELINE STABILIZATION/GEOTEXTILE TUBE INSTALLATION AT IR SITE 7 – OLD DUPONT DISPOSAL AREA NAVAL WEAPONS STATION YORKTOWN CHEATHAM ANNEX YORKTOWN, VIRGINIA

Submitted To:
Department of the Navy, Atlantic Division
Naval Facilities Engineering Command
6506 Hampton Boulevard
Norfolk, Virginia 23508-1278

Contract No.: N62470-03-D-4198
Contract Task Order No. 001, Mod. 02 & 03
Bhate Project No.: 9030080

JUNE 2006

Prepared By:

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RESPONSIVENESS · INTEGRITY · TEAMWORK

6/30/06-01940

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NAVAL WEAPONS STATION YORKTOWN CHEATHAM ANNEX YORKTOWN, VIRGINIA

REVIEW SHEET

COMMITMENT TO IMPLEMENT THIS WORK PLAN

Jeff Dickson Project QC Manager/Site Superintendent	Jeff Dickson/LMP Signature	6/30/06 Date
Andrew Rider, P.E. Project Manager	Andrew Rider Signature	Date
Judith McBride Health and Safety Manager	Judith McBride Signature	6/30/06 Date
Lenus M. Perkins Senior Project Manager	Lenus M. Perkins Signature	6/30/06 Date
Tim King OE/UXO Director	Tim King Signature	Date

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SITE 1 – LANDFILL NEAR INCINERATION WORK PLAN ADDENDUM FOR SHORELINE STABILIZATION/GEOTEXTILE TUBE INSTALLATION AT IR SITE 7 – OLD DUPONT DISPOSAL AREA

NAVAL WEAPONS STATION YORKTOWN CHEATHAM ANNEX YORKTOWN, VIRGINIA

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1 INTRODUCTION

1.1 Background

Bhate Environmental Associates, Inc. (Bhate), has been retained by the Department of the Navy, Naval Facilities Engineering Command (NAVFAC), Norfolk, Virginia, under Contract No. N62470-03-D-4198, Contract Task Order No. 001 (CTO #001), Modification (Mod) 02 and 03 to perform a Time-Critical Removal Action (TCRA) and munitions response action at Site 7 (Figure 1-1), Naval Weapons Station (WPNSTA) Yorktown, Cheatham Annex (CAX), located in Yorktown, Virginia.

1.2 Scope of Work

The *Action Memorandum for Site 7 – Old Dupont Disposal Area* (U. S. Navy, 2004) described the TCRA. The proposed TCRA at Site 7 addresses only 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. The geotextile tubes will be placed against the toe of the eroding slope and will protect approximately 240 feet of the shoreline. Figure 1-2 shows the extent of the shoreline to be protected which encompasses the area of debris south of Cabin 169 and extends to the northern boundary of Cabin 170.

The design specifications and drawings, developed by Baker Environmental, Inc. (Baker), for the placement of the geotextile tubes were provided by NAVFAC Mid-Atlantic to Bhate (Appendix A). The design specifications and drawings document is broken down into the following components:

- Site Preparation
- Waste Disposal
- Stabilization of the Existing Slope
- Installation of the Geotextile Tubes and Scour Aprons
- Filling of the Geotextile Tubes and Scour Aprons
- Backfilling around the Geotextile Tubes and Scour Aprons
- Site Restoration
- Standards and Specifications
- Submittals
- Performance

The excavated waste and debris will be transported to and disposed at a Navy-approved off-site Resource Conservation and Recovery Act (RCRA) Subtitle D landfill. Metal and woody debris will be recycled, if possible.

Based on preliminary results conducted during sampling activities, the landfill material is assumed to be non-hazardous (Baker, 2004). The management and disposal of hazardous waste is not anticipated and, therefore, is not included in the project specifications.

On 9 June 2004, a 3-inch diameter projectile was found on the beach of the York River, below Site 7. The projectile was removed from the site and disposed of by Naval Weapons Station Yorktown Explosive Ordnance Disposal Mobile Unit Two (EODMUTWO). The projectile was severely corroded and appeared to be unfired and unfuzed. Evidence following disposal procedures was inconclusive as to whether the projectile was explosive or inert filled. The origin of this single item is unknown.

In order to accommodate installation of the geotextile tube and scour apron, all debris must be removed from the upland area of Site 7 to an approximate depth of one foot. For safety reasons, all munitions of explosive concern (MEC) must be removed from the site to the same depth.

The *Scope of Work, Munitions Response Actions to Support Geotextile Installation at the Old Dupont Disposal Area, Cheatham Annex, WPNSTA Yorktown, Yorktown, Virginia* (U. S. Navy, 2005) describes the munitions response actions. A MEC removal action will be performed in accordance with an approved Explosives Safety Submission (ESS) in the area where the geotextile tubes will be installed. The total area of the MEC removal action includes two distinct areas. The area where the geotextile tube will be installed is from the toe of the slope of the embankment to about ten feet from the high tide line and approximately 250 feet long +/- 40 feet. This area is referred to as the upland area. The second area where the scour apron will be installed extends ten feet from the high tide line to about 25 feet east towards the York River and also approximately 250 feet long +/- 40 feet. This area is referred to as the shoreline area. The scope of work includes the following four tasks:

- Munitions response in the upland area
- Munitions response in the shoreline area
- Explosives Safety Submission preparation (submitted under separate cover)
- Update the work plan

The ESS was prepared in accordance with Naval Ordnance Safety and Security Activity (NOSSA) Instruction 8020.15. An ESS is required before conducting ground disturbance or intrusive activities in areas known or suspected to contain munitions and explosives of concern (MEC). The ESS is a planning document for conventional ordnance and explosives (OE) response actions and provides the safety specifications for execution of the selected response alternative. The ESS is a separate submittal from this work plan, however, an overview of the operational approach for the OE response action are described herein. The final ESS was prepared and submitted to NAVFAC Mid-Atlantic and approved by NOSSA in December 2005

(Bhate, 2005). In addition, an Unexploded Ordnance (UXO) Work Plan is being prepared and submitted under a separate cover.

The proposed TCRA (Navy, 2004) and the design specifications and drawings (Appendix A) included the stabilization of the existing slope and placement of a geotextile/geomembrane on the slope. Due to the lack of available funding, these items were removed from Bhate's scope of work.

1.3 Site Description

The area was used as a landfill by the City of Penniman and the DuPont Penniman facility which manufactured ordnance during the World War I era. Site 7 is approximately one-acre in size and is located adjacent to recreational cabins 169 and 170 along the York River (See Figure 1-2). The areas surrounding Site 7 are sparsely wooded with trees and shrubs except to the east, which is along the York River. The edge of the site along the York River is extremely steep (nearly vertical in areas) and has lost most of its vegetation to erosion due to slope soil characteristics and wave action. The river is located approximately 15-feet below Site 7, at the bottom of the steep slope. According to the 1984 Initial Assessment Study (IAS) for CAX, Site 7 received wastes from the City of Penniman and the DuPont Penniman facility, which dates the waste to the World War I era. The wastes were reported to be non-hazardous and/or inert. Even though specific information documenting the types and quantities of wastes was not available, the IAS did not recommend Site 7 for a Confirmation Study because of the "non-hazardous nature of the wastes disposed there" (Naval Energy and Environmental Support Activity (NEESA), 1984).

On September 18, 2003, Hurricane Isabel impacted the northern Outer Banks of North Carolina and crashed onto the shores of Site 7. Shortly after the hurricane, debris was found that appeared analogous to what was used during the operation of the DuPont Penniman facility. The shoreline of Site 7 is approximately 15 feet lower than the elevation of the two recreational cabins along the York River. The hurricane washed away the shoreline and created a very unstable base for the two cabins, in turn requiring the stabilization of the shoreline. In May 2004, Bhate performed a cleanup of the beach, which covered an area of approximately 600 feet along the shore and found no MEC material.

The *Action Memorandum for Site 7 – Old Dupont Disposal Area* (Navy, 2004), proposed a TCRA for the site. The TCRA recommended shoreline stabilization, which will mitigate the potential direct contact threat posed by the eroding disposal area debris and will mitigate the threat of contaminant release and migration. The TCRA was developed as a short-term response to mitigate risk at the site. A long-term remedial action for the site has not yet been evaluated. This action, as proposed, will not impede future responses based on available information and will immediately address obvious contamination and a potential human health and environmental hazard. The proposed removal action is consistent with accepted removal practices and is expected to mitigate the imminent threats that meet the Natural Oil and Hazardous Substance Pollution Contingency Plan (NCP) removal criteria. If no action is taken or the action is delayed, the potential for direct contact with the debris and the threat of migration of contaminants from the site will remain. In addition, the slope at the site will continue to erode into the York River.

The *Final Trenching and Limited Field Investigation Report Site 7N* (Baker, 2004) was conducted in support of the proposed TCRA following the landfill exposure along the York River shoreline from Hurricane Isabel. The limited sampling and analysis event did not fully define the extent of contamination. The report had three recommendations. The first recommendation was to consider installing a fence to lessen a potential falling risk. The second recommendation was to stabilize the shoreline to prevent further erosion of the ash and debris layer along the exposed slope. This would help minimize future erosion of the landfill material into the York River until a final remedy for the site is determined and completed. The third recommendation was to plan and execute a more comprehensive investigation of the site. This investigation would have a detailed determination of the nature and extent of contamination and an assessment of the human health and ecological risks. As requested by the Navy, this work plan only addresses the second recommendation to stabilize the shoreline to prevent further erosion along the exposed slope.

0 1 Mi. 2 Mi.

1" = 1 MILE

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SITE LOCATION MAP

Source: Topozone.com

PROJECT NO.	SCALE	DATE	DRAWN BY:
9030080	SHOWN	1/19/06	MRM

DRAWING NO: FIGURE 1-1

CHEATHAM ANNEX
SITE 7-OLD DUPONT DISPOSAL AREA
NAVAL WEAPONS STATION
YORKTOWN, VIRGINIA
CONTRACT NO. N62470-03-D-4198 CTO-001
BHATE PROJECT NO. 9030080

FIGURE 1-1

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. (PHRA) ON APRIL 27, 2004.
4. EDGE OF WATER ON APRIL 29, 2004 AT 12:00 PM.
5. THIS INFORMATION IS DEPICTED TO PROVIDE VISUAL AID WITHIN THE CONTEXT OF THIS REPORT AND SHOULD NOT BE USED AS A SOLE REFERENCE IN PRECISE DIMENSIONING OF FEATURES INDICATED. PLEASE VERIFY THE LOCATION OF ALL FEATURES, INCLUDING UNDERGROUND AND ABOVEGROUND UTILITIES, PRIOR TO ANY SUBSURFACE EXPLORATION.

GRAPHICAL SCALE

50' 0 50'

1"=50'

SOURCE: TOPOGRAPHIC SURVEY MAP OF CAX SITE 7
PREPARED BY PHRA (5/18/04) REF. FILE 10491–3–1

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SITE PLAN

CHEATHAM ANNEX
SITE 7–OLD DUPONT DISPOSAL AREA
NAVAL WEAPONS STATION
YORKTOWN, VIRGINIA
CONTRACT NO. N62470–03–D–4198 CTO–001
BHATE PROJECT NO. 9030080

SCALE	DRAWING NO.	DRAWN BY:	DATE:	
1"=50'	2 OF 3	MRM/EJR	1/19/06	FIGURE 1–2

2 REMEDIATION ACTIVITIES

2.1 Overview of Proposed Approach and Rationale

Bhate has developed an operational approach for the shoreline stabilization project at Site 7 at the WPNSTA Yorktown, CAX that is protective of Bhate and WPNSTA personnel, as well as the environment and the general public. This approach is based on experience with similar projects and consultation with specialists.

Approximately 240 feet of geotextile tubes will be placed along the toe of the eroding slope of Site 7. Figure 1-2 shows the extent of the shoreline to be protected by the geotextile tubes. During mobilization and site preparation, an initial OE/UXO clearance will be conducted within the footprint of the disposal area. After the initial OE/UXO clearance, the clearing and grubbing of the site will be conducted. Prior to the installation of the tubes, OE/UXO remediation of the upland and shoreline areas will be conducted, which will include the screening and removal of the large metal and concrete debris. The screened material will either be certified 'free of explosives' and recycled or disposed of by denotation on-site or at the WPNSTA Yorktown open burn/open detonation (OB/OD) range. No soil will be taken off-site.

2.2 Pre-Mobilization Activities

Bhate has prepared the following documents for review and approval by the Navy:

- Operational Work Plan Addendum
- Unexploded Ordnance (UXO) Work Plan (Separate submittal)
- Explosives Safety Submission (Previously submitted and approved) (Bhate, 2005)

The following sections and appendices from the *Final Work Plan, Site 1 - Landfill Near Incinerator, Naval Weapons Station Yorktown, Cheatham Annex, Yorktown, Virginia* (Bhate, 2003) are applicable to Site 7 and are incorporated by reference.

- Resources and Project Organization (Section 2: Bhate, 2003)
- Environmental Protection Plan (Section 6; Bhate, 2003)
- Quality Control Plan (Appendix A, Bhate, 2003)
- Site Safety and Health Plan (SSHP) (Appendix C; Bhate, 2003), except for an addendum of the plan covering UXO activities (Separate submittal)
- Site-Specific Accident Prevention Plan (Appendix C; Bhate, 2003)

2.2.1 Utility Mark Out and Line Termination

To assist in the planning of the site activities, Bhate will submit a request to the Public Works Center for a utility mark out at the site prior to mobilization.

2.2.2 Pre-Construction Meeting

Prior to mobilization, Bhate will coordinate the scheduling of a pre-construction meeting with the Resident Officer In-Charge of Construction (ROICC) (who will provide notification to attendees). Bhate will use the meeting to present, in detail, steps for the removal activities and construction activities. Lines of communication between Bhate, the ROICC, the Navy Technical Representative (NTR), and WPNSTA Yorktown personnel will be confirmed during the meeting.

2.2.3 Station Permits

Bhate will submit applications, as required, to the WPNSTA Yorktown Public Works Department in conjunction with mobilization to the site. At a minimum, Bhate anticipates the only permit, which may be required, is for hot work. The hot work permit (if required) will be renewed at the beginning of each shift or as required by the WPNSTA Yorktown Safety Department.

2.3 Mobilization and Site Preparation

Bhate will schedule a mobilization date upon receiving Work Plan Addendum approval and Notice to Proceed from the ROICC. Bhate personnel, equipment, and materials will be mobilized from Bhate resource centers located near Richmond, Virginia; Birmingham, Alabama; Fort Walton Beach, Florida; and Wilmington, North Carolina. Local vendors will provide some of the equipment and materials needed for the project.

Bhate will comply with WPNSTA Yorktown security requirements upon mobilization and throughout the course of the project. Bhate will submit pass application forms and criminal history record request for clearances three weeks prior to mobilization. Security badges will be obtained for on-site Bhate and subcontract employees upon arrival at WPNSTA Yorktown. Each employee will register with the Security Department by submitting pass application forms and criminal history records, which includes providing their names, social security numbers, photo identification, and passport or a copy of their birth certificate. Bhate personnel will be restricted from entering areas at WPNSTA Yorktown not associated with the project.

Bhate will mobilize labor, equipment, and materials necessary to safely and efficiently execute the project tasks. Upon mobilization, Bhate will initially establish a command center for administration and support personnel. The Command Center will be located outside of the exclusion zone along Chase Road. A portable restroom and steel storage trailer will be located at Site 7. Bottled water will be provided at the site and potable water coolers will be provided in the office/crew trailer.

2.3.1 Work Zones

To prevent migration of contamination caused by personnel or equipment, work areas and personal protective equipment (PPE) will be clearly specified prior to beginning operations.

The work area will be divided into the following three zones:

- Support Zone
- Contamination Reduction Zone
- Exclusion Zone

In addition, on-site and off-site traffic patterns will be designated, as well as, stockpile area(s) and decontamination pad (if necessary), water sources identified, and coordination with the Station Fire Department.

2.3.1.1 Support Zone

Bhate will establish the Support Zone (SZ) at the previous trailer location at Site 1, as agreed to by the Navy. The support zone will serve as a staging area outside the immediate work area.

2.3.1.2 Contamination Reduction Zone

Bhate will establish a Contamination Reduction Zone (CRZ) inside the entrance to the geotextile tube installation area from the SZ. In the CRZ, Personnel will remove any disposable PPE and place it into lined receptacles for disposal as non-hazardous debris.

2.3.1.3 Exclusion Zone

The Exclusion Zone (EZ) will include the geotextile tube installation area, the clearing and grubbing area, the soil screening area, and any stockpiles. Bhate will install a temporary, high-visibility barricade fence at the limits of each EZ to restrict access to unauthorized personnel. The Bhate Superintendent and Site Superintendent/Site Safety and Health Specialist (SSHS) will monitor and control EZ area access. Activities within the EZ area will conform to the SSHP (Bhate, 2003). The high-visibility fence will be removed at the completion of geotextile tube installation.

During the surface sweep, subsurface excavation MEC remediation activities, and the screening activities the EZ will be a distance of 219 feet (Figure 2-1) from the edge of the work area. The EZ includes a part of Chase Road. Guards or guard material, such as road barriers or signs, will be posted at both ends of the road to keep unauthorized personnel out of the exclusion zone. This EZ will remain in effect for surface sweep and subsurface excavation operations.

During the MEC remediation activities, non-UXO trained personnel will not be allowed in the EZ during intrusive operations. If access is required by non-UXO qualified personnel all work will stop while they are in the EZ.

2.3.1.4 On-Site Traffic Patterns

Due to limited sight distances caused by uneven terrain, Bhate will establish defined routes for material handing and movement around the site. Where necessary, Bhate will employ spotters to guide heavy equipment operators and vehicles transporting materials in tight work areas. A general traffic pattern for the site will be established and will be communicated in advance to field personnel.

2.3.1.5 Off-Site Traffic Control

Bhate will conform to WPNSTA Yorktown requirements with respect to controlling unauthorized vehicle access into the site. In addition, Bhate will coordinate any required roadway closures with the ROICC and the appropriate department(s) at WPNSTA Yorktown. Haul routes through the WPNSTA Yorktown, CAX will be approved in advance by the ROICC, Activity Point of Contact (POC), and Navy Environmental Group.

2.3.1.6 Water Source for Remedial Activities

A source of non-potable water may be necessary for pressure washing of truck tires, dust control, and washing of some of the larger equipment. Bhate will coordinate with the ROICC and the Station Fire Department to locate a source for water near the site. If no water source is available near the site, Bhate will arrange for the use of temporary containers such as water trucks or plastic storage tanks to store non-potable water for use in decontamination activities.

2.3.1.7 Decontamination Pad

If necessary, decontamination pads will be constructed of polyethylene sheeting and placed under trucks and equipment in the CRZ. Decontamination pads will be constructed to contain rinse waters and direct runoff back towards the landfill. The pads will be constructed so that they can be moved to other areas as needed.

2.3.1.8 Stockpile Area Construction

Temporary stockpiling of the waste materials will be necessary to facilitate site operations. The stockpile areas will be located within the EZ. All stockpiles except for woody debris will be placed on and covered by polyethylene sheeting to minimize contact with rainwater or the ground surface.

2.3.1.9 Stand-by Station Fire Protection

Bhate will consult with the Navy to determine the requirements for placing the Station Fire Department on Stand-by status during site activities. In addition, Bhate will implement on-site fire protection measures specified by the Navy.

2.3.2 Initial MEC Clearance

An initial MEC surface clearance will be conducted prior to any other work at the site. The MEC surface clearance is limited to the areas where the following activities will be conducted:

- Clearing and grubbing
- Geotextile tube installation
- Silt fence installation
- High visibility safety fence installation
- Temporary access road construction
- Equipment lay-down
- Stockpiling materials

The specific MEC clearance procedures are contained in the UXO Work Plan (Bhate, 2006). Coordination with the Project Manger for the MEC remediation will be required prior to the start of this work plan.

2.3.3 Sampling and Analysis Activities

The sampling and analysis activities for this project include the verification of cleanliness of sand and backfill material being used on-site.

The sand and backfill brought in from off-site will be tested for total petroleum hydrocarbon (TPH); benzene, toluene, ethylbenzene, and total xylenes (BTEX); and full Toxicity Characteristic Leaching Procedure (TCLP) including ignitability, corrosivity, and reactivity. A composite sample of material will be taken from each borrow site. TPH concentrations will be determined by using U.S. Environmental Protection Agency (USEPA) 600/4-79-020 Method 418.1. BTEX concentrations will be determined by using USEPA SW-846 Method 5030/8020. TCLP will be performed by using USEPA SW-846 Method 1311. The material will contain less than 100 parts per million (ppm) of TPH and less than 10 ppm of the sum of BTEX and will not fail the TCLP test or other RCRA characteristics tests.

2.3.4 Clearing and Grubbing

Clearing and grubbing will consist of felling trees and removal of vegetation within the EZ. The clearing and grubbing will commence after the completion of the MEC surface clearance. Only those trees necessary for the shoreline access, geotextile installation, and equipment laydown and operation area will be felled. Trees, slash, and timber will be ground and spread in the wooded areas adjacent to the site or stockpiled for future on-site use. Equipment anticipated to be used

for clearing and grubbing includes chainsaws, machetes, an excavator, a tub grinder, and a chipper/shredder. The stumps will be removed during the subsurface MEC clearance activities.

2.4 MEC Remediation

After the initial MEC surface clearance, there are two additional MEC remediation activities, upland excavation with soil screening and shoreline magnetic detection of anomalies using hand-held instruments. The upland and shoreline MEC remediation activities are briefly described in further detail below. For additional description of these activities, please refer to the UXO Work Plan (Bhate, 2006).

2.4.1 Upland

In order to accommodate the installation of the geotextile tubes, the upland area must be cleared of MEC. The upland area is defined as from the toe of the slope of the embankment to about 10 feet from the high tide line and approximately 250 feet long +/- 40 feet. This will be accomplished by the excavation and mechanical screening of the soil. All of the soil will be placed into a conveyor belt feed screening machine utilizing a 2-inch screen. The soil passing through the screen will be stockpiled adjacent to the screening area prior to replacement. The material not passing through the screen will be checked for MEC, segregated, and placed into roll-off containers.

2.4.2 Shoreline

In order to accommodate the placement of sand on the river side of the geotextile tubes, the shoreline area must be cleared of MEC. The shoreline area is defined as where the scour apron will be installed, which extends 10 feet from the high tide line to about 25 feet east towards the York River and also approximately 250 feet long +/- 40 feet. This will be accomplished by using a mag/dig approach. Two lateral-transect strips approximately three feet wide running the length of the shoreline (300 feet) will be investigated. The first transect strip along the shoreline will be approximately 7 feet above the low tide mark and the second transect will be 7 feet further inland and parallel with the first transect. These two transect strips will cover approximately 20% of the area from the low tide up to 25 feet into the shore. If no MEC or explosive contaminated scrap is found during the investigation of these transect strips, it will be reasonably assumed that this area does not contain any discarded military munitions (DMM) burial pits, and no further removal effort will be undertaken for the area near the shoreline.

2.4.3 MEC Disposal

Once a MEC item is encountered, the UXO technicians will determine if the item is safe to move. If the item is determined to be unsafe to move, a blow in place (BIP) will be planned and initiated using the demolition procedures described in the UXO Work Plan. If both UXO technicians have determined that the MEC item is safe to move, they will move the item to a safe disposal area (SDA) and counter charge the item using the demolition procedures described in the UXO Work Plan. The sited and permitted WPNSTA Yorktown Explosives Ordnance Disposal (EOD) range is the SDA of choice. Prior to shipment of the item from CAX to

WPNSTA Yorktown, a Uniform Hazardous Waste Manifest will be prepared for signature by a WPNSTA Yorktown Environmental representative. The transportation of the MEC item will conform to the UXO Work Plan (Bhate, 2006) and 49 Code of Federal Regulations (CFR) Parts 100-185.

2.4.4 Solid Waste Disposal

No soil will be removed from the site. The screened soil will be placed back on the site. The screened material from the MEC remediation is considered Material Potentially Presenting an Explosive Hazard (MPPEH). This material must either be "Certified Safe" or "Certified Hazardous" in accordance with Department of Defense (DOD) Instruction 4140.62, *Management and Disposition of Material Potentially Presenting an Explosive Hazard (MPPEH)*, dated 3 December 2004. All "Certified Safe" MPPEH material will be transferred to the nearest Defense Reutilization Managing Organization (DRMO). In the event that DRMO will not accept the "Certified Safe" MPPEH related scrap, then Bhate will transport to a local recycler for processing. "Certified Hazardous" MPPEH will require the material to be transferred to an agency that meets the requirements of DOD Instruction 4140.62. Bhate will track the material from the time of recovery through the disposal process and will include this documentation in the Final Report.

Any necessary stockpiling will be in accordance with Section 2.3.1.8 of this Work Plan Addendum. Equipment anticipated to be used for the excavation and disposal includes an excavator, bulldozer, roll-offs, and an off-road dump truck.

2.5 Shoreline Protection

The remediation activities for Site 7 will consist of geotextile tube placement and filling, grading the bank, and placing a geomembrane/geotextile fabric over the bank to prevent erosion.

2.5.1 Geotextile Tube Placement

Approximately 240 feet of geotextile tubes will be placed along the toe of the eroding slope of Site 7 as shown on Figure 1-2. The geotextile tubes will be fabricated from high-quality, high-strength woven polyester or polypropylene. As specified in the design specifications in Appendix A, the geotextiles shall meet the testing requirements listed in Tables 2(a) and 2(b) of Geosynthetic Research Institute (GRI) Test Method GT10, "Test Methods, Properties and Frequencies for High Strength Geotextile Tubes used as Coastal and Riverine Structures". The geotextile tube will be the same material as is used for the scour apron. A system of multiple geotextile tubes will be installed. The geotextile tubes will be placed and installed in accordance with the design specifications and drawings in Appendix A.

The location of the geotextile tubes will be surveyed by professional surveyors and identified with grade stakes prior to placement. First, a trapezoidal trench or saddle will be formed in the sand and lined with a scour apron and the still empty tubes. Large stakes or anchors may be used at predetermined spacing to fasten the geotextile tubes in place during filling. This will provide a stable base for the tube(s) and allows the maximum height to be achieved. The tubes will be

placed on top of a geotextile scour apron to prevent undercutting of the tube's foundation during coastal storms and to reduce local erosion caused by the flow of water out during the filling process. Approximately one foot of cover will be placed over the scour apron to protect the apron from damage.

2.5.2 Geotextile Tube Filling

The geotextile tubes will be filled hydraulically and/or mechanically with a slurry of sand and water. Sand will be imported from an off-site borrow location. The sand for filling the tube(s) will contain not more than 15 percent fines (percent by weight passing the No. 200 sieve) and should be no larger than 0.3 millimeters (mm) in diameter. Gradation testing of the sand will be conducted in accordance with American Society for Testing and Materials (ASTM) D 422 as specified in the design specifications in Appendix A. Two gradation tests will be performed for each source of borrow material that is used. Additional testing may be warranted at any time that visual inspection of the sand fill materials indicate that the specified range of particles is not being met.

The anchor tube on the scour apron will be filled first to provide ballast for the scour apron. After the scour apron is filled and secured, the geotextile tube will be filled. The geotextile tube will be initially filled with water to their desired height. Once this has been achieved, the geotextile tubes will be filled with the sand slurry. The sand slurry will push out the existing water through the relief port(s). After completion of filling of the tubes, the fill and relief ports will be properly secured.

If the geotextile tubes are punctured during filling, no field stitching or repairs will be allowed. The tubes will be replaced with a new tube. If a multiple tube system is used, the tubes will be overlapped or butted together so that there are no gaps between the tubes.

Once the tubes are installed, a professional land surveyor will verify the effective height at 25 feet intervals along the length of the tubes.

Equipment anticipated to be used for placing and filling the geotextile tubes includes a hydro pump, excavator, dozer, and various hand tools.

2.6 Backfilling and Site Restoration

After geotextile tube installation is complete, Bhate will:

- Place and grade six inches of topsoil over the upland disturbed area.
- Place and grade fine sand between the geotextile tubes and the York River. The scour apron will have a minimum of one foot of cover to protect the apron from damage.
- Survey the area to verify that the final elevations are in accordance with the drawings and/or acceptable to the Navy.

- Fertilize and seed with specified seed mix on the upland disturbed area.

Bhate will provide laboratory test results to show that any off-site fill materials meet Virginia Department of Environmental Quality (VDEQ) clean fill requirements prior to placement of the fill material. Equipment anticipated to be used for site restoration includes a bulldozer, track loader, and an off-road dump truck.

Bhate will monitor the progress of site restoration and stabilization to determine the appropriate time for removal of erosion and sediment control features as discussed in Section 4 of this Work Plan. Bhate may recommend leaving the erosion and sediment control features in place following demobilization.

2.7 Project Milestones and Schedule

The project milestones are presented in Table 2-1 below. The proposed schedule (Gantt Chart) is presented in Appendix B. The anticipated site mobilization date is June 26, 2006, as noted on the milestone/schedule. In order to avoid impact and delays, the schedule, and most importantly the critical items (in bold) must be adhered to.

Table 2-1. Project Milestones

Milestone	Completion Due
Draft Work Plan Addendum	January 20, 2006
****Review and Comments from the Navy and VDEQ**	**February 20, 2006**
Final Work Plan Addendum	June 30, 2006
****Security Clearance(s)**	**July 17, 2006**
Site Mobilization	July 17, 2006
Clearing and Grubbing	July 20, 2006
Excavate/Screen Soil & Debris and Replace Soil	September 4, 2006
Geotextile Tube Installation and Site Restoration	October 27, 2006
Demobilization	November 3, 2006
Draft Closeout Report	December 1, 2006
*****Review and Comments from the Navy and VDEQ**	**January 19, 2007**
Final Closeout Report	February 9, 2007

****Critical item for Site Mobilization**
*****Critical item for Final Closeout Report submittal**

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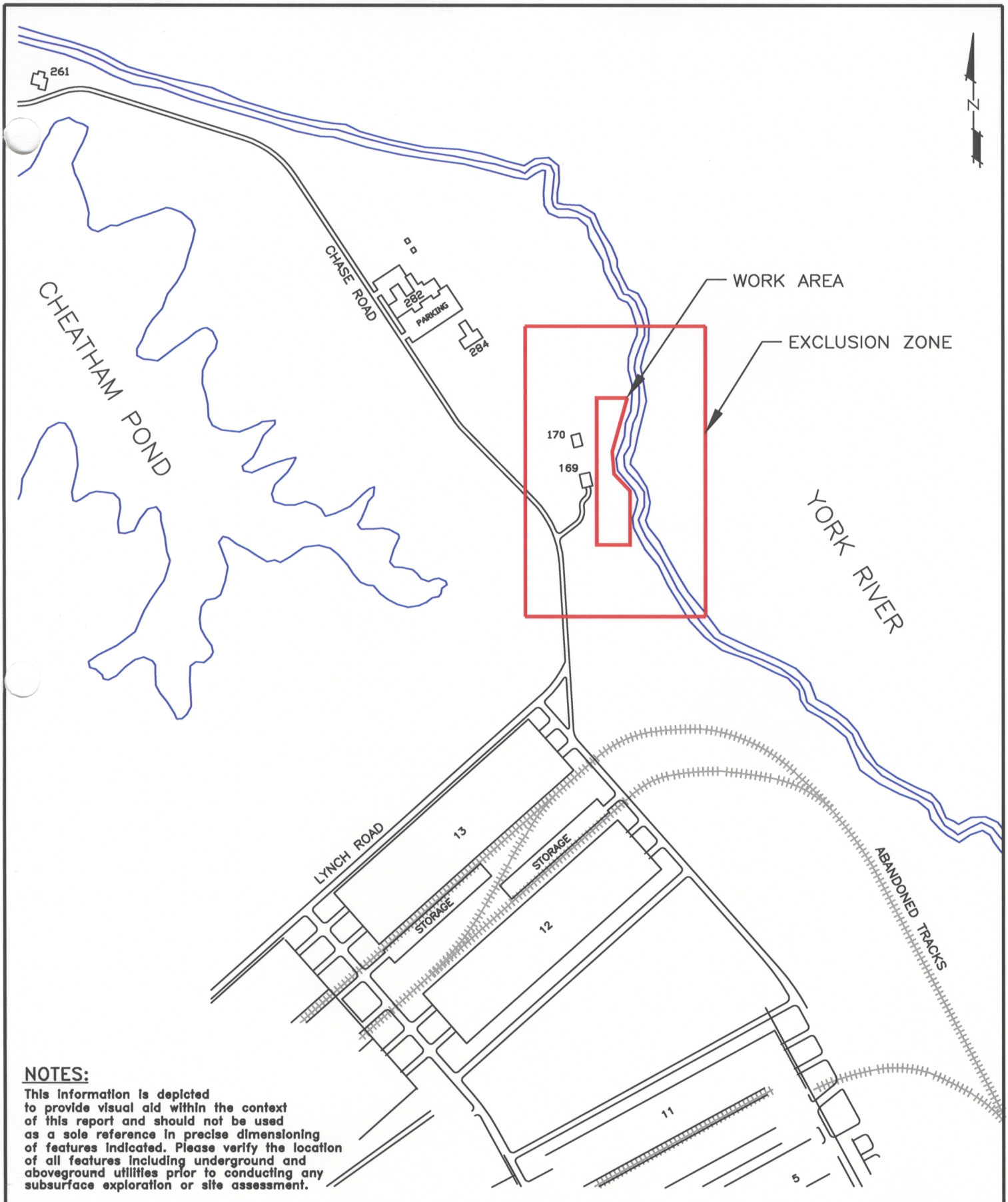

NOTES:

This information is depicted to provide visual aid within the context of this report and should not be used as a sole reference in precise dimensioning of features indicated. Please verify the location of all features including underground and aboveground utilities prior to conducting any subsurface exploration or site assessment.

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SITE MAP WITH OE EXCLUSION ZONE OF 219'

PROJECT NO.	SCALE	DATE	DRAWN BY:
9030080	1"=400'	1/19/06	MRM

DRAWING NO: 9030080-02

CHEATHAM ANNEX
SITE 7-OLD DUPONT DISPOSAL AREA
NAVAL WEAPONS STATION
YORKTOWN, VIRGINIA
CONTRACT NO. N62470-03-D-4198 CTO-001
BHATE PROJECT NO. 9030080

Figure 2-1

3 SUBMITTALS

The following list contains the submittals for this project.

- Work Plan Addendum
- Product data for geotextile tubes, sand backfill, and select fill
- Material certification data for the geotextile fabric and the select fill material
- Statement, signed by an official authorized to certify on behalf of the manufacturer, attesting that the materials and or component materials meet the specified requirements
- Closeout Report

The above will be submitted and accepted by the ROICC prior to initiating any subsequent work.

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4 EROSION AND SEDIMENT CONTROL PLAN

An Erosion and Sediment (E&S) Control Plan is a working document. The control measures and plans described herein will be adhered to and Bhate will be responsible for ensuring that E&S control measures are monitored and maintained. The nature of sediment and erosion control requires continual re-evaluation of site conditions and modification of the E&S Control Plan. In addition to this erosion and sediment control plan, a stormwater pollution plan for construction activities has been prepared and is found in Appendix C.

This E&S Control Plan describes the erosion and sediment control measures that will be installed at CAX Site 7, to limit the migration of soil and sediment from disturbed areas. Erosion and sediment control devices and procedures will be in accordance with the *Virginia Erosion and Sediment Control Handbook* (VESCH), Third Edition, 1992, as prepared by the Virginia Department of Conservation and Recreation (VDCR), Division of Soil and Water Conservation (Tel: 804-786-2064). Applicable sections from the VESCH are provided in Appendix B of the *Final Work Plan, Site 1 - Landfill Near Incinerator, Naval Weapons Station Yorktown, Cheatham Annex, Yorktown, Virginia* (Bhate, 2003). Earth-disturbing activities will include the following:

- Clearing and grubbing of vegetation
- Excavation of contaminated debris and soils
- Site restoration and grading

Proposed erosion and sediment control locations are shown on Figure 4-1 and include the following:

- Stabilized construction entrance/exit
- Silt fencing
- Dust control
- Topsoil placement
- Temporary and permanent seeding and mulching

4.1 Silt Fence

Silt fences will be installed at Site 7 to minimize off-site migration of sediment. Installation of the silt fences will be conducted as shown in VESCH Standard and Specification 3.05 (Appendix B; Bhate, 2003). At a minimum, silt fences will be installed during site preparation work and will be in place prior to any ground disturbance activities. The silt fences will be inspected during each workday and after every significant precipitation event. Bhate will complete any needed repairs promptly following detection.

4.2 Temporary Stone Construction Entrance

A temporary stone construction entrance, consisting of filter fabric overlain by Virginia Department of Transportation (VDOT) #1 coarse aggregate (2- to 3-inch diameter), will be installed to control migration of sediment onto adjacent roadways. In addition, all traffic will be routed through this entrance/exit. The entrance may be omitted if, in the opinion of the ROICC, significant tracking of sediment onto adjacent roads will not result from site activities. If required, the entrance will have minimum dimensions of 70 feet long by 12 feet wide, and will have a minimum thickness of 6 inches with 3 of the 6 inches embedded below surrounding grade. The entrance will be installed as described in VESCH Standard and Specification 3.02 (Appendix B, Bhate, 2003). Upon completion of earthmoving and site restoration activities, the temporary construction entrance will be regraded and incorporated into the finished access road.

4.3 Dust Control

Dust control will be performed, as necessary, in disturbed areas using a water truck with spray nozzle or a small centrifugal pump, polyethylene water tank, and water authorized for use by the ROICC. Dust control will be performed in accordance with the guidance provided in VESCH Standard and Specification 3.39 (Appendix B, Bhate, 2003) and as directed by the Navy.

4.4 Topsoil

Bhate will place a minimum of six inches of suitable imported topsoil over disturbed areas. The topsoil will conform to requirements for organic content, pH, and soluble salts provided in VESCH Standard and Specification 3.30 (Appendix B, Bhate, 2003). Final approval of the topsoil will be provided by the Navy.

4.5 Temporary Seeding and Mulching

Disturbed areas at final grade will be permanently seeded within seven days. If permanent seeding is not practical within the seven days or feasible due to seasonal constraints, a temporary mixture of Kentucky 31 tall fescue and mulch applied at a rate of 100 pounds (lbs)/acre and mulch will be used. In addition, if disturbed areas need temporary stabilization, mulch alone may be used.

4.6 Permanent Seeding and Mulching

An approved seed mixture as determined by the Navy Natural Resource Personnel will be applied to disturbed areas. Seeding will be accomplished with either a hand-held broadcast seeder or by a hydroseeding subcontractor. The seed will be covered with a mulch or erosion matting if the seed is applied by a hand-held broadcaster. The permanent seed mixture will consist of Kentucky 31 tall fescue at 100 lbs/acre, Common Bermuda grass at 10 lbs/acre, Red Top grass at 2 lbs/acre, and a seasonal nurse crop as per dates listed in Table 3.32-D of the VESCH standards at 20 lbs/acre. Seed and mulch application will be performed in conformance

with VESCH Standard and Specifications 3.32 (Appendix B, Bhate, 2003) as necessary and as approved by the Navy.

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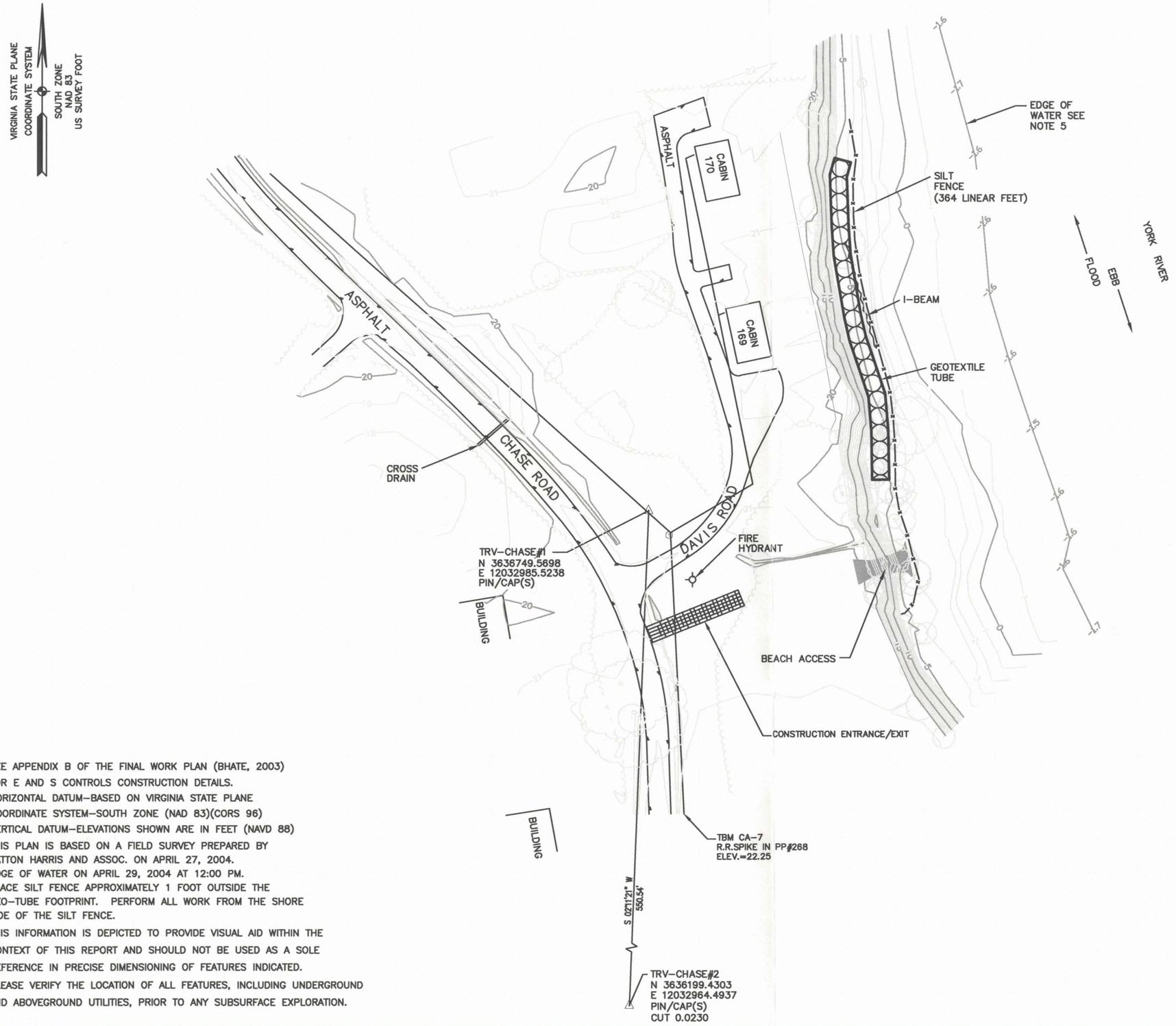

LEGEND:

ASPHALT ROAD	
TREE LINE	
GPS CONTROL STATION	PHRA(GPS) CAX-2
CONSTRUCTION ENTRANCE	
SILT FENCE	

GRAPHICAL SCALE

75' 0 75'

1"=75'

NOTES:

1. SEE APPENDIX B OF THE FINAL WORK PLAN (BHATE, 2003) FOR E AND S CONTROLS CONSTRUCTION DETAILS.
2. HORIZONTAL DATUM-BASED ON VIRGINIA STATE PLANE COORDINATE SYSTEM-SOUTH ZONE (NAD 83)(CORS 96)
3. VERTICAL DATUM-ELEVATIONS SHOWN ARE IN FEET (NAVD 88)
4. THIS PLAN IS BASED ON A FIELD SURVEY PREPARED BY PATTON HARRIS AND ASSOC. ON APRIL 27, 2004.
5. EDGE OF WATER ON APRIL 29, 2004 AT 12:00 PM.
6. PLACE SILT FENCE APPROXIMATELY 1 FOOT OUTSIDE THE GEO-TUBE FOOTPRINT. PERFORM ALL WORK FROM THE SHORE SIDE OF THE SILT FENCE.
7. THIS INFORMATION IS DEPICTED TO PROVIDE VISUAL AID WITHIN THE CONTEXT OF THIS REPORT AND SHOULD NOT BE USED AS A SOLE REFERENCE IN PRECISE DIMENSIONING OF FEATURES INDICATED. PLEASE VERIFY THE LOCATION OF ALL FEATURES, INCLUDING UNDERGROUND AND ABOVEGROUND UTILITIES, PRIOR TO ANY SUBSURFACE EXPLORATION.

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EROSION AND SEDIMENT CONTROL PLAN

CHEATHAM ANNEX
SITE 7-OLD DUPONT DISPOSAL AREA
NAVAL WEAPONS STATION
YORKTOWN, VIRGINIA
CONTRACT NO. N62470-03-D-4198 CTO-001
BHATE PROJECT NO. 9030080

SCALE	DRAWING NO.	DRAWN BY:	DATE:	
1"=75'	3 OF 3	EJR	1/19/06	FIGURE 4-1

5 SITE SAFETY AND HEALTH PLAN ADDENDUM

5.1 Hazard/Risk Analysis

The approved Site Safety and Health Plan (Appendix C of the *Final Work Plan*) (Bhate, 2003) has been amended to address specific potential health and safety hazards associated with performing the work under this task order modification 02. The potential health and safety hazards of this project are summarized below in Table 5-1. The potential for encountering these hazards is ranked (high, moderate, or low) based on the work to be performed and the hazard control measures to be used.

Table 5-1. Task Hazards Summary

Summary	Hazard potential [High, Moderate, or Low]	Description of potential hazards
v **Safety** (i.e. Walking and working surfaces, heavy equipment, traffic, falls, excavations, power and hand tools, materials handling, hoisting and rigging, electrical safety, etc.)	• Moderate All tasks and their control measures are addressed in Task Specific Activity Hazard Analyses in Appendix D of this Work Plan Addendum	• Uneven walking and working surfaces • Slips, trips, and falls • Materials handling • Clearing and grubbing operations • Possible UXO
v **Utilities**	• Low	• Utilities are not anticipated to be encountered
v **Chemical**	• Low	• No chemical contaminants are anticipated to be encountered
v **Physical** (i.e. Heat, cold, noise)	• Low	• Thermal stressors (variable weather anticipated)
v **Biological** (i.e. Plants, animals, insects, spiders)	• Low	• Insect stings and bites • Poisonous animals and plants

The Activity Hazard Analysis (AHA) for the scope of work, identifies potential safety, health, and environmental hazards, and provides for the protection of personnel, the community and the environment. Because conditions may be constantly changing during the course of a project, supervisors must be aware of conditions that may harm site personnel, the community, or the environment. If needed, the Bhate Health and Safety Manager (HSM) will write or approve addenda to modify the AHA. An AHA for the scope of work proposed at the site is presented in Appendix D.

5.2 Emergency Contacts and Medical Facility

The appropriate contact(s) from the emergency contact list found in Appendix E of this Work Plan Addendum will be made for all emergency situations.

> **NOTE: For ambulance, fire, or police contacts, give the name of the road and the nearest intersection. Notify the Project Manager (PM) after emergency contacts have been made.**

The PM should be contacted if unforeseen circumstances require the immediate procurement of additional personal protective or emergency equipment. Attending emergency physicians should be given the telephone number of the Bhate Health and Safety Manager to obtain immediate access to an employee's medical records and for consultation purposes.

The telephone numbers of these secondary contacts are also listed in Appendix E. In conjunction with local street maps, site plats located in this Plan will be used to identify the appropriate hospital route from the site.

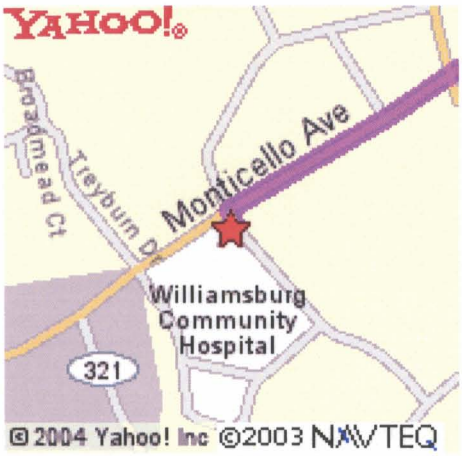
The nearest medical facility is:

Sentara Williamsburg Community Hospital
301 Monticello Avenue
Williamsburg, Virginia 23185

A site-specific Route Map to this facility is included as Figure 5-1. During site activities, a site-specific Hospital Route Map(s) will be posted on-site by the Site Superintendent/Site Safety and Health Specialist (SSHS). The SSHS will also brief site personnel on the appropriate hospital directions.

Overview

Detail



Directions

1. Starting at Site 7N (From Davis Road)
2. Turn left on Chase Road
3. Bear left on D Street
4. Turn right on Sanda Avenue – go 0.3 mile
5. Turn left on ramp – go 0.1 mile
6. Bear right on Colonial National Historical Parkway – go 4.3 mile
7. Continue on Virginia 132Y West – go 0.3 mile
8. Bear left on a local road – go < 0.1 mile
9. Bear left on Virginia 132 South – go 0.4 mile
10. Turn right on Lafayette Street – go 0.9 mile
11. Continue on Monticello Avenue – go 0.3 mile
12. Turn left on South Mount Vernon Avenue – go < 0.1 mile
13. Arrive at Sentara Williamsburg Community Hospital

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HOSPITAL ROUTE MAP
CHEATHAM ANNEX TO SENTARA
WILLIAMSBURG COMMUNITY HOSPITAL
Source: Yahoo.com

PROJECT NO.	SCALE	DATE	DRAWN BY:
9030080	NTS	1/19/06	MRM
			DRAWING NO: FIGURE 5-1

CHEATHAM ANNEX
SITE 7–OLD DUPONT DISPOSAL AREA
NAVAL WEAPONS STATION
YORKTOWN, VIRGINIA
CONTRACT NO. N62470–03–D–4198 CTO–001
BHATE PROJECT NO. 9030080

FIGURE 5–1

6 SELECTED REFERENCES

Baker Environmental, Inc. (Baker), March 2001, *Final Field Investigation Report, Site 7 and AOC 2, Naval Weapons Station Yorktown, Yorktown, Virginia, Cheatham Annex Site.*

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

Bhate Environmental Associates, Inc. (Bhate), June 2003, *Final Work Plan, Site 1 - Landfill Near Incinerator, Naval Weapons Station Yorktown, Cheatham Annex, Yorktown, Virginia.*

Bhate Environmental Associates, Inc., December 2005, *Final Explosives Safety Submission, Shoreline Stabilization/Geotextile Tube Installation at IR Site 7 – Old Dupont Disposal Area, Naval Weapons Station Yorktown, Cheatham Annex, Yorktown, Virginia.*

Bhate Environmental Associates, Inc., January 2006, *Draft UXO Work Plan Addendum, Shoreline Stabilization/Geotextile Tube Installation at IR Site 7 – Old Dupont Disposal Area, Naval Weapons Station Yorktown, Cheatham Annex, Yorktown, Virginia.*

Department of Defense (DOD) Instruction 4140.62, *Management and Disposition of Material Potentially Presenting an Explosive Hazard (MPPEH)*, dated December 3, 2004.

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

United Sates Environmental Protection Agency (USEPA), May 1998, *Aerial Photographic Analysis USN Supply Center – Cheatham Annex, Williamsburg, Virginia.*

U.S. Navy, July 2004, *Action Memorandum for Site 7 – Old Dupont Disposal Area.*

U.S. Navy, December 5, 2005, Revised May 15, 2006, *Scope of Work, Munitions Response Actions to Support Geotextile Installation at the Old Dupont Disposal Area, Cheatham Annex, WPNSTA Yorktown, Yorktown, Virginia*

Virginia Department of Conservation and Recreation (VDCR), Division of Soil and Water Conservation, 1992, *Virginia Erosion and Sediment Control Handbook (VESCH), Third Edition.*

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Appendix A

APPENDIX A

DESIGN SPECIFICATIONS AND DRAWINGS

Site 7N – Old DuPont Disposal Area
Shoreline Stabilization Project
Cheatham Annex
Naval Weapons Station Yorktown, Yorktown, Virginia
Scope of Work

Objective:

The purpose of this submittal is to provide a scope of work, commercial specifications, and construction drawings for the installation of two geotextile tubes (a larger 12 ft wide by 5 ft high and a smaller 1.5 ft diameter scour apron tube) and stabilizing the eroding slope at Cheatham Annex Site 7N, Old DuPont Disposal Area. The total length of shoreline stabilization is approximately 240 feet as shown in the Design Drawings. Each 240 ft length of geotextile tube will be a system of multiple geotextile tubes making up one continuous length of geotextile tube.

Drawings:

The contractor shall base their bids on the submittal drawings attached to this document.

DWG No	EFD DWG NO	NAVFAC DWG NO	TITLE
T-1	XXXXXX	4522119	Vicinity and Location Map and General Notes
C-1	XXXXXX	4522120	Site Preparation
C-2	XXXXXX	4522121	Shoreline Stabilization
C-3	XXXXXX	4522122	Cross Sections and Typical Section
C-4	XXXXXX	4522123	Erosion and Sediment Control Plan, Notes, and Details

Specifications:

The specifications for the installation of geotextile tubes at Site 7N, the Old DuPont Disposal Area, are outlined below:

1. Site Preparation
    a. Prior to the initiation of site activities, the Contractor shall meet with the Government's representative before commencement of any work. Thereafter, meetings will be as often as necessary at the discretion of the Government, but not less than a mutual effort will be made to resolve all problems identified.
    b. A temporary construction access road shall be constructed in accordance with Sheet C-1 of the Design Drawings. The proposed location of the temporary access road may vary based on site conditions and will be field determined.
    c. Clearing and grubbing of the area will be required prior to installation of the geotextile tubes. Sheet C-1 details the area to be cleared. The contractor shall remove trees, stumps, logs, shrubs, and brush as needed to access the site. Surface debris, including fallen trees and the existing I-beams, shall be removed prior to installation of the geotextile tubes to ensure a smooth surface. The surface area must be free of debris that may puncture or otherwise damage the geotextile.

d. The surface of the area for scour apron and geotextile tube placement shall be graded to create a smooth surface. A minimum of six inches of sand, free of debris, will be required underneath the geotextile tubes. A shallow trench shall be constructed, in accordance with Sheet C-3 of the Design Drawings, on the tube centerline to prevent the geotextile tubes from rolling during filling. If debris is encountered during the excavation of the trench, the area shall be undercut and filled with a minimum of six inches of fine sand prior to placement of the tubes. Debris shall be segregated and disposed off-site at an approved disposal facility.
e. The location of the geotextile tubes shall be surveyed by a professional land surveyor and designated with grade stakes prior to placement.
f. High visibility safety fence shall be installed to prevent unauthorized access to the site. Sheet C-1 identifies the proposed location of the safety fence. The safety fence shall be maintained on a daily basis throughout construction activities.
g. Erosion and sediment controls shall be installed in accordance with Sheet C-4 of the Design Drawings. Additional silt fencing may be required based on changing site conditions and shall be installed as necessary. Silt fence shall be inspected and maintained on a daily basis.
h. The Navy and construction oversite personnel will verify and sign-off that the area has been adequately prepared based on the Design Drawings.

2. Waste Disposal
   a. Trees, stumps, logs, shrubs and other "Green Waste" shall be removed from Government property and shall be disposed off-site at an approved landfill.
   b. Surface debris, metal debris, and other waste shall be segregated, sampled and analyzed, and disposed off-site at an approved landfill. The Contractor shall base bids on all disposal material testing as non-hazardous.
   c. The designated haul route for off-site disposal trucks is as follows:
      - South on Chase Road
      - South on D Street
      - West on Sanda Avenue to Main Gate
3. Stabilization of the Existing Slope
   a. The existing slope shall be covered with a geomembrane fabric sandwiched between 2 layers of non-woven geotextile fabric to help stabilize slope erosion. See Sheet C-3 of the Design Drawings for installation details of the geomembrane/geotextile fabric system. The geomembrane/geotextile system installation will require a 1-foot deep trench along the top of the bank to secure (key) the material. The bottom (lower) end of the geomembrane/geotextile system shall be placed under the geotextile tube as indicated. Debris and potentially contaminated soil encountered during excavation of the key trench and placement of the geomembrane/geotextile shall be segregated and disposed of at an approved, off-site disposal facility.
   b. The geomembrane shall be a 30-mil linear low-density polyethylene (LLDPE) material fabricated in one roll.
   c. The geotextile shall be an 8-once/square yard non-woven polypropylene fabric, provided in standard roll sizes of approximately 15 feet by 300 feet.
   d. The Navy and construction oversite personnel will verify and sign-off that the geomembrane/geotextile system has been installed in accordance with the Design Drawings and this Scope of Work.
4. Installation of the Geotextile Tubes and Scour Aprons
   a. Geotextile tubes shall be a manufacturer standard catalog product, specifically manufactured for shoreline protection.
   b. Scour Aprons and geotextile tubes shall be placed at the locations shown on the drawings.

c. Geotextile tubes shall be installed by contractors having demonstrated experience in filling large circumference geotextile tubes (at least 500 cumulative linear feet under the direction of a manufacturer's representative). The installer shall be approved by the geotextile tube manufacturer.
d. The contractor shall have on site a representative of the geotextile tube manufacturer to provide assurance of proper deployment and filling procedures. The representative will be present during the initial day of shoreline tube placement, and thereafter at the contractor's expense as necessary to assure that the requirements of these specifications are satisfied. This requirement replaces paragraph 5.2 of GT11.
e. Damaged geotextiles shall be replaced in accordance with manufacturer recommendations.
f. Sharp instruments shall not be used for handling the geotextiles. Geotextiles shall not be dragged along the ground. Geotextiles shall be stored in areas where water cannot accumulate, elevated off the ground, and protected from conditions that will affect the properties or performance of the geotextile.
g. Geotextiles shall meet the testing requirements listed in Tables 2(a) and 2(b) of GRI Test Method GT10, "Test Methods, Properties and Frequencies for High Strength Geotextile Tubes used as Coastal and Riverine Structures."
h. The geotextile tube shall be the same material as that used for the scour apron.
i. Large stakes or anchors can be used at predetermined spacing to fasten the geotextile tubes in place during filling.
j. Once the scour apron is deployed, it shall be properly secured. The geotextile tube shall be deployed on top of the scour apron with the fill ports facing upwards along the top centerline and properly secured.

5. Filling of the Geotextile Tubes and Scour Aprons
   a. Fine sand for filling the geotextile tubes shall be provided from a designated off-site borrow site.
   b. Suitable find sand for filling the tubes will contain not more than 15 percent fines (percent by weight passing the No. 200 sieve) and should be no larger than 0.3 mm in diameter.
   c. Gradation testing of the fill shall be conducted in accordance with ASTM D 422. Two gradation tests shall be performed for each source of borrow material that is used. Additional testing may be warranted at any time that visual inspection of the sand fill materials indicate that the specified range of particle sizes is not being met.
   d. Prior to filling the geotextile tubes, provide certified test results to verify that the material is free of contamination and meets the required material specification. Soils brought in from off-site for use as backfill shall be tested for TPH, BTEX, and full TCLP including ignitability, corrosivity, and reactivity. Backfill shall contain less than 100 parts per million (ppm) of TPH and less than 10 ppm of the sum of benzene, toluene, ethyl benzene, and zylene and shall not fail the TCLP test. TPH concentrations shall be determined by using EPA 600/4-79-020 Method 418.1. BTEX concentrations shall be determined by using EPA SW-846 Method 5030/8020. TCLP shall be performed in accordance with EPA SW-846 Method 1311. Provide testing for TPH, BTEX, and TCLP from a composite sample of material from each borrow site.
   e. Fill the anchor tube on the scour apron first to provide ballast for the scour apron.
   f. After the scour apron is filled and secured, fill the geotextile tube. The geotextile tube is initially filled with water to their desired height. Once this has been achieved, a sand slurry can be introduced into the geotextile tube. The sand slurry will push out the existing water through the relief port. The solids will settle and gradually replace the existing water.

g. The discharge line of the hydraulic pump shall be fitted with a Y-valve to allow control of the rate of filling. The Y-valve system must be fitted with an internal mechanism such as a gate, butterfly valve, ball valve, or pinch valve to allow the contractor to regulate the discharge into the geotextile tube. The discharge pipe shall also be fitted with a pressure gage to monitor pressures within the tube.
h. If the geotextile tubes are punctured during filling, no field stitching or repairs will be allowed. The tube shall be replaced with a new tube.
i. If a multiple tube system is used, tubes shall be overlapped or butted together so that there are no gaps between the tubes.
j. Upon completion of filling, the fill and relief ports shall be properly secured.
k. Tubes require horizontal alignment within ± 2.0 feet of the designated state-plane coordinates shown on the drawings.
l. The required minimum elevation of the top of the geotextile tubes is 6.5 ft NAVD 88. The filled tubes shall have an effective height of ±0.5 feet of this required elevation. Effective height is defined as the height from the existing tube foundation to the average top of the filled tube measured every 25 feet along the length of the tube between fill ports. Any subsidence of the top elevation of the tube below the specified height shall be corrected by supplemental filling or, if the tube has been damaged, replacement of the tube. Filling tubes higher than the manufacturer's recommended height can lead to failure during construction.
m. The effective height at the tube overlaps will be approximately 80% of the specified height. This equates to approximately one foot of loss in height. The effective height at the tube overlaps may fall below the required minimum elevation of 6.5 ft NAVD 88. A 20% loss of height below 6.5 ft will be acceptable at the tube overlaps.
n. A professional land surveyor shall verify the effective height at the specified interval of 25 feet along the length of the tube between fill ports.
o. At no time shall construction equipment be operated directly on the geotextile tube or the scour apron. Filled geotextile tubes and scour aprons can be traversed if a 1-foot minimum of soil is covering the geotextile.
p. Upon placement of the 240 feet of geotextile tubes, a survey of the installed geotextile tubes shall be conducted by a professional land surveyor. This survey will aid in determining the segmented lengths of the geotextile tubes in the event that replacement of damaged tubes is required.
q. The Navy and construction oversite personnel will verify and sign-off that the geotextile tubes have been adequately installed based on the Design Drawings.

6. Backfilling around the Geotextile Tubes and Scour Aprons
   a. Any select fill used for backfilling between the geotextile tubes and the existing eroding slope, or for securing the geomembrane/geotextile system shall be provided from a designated off-site borrow site.
   b. Select fill shall be comprised of any materials classified by ASTM D 2487 as GW, GP, GM, GP-GM, GW-GM, SW, or SP. Select fill materials for grading shall be comprised of stones less than 2 inches.
   c. Provide certified test results to verify that the material is free of contamination and meets the required material specification. Material brought in from an off-site borrow source must meet the testing requirements outlined in 5.d.
   d. Backfill between the geotextile tubes and the York River with fine sand in accordance with the drawings. Sand used for filling the geotextile tubes can be used to externally backfill the geotextile tubes to the York River.
   e. The scour apron shall have a minimum of one foot of cover to protect the apron from damage. Additional backfill shall be placed to provide a 3 to 1 slope from the

geotextile tubes to the shoreline in accordance with Sheet C-3 of the Design Drawings.

f. The Navy and construction oversite personnel will verify and sign-off that the geotextile tubes have been adequately backfilled based on the Design Drawings.

7. Site Restoration
   a. The work area above the slope and any areas disturbed during this work will require the placement of six inches of topsoil and the installation of a vegetative mat or hydroseeding in accordance with the permanent sediment requirement of Sheet C-4.
   b. The shoreline in front of the geotextile tubes shall be left in a properly graded manner. Final grading to specified elevations shall be completed in accordance with Sheet C-3 of the Design Drawings.
   c. Upon completion of the project, all construction entrances shall be removed and permanently seeded/mulched, unless directed otherwise by the Navy.
   d. Elevations along the geotextile tubes shall be measured to verify that the final elevations are in accordance with the drawings.
   e. A final as-built survey shall be conducted by a professional land surveyor. The final as-built shall include the location of the geotextile tubes and final grading contours.
   f. The Contractor shall maintain the newly seeded areas in accordance with the erosion and sediment control notes on Sheet C-4.
8. Standards and Specifications
   a. The following specifications shall be followed for the testing and installation of the geotextile tubes:
      1. GRI Test Method GT10 – Test Methods, Properties and Frequencies for High Strength Geotextile Tubes used as Coastal and Riverine Structures
      2. GRI Test Method GT11 – Installation of Geotextile Tubes used as Coastal and Riverine Structures
   b. The following specifications and standards shall apply to the testing, handling and installation of the geomembrane and geotextile fabrics:
      1. ASTM D 123 (1993a) Standard Terminology Relating to Textiles
      2. ASTM D 638 (2003) Standard Test Method for Tensile Properties of Plastics
      3. ASTM D 1004 (2003) Standard Test Method for Initial Tear Resistance of Plastic Film and Sheeting
      4. ASTM D 1238 (2004) Standard Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer
      5. ASTM D 1505 (2003) Standard Test Method for Density of Plastics by the Density-Gradient Technique
      6. ASTM D 1683 (1990a) Failure in Sewn Seams of Woven Fabrics
      7. ASTM D 3787 (1987) Bursting Strength of Knitted Goods: Constant – Rate Of Travel (CRT) – Ball Burst Test. Replace polished steel ball with 5/16-inch diameter solid steel cylinder with a hemispherical tip centered within the ring clamp.
      8. ASTM D 3884 (1992) Abrasion Resistance of Textile Fabrics (Rotary Platform, Double-Head Method
      9. ASTM D 3895 (2003) Standard Test Method for Oxidative-Induction Time of Polyolefins by Differential Scanning Calorimetry
      10. ASTM D 4218 (1996-2001) Standard Test Method for Determination of Carbon Black Content in Polyethylene Compounds By the Muffle-Furnace Technique
      11. ASTM D 4354 (1989) Sampling of Geosynthetic for Testing
      12. ASTM D 4355 (1992) Deterioration of Geotextile from Exposure to

	Ultraviolet light and Water (Xenon-Arc Type Apparatus)
13. ASTM D 4491	(1992) Water Permeability of Geotextiles by Permittivity
14. ASTM D 4533	(1991) Trapezoid Tearing Strength of Geotextile
15. ASTM D 4632	(1991) Grab Breaking Load and Elongation of Geotextiles
16. ASTM D 4751	(1993) Determining the Apparent Opening Size of a Geotextile
17. ASTM D 4833	(2000) Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products
18. ASTM D 4873	(1988) Guide for Identification, Storage, and Handling of Geotextiles
19. ASTM D 4884	(1990) Seam Strength of Sewn Geotextiles
20. ASTM D 5199	(2001) Standard Test Method for Measuring the Nominal Thickness of Geosynthetics
21. ASTM D 5323	(1999) Standard Practice for Determination of 2% Secant Modulus for Polyethylene Geomembranes
22. ASTM D 5596	(2003) Standard Test Method for Microscopic Evaluation of the Dispersion of Carbon Black in Polyolefin Geosynthetics
23. ASTM D 5617	(1999) Standard Test Method for Multi-Axial Tension Test for Geosynthetics
24. ASTM D 5712	(1999) Standard Test Method for the Analysis of Aqueous Extractable Protein in Natural Rubber and Its Products Using the Modified Lowry Method
25. GRI GM11	Accelerated Weathering of Geomembranes Using a Fluorescent UVA Device

9. Submittals:
   a. Submit a plan of construction for the installation of the geotextile tubes and geomembrane/geotextile system to be installed on the slope. The plan of construction shall describe the sequence of operations for the construction of the geotextile tubes for shoreline protection. The plan shall address site preparation, waste disposal, erosion and sediment control measures, access to the York River, deployment and filling of tubes, placing a geomembrane/geotextile fabric system over the existing slope, and site restoration. Equipment to be used for geotextile tube installation shall also be specified. The ROICC shall approve the plan of construction prior to initiation of site activities.
   b. Submit product data for the geotextile tubes, the geomembrane/geotextile system for covering the slope, sand backfill and select fill material.
   c. Submit material certification data for the geotextile fabrics, geomembrane fabric, and the select fill material. Provide a statement, signed by an official authorized to certify on behalf of the manufacturer, attesting that the materials and/or component materials meet the specified requirements.
   d. This site is not within the jurisdiction of the Virginia Marine Resources Commission (VMRC) and will not require a permit. A U.S. Army Corps of Engineers (USACE) permit is not required since wetlands are not present at the site.
   e. Submit a construction closeout report following the completion of all site activities. The closeout report shall detail the activities conducted at the site and shall include a final as-built survey, geotextile product specifications from the manufacturer, analytical and gradation testing documentation of the fill material, and waste manifests. The final as-built survey shall include the location of the geotextile tubes, elevations at select intervals along the length of the tubes, and final grading contours.

10. Performance

a. The Contractor shall be required to (a) commence work under this contract within 10 calendar days after the date the Contractor receives the notice to proceed, (b) prosecute the work diligently, and (c) complete the entire work within 150 calendar days after the date the Contractor receives the notice to proceed. The time stated for completion shall include final cleanup of the premises and submittal of the final construction completion report.

b. If the Contractor fails to complete the work within the time specified in the contract, the Contractor shall pay liquidated damages to the Government in the amount of $200.00 for each calendar day of delay until the work is completed or accepted.

c. If the Government terminates the Contractor's right to proceed, liquidated damages will continue to accrue until the work is completed. These liquidated damages are in addition to excess costs of repurchase under the Termination clause.

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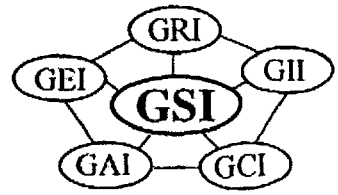

Original: Sept. 27, 1999
Rev. 1: Sept. 1, 2001

GRI Test Method GT10*

Standard Specification for

"Test Methods, Properties and Frequencies for High Strength Geotextile Tubes used as Coastal and Riverine Structures"

This specification was developed by the Geosynthetic Research Institute (GRI) with the cooperation of the member organizations for general use by the public. It is completely optional in this regard and can be superseded by other existing or new specifications on the subject matter in whole or in part. Neither GRI, the Geosynthetic Institute, nor any of its related institutes, warrant or indemnifies any materials produced according to this specification either at this time or in the future.

1. Scope

1.1 This specification covers high strength geotextile index test properties for subsequent use to form coastal and riverine structures in the form of soil filled geotextile tubes.

1.2 This specification sets forth a set of minimum physical, mechanical and chemical properties that must be met, or exceeded by the geotextile being manufactured. In a few cases, a maximum value is specified.

1.3 This specification covers not only the main geotextile tube, but also the scour apron(s), if so required in the design.

1.4 In the context of quality systems and management, this specification represents a manufacturing quality control (MQC) document.

Note 1: Manufacturing quality control represents those actions taken by a manufacturer to ensure that a product represents the stated objective and properties set forth in the specification.

*This GRI standard is developed by the Geosynthetic Research Institute through consultation and review by the member organizations. This specification will be reviewed at least every 2-years, or on an as-required basis. In this regard it is subject to change at any time. The most recent revision date is the effective version.

1.5 This standard specification is intended to ensure good quality and performance of high strength fabrics used as geotextile tubes and scour aprons but is possibly not adequate for the complete specification in a specific situation. Additional tests, or more restrictive values for the tests indicated, may be necessary under conditions of a particular application.

1.6 This standard specification does not address installation practices or design guidance. Both of these items are addressed in companion documents focusing on this application area.

2. Referenced Documents

2.1 ASTM Standards

D 4355 Test Method for Deterioration of Geotextiles from Exposure to Ultraviolet Light and Water (Xenon-Arc Type Apparatus)
D 4491 Test Methods for Water Permeability of Geotextiles by Permittivity
D 4533 Test Method for Trapezoidal Tearing Strength of Geotextiles
D 4595 Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method
D 4751 Test Method for Determining Apparent Opening Size of a Geotextile
D 4833 Test Method for Index Puncture Resistance of Geotextiles, Geomembranes and Related Products
D 4873 Guide for Identification, Storage and Handling of Geotextiles
D 4884 Test Method for Seam Strength of Sewn Geotextiles

2.2 GRI Standards

GTXX Standard Practice for the Installation of Geotextile Tubes used as Coastal and Riverine Erosion Control Structures
GTXX Standard Guide for the Design of Geotextile Tubes used as Coastal and Riverine Erosion Control Structures (in preparation)
GT9/GG6 Standard Guide for Grip Types for Use in the Wide Width Testing of Geotextiles and Geogrids

3. Definitions

3.1 Geotextile Tube - A large tube [greater than 7.5 ft (2.3 m) in circumference] fabricated from high strength woven geotextile in lengths greater than 20 ft (6.1 m). Geotextile tubes used in coastal and riverine applications are most often filled hydraulically with a slurry of sand and water, although many other fill materials have been used. The tubes can also be filled by a combination mechanical and hydraulic method.

3.2 Scour Apron - An apron of geotextile designed to protect the foundation of the main geotextile tube from the undermining effects of scour. In coastal and riverine applications, scour can be present at the base of the tube due to wave and current

action. Scour aprons may be on both sides of the main tube, or on only one side. Scour aprons also reduce local erosion and scour caused during the hydraulic filling process of the main tube. Scour aprons are typically anchored by a small tube at the water's edge or by sandbags attached to the apron.

3.3 Fill Port - Also called a fill spout or fill nozzle, fill ports are sleeves sewn into the top of the geotextile tube into which the pump discharge pipe is inserted. Ports are typically 12 to 18 inches (300 to 450 mm) in diameter and 3 to 5 feet (0.9 to 1.5 m) in length. Ports are spaced along the top of the tube to provide access to the contractor. Spacing is usually no closer than 25 feet (7.6 m) to accommodate sand slurry but can be as far apart as 100 feet (30 m) for some viscous fill materials. After pumping, ports are to be closed by tying, sewing or gluing shut. After filling the tube the port sleeves shall be closed and attached to the main tube in a manner sufficient to prevent movement of the sleeve by wave action. Fill ports are fabricated from the same geotextile as the main tube.

3.4 Manufacturing Quality Control (MQC) - A planned system of inspections that is used to directly monitor and control the manufacture of a material which is factory originated. MQC is normally performed by the manufacturer of geosynthetic materials and is necessary to ensure minimum (or maximum) specified values in the manufactured product. MQC refers to measures taken by the manufacturer to determine compliance with the requirements for materials and workmanship as stated in certification documents and contract specifications [ref. EPA/600/R-93/182]. This definition is expanded herein for geotextile tubes and scour aprons to include fabrication, including sewing and packaging by the fabricator.

Note 2: This particular specification for high strength fabrics used as geotextile tubes and scour aprons falls under the concept of MQC.

3.5 Manufacturing Quality Assurance (MQA) - A planned system of activities that provides assurance that the materials were constructed as specified in the certification documents and contract specifications. MQA includes manufacturing facility inspections, verifications, audits and evaluation of the raw materials (resins and additives) and finished geosynthetic products to assess the quality of the manufactured materials. MQA refers to measures taken by the MQA organization to determine if the manufacturer is in compliance with the product certification and contract specifications for the project [ref. EPA/600/R-93/182].

4. Material Classification and Formulation

4.1 This specification covers high strength geotextiles for tubes and scour aprons which are placed into two categories: Class 1 is for aggressive conditions, and Class 2 is for typical conditions.

Note 3: It is recognized that "aggressive" and "typical" are arbitrary terms, however, based on current practice and field

performance these two categories appear to be suitable for most projects.

4.2 The type of fabric style is not identified as such, but based on current manufacturing practice the properties lend themselves to woven, high tenacity, monofilament, multifilament or fibrillated geotextiles.

4.3 The type of polymer used for the production yarns is not identified as such, but based on current manufacturing practice both the "aggressive" conditions and the "typical" conditions can be attained using polyester or polypropylene yarns.

4.4 Due to the critical nature of fabrication and the involvement of the manufacture, the main tube and scour apron must be sourced from the same manufacturer.

5. Specification Requirements

5.1 The fabric for use as geotextile tubes and associated scour aprons shall conform to Tables 1(a) and 1(b) for "aggressive" conditions, and to Tables 2(a) and 2(b) for "typical" conditions. These are referred to Class 1 and Class 2, respectively. Each table is further subdivided according to the tube in part "a" and the scour apron in part "b", of the respective tables. Each of the tables are given in English and SI (metric) units. The conversion from English to SI is soft.

5.2 The tables are subdivided into mechanical, hydraulic and endurance test categories. Each item is accompanied by the appropriate ASTM test method designation and the minimum frequency of performing the test.

Note 4: The wide width testing of high strength fabrics is not trivial. Past problems have arisen from noncalibrated testing machines, poorly prepared specimens, inadequate elongation measuring devices, and (perhaps most of all) improper gripping devices. This last item of grips is addressed in GRI GT9/GG6.

Note 5: The targeted value of apparent opening size (AOS) is the largest opening size of the fabric's voids. Thus, the sieve size number is intended to specify the minimum sieve opening size. When specified in units of mm, AOS is the maximum dimension allowed.

Note 6: A minimum water flow rate is specified in both tables via ASTM D4491. This is a constant head permeability test usually resulting in the permittivity of the fabric. En route to permittivity one measures the water flow rate (i.e., the "flux") which is requested in the specification. The two terms are interrelated by the thickness of the fabric.

5.3 The various properties shall be tested at the minimum frequency shown in Tables 1 and 2. If the specific manufacturer's quality control guide is more stringent and the product is certified accordingly, it must be followed in like manner.

Note 7: This specification is focused on manufacturing quality control (MQC). Conformance testing and manufacturing quality assurance (MQA) testing are at the discretion of the purchaser and/or quality assurance organization.

6. Workmanship and Appearance

6.1 The finished fabric shall have good appearance qualities. It shall be free from such defects that would affect the specific properties of the geotextile, tube or apron.

6.2 General manufacturing procedures shall be performed in accordance with the manufacturer's internal quality control guide and/or documents.

7. MQC Sampling

7.1 Sampling shall be in accordance with the specific test methods listed in Tables 1 and 2. If no sampling protocol is stipulated in the particular test method, then test specimens shall be taken evenly spaced across the entire width of the geotextile. No sampling of the fabricated tube is recommended.

7.2 The number of replicate tests shall be in accordance with the appropriate test methods listed in Tables 1 and 2.

7.3 The average of the test results should be calculated per the particular standard cited and compared to the minimum value listed in these tables, hence the values listed are the minimum average values.

Note 8: The exceptions to this item are the physical properties and the AOS, as described in Note 5.

8. MQC Retest and Rejection

8.1 If the results of any test do not conform to the requirements of this specification, retesting to determine conformance or rejection should be done in accordance with the manufacturing protocol as set forth in the manufacturer's quality manual.

9. Packaging and Labeling

9.1 The finished geotextile tube and its associated scour apron shall be rolled on a stable core or accordion folded into a bundle for handling, storage and shipment. The geotextile tube and/or scour apron is to be protected by an outer wrapping or plastic bag. The manufacturer's identification label shall be clearly visible on the

outer wrapping and in a manner consistent with the established policy of the manufacturer.

9.2 Handling of the rolls or bundles shall be by forklift stinger or carpet pole, or by dedicated slings and spreader bars consistent with the weight of the unit. No hooks, tongs or other sharp instruments shall be used for handling. The geotextile tube or scour apron shall not be dragged along the ground.

9.3 Geotextile tubes shall be stored elevated off the ground in areas where water cannot accumulate and where they are protected from conditions that will affect the properties or performance of the geotextile.

9.4 Geotextile tubes and scour aprons shall be labeled, shipped, stored, and handled in accordance with ASTM D4873 and as specified herein. Each segment of geotextile tube and scour apron shall be wrapped in an opaque layer of plastic during shipment and storage. The plastic wrapping shall be placed around the unit in the manufacturing facility and shall not be removed until deployment. Each packaged segment of geotextile tube and/or scour apron shall be labeled with the manufacturers name, geotextile type, lot numbers, roll numbers, and dimensions (length, width, gross weight).

10. Certification

10.1 Upon request of the purchaser in the contract or order, a manufacturer's certification that the material was manufactured and tested in accordance with this specification, together with a report of the test results, shall be furnished at the time of shipment.

Table 1(a): Class 1 Tubes - Aggressive Conditions
(all are minimum average values unless noted otherwise)

Property	Test Method ASTM	English Units		Metric Units	
		Property	Frequency	Property	Frequency
Physical					
Tube Circumference	Measured	7.5/15/22.5/30/45/60-ft.	n/a	2.3/4.6/6.8/9.1/14/18 m	n/a
Fill Port (diameter)	Measured	12 or 18 in.	n/a	30 or 45 cm	n/a
Mechanical					
Wide Width Tensile Strength	D4595	1000 x 1000 lb/in.	10,000 yd^2	175 x 175 kN/m	7500 m^2
Wide Width Elongation (max.)	D4595	15 x 15%	10,000 yd^2	15 x 15%	7500 m^2
Trapezoidal Tear Strength	D4533	600 x 600 lb	10,000 yd^2	2.7 x 2.7 kN	7500 m^2
Puncture Strength	D4833	400 lb	10,000 yd^2	1.8 kN	7500 m^2
Seam Strength (factory)	D4884	600 lb./in.	50,000 yd^2	105 kN/m	40,000 m^2
Hydraulic					
Apparent Opening Size (AOS)	D4751	No. 40 Sieve (min.)	50,000 yd^2	0.425 mm (max)	40,000 m^2
Water Flow Rate	D4491	6 gpm/ft^2	50,000 yd^2	240 l/min/m^2	40,000 m^2
Endurance					
Accelerated UV Resistance (% retained after 150 hr)	D4355	65%	year	65%	year

Table 1(b): Class 1 Scour Aprons - Aggressive Conditions
(all are minimum average values unless noted otherwise)

Property	Test Method ASTM	English Units		Metric Units	
		Property	Frequency	Property	Frequency
Physical					
Anchor Tube Circumference	Measured	3-6 ft.	n/a	0.9 - 1.8 m	n/a
Mechanical					
Wide Width Tensile Strength	D4595	400 x 550 lb/in.	10,000 yd^2	70 x 95 kN/m	7500 m^2
Wide Width Elongation (max.)	D4595	20 x 20%	10,000 yd^2	20 x 20%	7500 m^2
Trapezoidal Tear Strength	D4533	180 x 270 lb	10,000 yd^2	0.8 x1.2 kN	7500 m^2
Puncture Strength	D4833	260 lb	10,000 yd^2	1.2 kN	7500 m^2
Seam Strength (factory)	D4884	350 lb/in.	50,000 yd^2	60 kN/m	40,000 m^2
Hydraulic					
Apparent Opening Size (AOS)	D4751	No. 40 Sieve (min.)	50,000 yd^2	0.425 mm (max)	40,000 m^2
Water Flow Rate	D4491	6 gpm/ft^2	50,000 yd^2	240 l/min/m^2	40,000 m^2
Endurance					
Accelerated UV Resistance (% retained after 150 hr)	D4355	65%	year	65%	year

Table 2(a): Class 2 Tubes - Typical Conditions
(all are minimum average values unless noted otherwise)

Property	Test Method ASTM	English Units		Metric Units	
		Property	Frequency	Property	Frequency
Physical					
Tube Circumference	Measured	7.5/15/22.5/30/45-ft	n/a	2.3/4.6/6.8/9.1/14 m	n/a
Fill Port (diameter)	Measured	12 or 18 in.	n/a	30 or 45 cm	n/a
Mechanical					
Wide Width Tensile Strength	D4595	400 x 550 lb/in.	10,000 yd^2	70 x 95 kN/m	7500 m^2
Wide Width Elongation (max.)	D4595	20 x 20%	10,000 yd^2	20 x 20%	7500 m^2
Trapezoidal Tear Strength	D4533	180 x 270 lb	10,000 yd^2	0.80 x 1.2 kN	7500 m^2
Puncture Strength	D4833	260 lb	10,000 yd^2	1.2 kN	7500 m^2
Seam Strength (factory)	D4884	350 lb./in.	50,000 yd^2	60 kN/m	40,000 m^2
Hydraulic					
Apparent Opening Size (AOS)	D4751	No. 40 Sieve (min.)	50,000 yd^2	0.425 mm (max)	40,000 m^2
Water Flow Rate	D4491	6 gpm/ft^2	50,000 yd^2	240 l/min/m^2	40,000 m^2
Endurance					
Accelerated UV Resistance (% retained after 150 hr)	D4355	65%	year	65%	year

Table 2(b): Class 2 Scour Aprons - Typical Conditions
(all are minimum average values unless noted otherwise)

Property	Test Method ASTM	English Units		Metric Units	
		Property	Frequency	Property	Frequency
Physical					
Anchor Tube Circumference	Measured	3-6 ft	n/a	0.9-1.8 m	n/a
Mechanical					
Wide Width Tensile Strength	D4595	400 x 400 lb/in.	10,000 yd^2	70 x 70 kN/m	7500 m^2
Wide Width Elongation (max.)	D4595	20 x 20%	10,000 yd^2	20 x 20%	7500 m^2
Trapezoidal Tear Strength	D4533	180 x 270 lb	10,000 yd^2	0.80 x 1.2 kN	7500 m^2
Puncture Strength	D4833	160 lb	10,000 yd^2	0.70 kN	7500 m^2
Seam Strength (factory)	D4884	200 lb./in.	50,000 yd^2	35 kN/m	40,000 m^2
Hydraulic					
Apparent Opening Size (AOS)	D4751	No. 30 Sieve (min.)	50,000 yd^2	0.60 mm (max)	40,000 m^2
Water Flow Rate	D4491	6 gpm/ft^2	50,000 yd^2	240 l/min/m^2	40,000 m^2
Endurance					
Accelerated UV Resistance (% retained after 150 hr)	D4355	65%	year	65%	year

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Original: Sept. 27, 1999

GRI Test Method GT11*

Standard Practice for

"Installation of Geotextile Tubes used as Coastal and Riverine Structures"

This standard practice was developed by the Geosynthetic Research Institute (GRI) with the cooperation of the member organizations for general use by the public. It is completely optional in this regard and can be superseded by other existing or new specifications on the subject matter in whole or in part. Neither GRI, the Geosynthetic Institute, nor any of its related institutes, warrant or indemnifies any projects developed according to this practice either at this time or in the future.

1. Scope

1.1 This practice provides guidelines for the installation of geotextile tubes used as coastal and riverine structures. This practice, however, is not to be considered as all-encompassing since each material and site specific condition usually presents its own challenges and special issues.

1.2 This practice includes installation of the main geotextile tube, its scour apron(s) and the filling procedure.

1.3 This practice presumes that the proper geotextile tubes and ancillary materials have been chosen and fabricated for the site specific conditions per the plans and specifications.

1.4 This standard may involve hazardous operations, equipment and climates. This standard does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

2. Referenced Documents

2.1 ASTM Standards

D 422 Test Method for Particle-Size Analysis of Soils

2.2 GRI Documents

GTXX Test Methods, Properties and Frequencies for High Strength Geotextile Tubes used as Coastal and Riverine Erosion Control Structures

3. Terminology

3.1 Geotextile Tube - A large tube [greater than 7.5 feet (2.3 m) in circumference] fabricated from high strength, woven geotextile, in lengths greater than 20 linear feet (6.1 m). Geotextile tubes used in coastal and riverine applications are most often filled hydraulically with a slurry of sand and water, although many other fill materials have been used. Tubes can also be filled by a combination mechanical/hydraulic method.

3.2 Scour Apron - An apron of geotextile designed to protect the foundation of the main geotextile tube from the undermining effects of scour. In coastal and riverine applications, scour can be present at the base of the tube due to wave and current action. There may be aprons on both sides of the main tube, or only on one side. Scour aprons also reduce local erosion and scour caused during the hydraulic filling process of the main tube. Scour aprons are typically anchored by a small tube at the water's edge or by sandbags attached to the apron.

3.3 Fill Port - Also called a fill spout or fill nozzle, fill ports are sleeves sewn into the top of the geotextile tube into which the pump discharge pipe is inserted. Ports are typically 12 to 18 inches (300 to 450 mm) in diameter and 3 to 5 feet (0.9 to 1.5 m) in length. Fill ports are fabricated from the same geotextile as the main tube. Ports are spaced along the top of the tube to provide access to the contractor. Spacing is usually no closer than 25 feet (7.6 m) to accommodate sand slurry but can be as far apart as 100 feet (30 m) for some viscous fill materials. After pumping, ports are to be closed by tying, sewing or gluing.

4. Significance and Use

4.1 The use of geotextile tubes for coastal and riverine structures is a relatively new technology. While a few contractors who have followed the technology are well versed in proper installation practices, many are not. It is to this latter group of relatively inexperienced contractors and installers that this standard is focused.

4.2 This standard practice is focused on proper installation of the major facets of geotextile tubes, i.e., the main tube, its scour apron(s), and the filling sequence. There are many additional (and generally unique) situations which can, and do, arise which are beyond the scope of this practice and must be handled on a site specific basis.

5. Pre-Construction Approvals

5.1 Experience Level - Geotextile tubes and scour aprons shall be installed by contractors having demonstrated successful experience in filling large geotextile tubes [totaling at least 1000 linear feet (300 m) under the direction of a manufacturer's representative]. The contractor shall be required to prove this experience with a letter provided by the manufacturer.

5.2 Manufacturer's Representative - Unless the contractor has satisfied the requirements of Paragraph 5.1, the contractor shall have an on-site representative of the geotextile tube manufacturer to provide instruction and training of the contractor/installer to assure proper deployment and filling procedures. The representative will be present during the initial day of tube placement at the manufacturer's expense. Thereafter, the representative will be at the contractor's expense as necessary to assure that the requirements of these specifications are satisfied.

Note 1: The decision as to length of time the manufacturer's representative is on the project is to be decided by the parties involved. They include the manufacturer, contractor, and owner.

5.3 Plan of Construction - The contractor shall submit a Plan of Construction describing the sequence of operations for the construction of the sand-filled geotextile tubes. The plan shall address site preparation, deployment and filling of tubes, placement of scour apron and anchor tubes, and tie-out to the shoreline at each end of the reach. Equipment to be used for geotextile tube construction shall be specified.

6. Procedure

6.1 Fill Material - Material for filling the geotextile tubes for coastal and riverine applications will normally consist of fine sand dredged from a designated borrow site. Suitable material for filling the tubes will contain not more than 15 percent fines (percent by weight passing the No. 200 sieve) to minimize subsidence of the tubes after filling. If excessive fines are observed during the filling process, the contractor should divert the flow until more suitable borrow material can be located.

Note 2: If the fill material is known to be primarily organic and/or fine-grained material, repeated fillings may be required to reach the design elevation of the tube.

Note 3: Considerable care must be taken to avoid overstressing the geotextile and inducing creep strains and excessive distortion. This type of fill material is not suitable for designs where the primary objective is a specified elevation.

6.2 Fill Gradation - Gradation testing of hydraulic fill materials shall be conducted in accordance with ASTM D 422. Samples shall be obtained from the dredge discharge pipe immediately before inserting the pipe into the fill port. At a minimum, one gradation test shall be performed for each 1000 linear feet (300 m) of fill tube. Extremely large tubes may require more frequent testing. Also, additional testing may be warranted at any time that visual inspection of the sand fill materials indicate that the percentage of fines may exceed the requirements presented herein.

6.3 Tube Foundation - The foundation for the placement of the geotextile tube and its scour apron(s) shall be smooth and free of protrusions which could damage the geotextile. Remnant timber piles, piers, footings, underground utilities, etc., at or below grade, shall be removed if located within 20 feet (6.0 m) of the project site. Weak or unsuitable foundation material shall be removed or stabilized.

6.4 Tube Alignment - Tubes used in coastal and riverine applications normally require alignment within ± 2.0 feet (600 mm) of the baseline. The alignment can be facilitated by a number of methods, e.g., earthen cradles, tie-down straps, or physical buttressing. The filled tubes shall have an effective height of ± 0.5 feet (150 mm) of the specified elevation. Effective height is defined as the height from the existing tube foundation to the average top of the filled tube measured every 25 feet (7.0 m) along the length of the tube between fill ports. Any subsidence of the top elevation of the tube below the specified height shall be corrected by supplemental filling or, if the tube has been damaged, replacement of the tube. Filling tubes higher than the manufacturer's recommended height can lead to failure during construction.

Note 4: At no time shall construction equipment be operated directly on the geotextile tube or its ancillary materials. Filled geotextile tubes and scour aprons can be traversed if a 1 foot (300 mm) minimum of soil is covering the geotextile. No hooks, tongs or other sharp instruments shall be used for handling. The geotextile tube or scour apron shall not be dragged along the ground.

6.5 Tube Anchorage - The main geotextile tube and scour apron shall be deployed along the alignment and secured in place as necessary to assure proper alignment after filling. No portion of the tube shall be filled until the entire tube segment has been fully anchored to the foundation along the correct alignment and pulled taut. Tolerance for deviation from the alignment shall be plus or minus 2 feet (600 mm). Means of assuring that the tubes are properly aligned within the specified tolerances, shall be incorporated into the placement methodology presented in the Plan of Construction.

6.6 Tube Overlaps - Tubes shall be overlapped at end joints or butted together so that there are no gaps unless permitted otherwise in the Plan of Construction. Beneath the geotextile tube, the ends of each geotextile scour apron shall be overlapped a minimum of 5 feet (1.5 m). The effective height of the tube structure at the overlap is typically 80% of the specified height. This equates to a 1-foot (300 mm) drop in effective height at the overlap for a 6 ft. (1.8 m) high structure.

6.7 Tube Filling - After completing the deployment and anchorage of the geotextile tube, filling with sand from the borrow area shall be accomplished in accordance with the approved Plan of Construction. The discharge line of the dredge shall be fitted with a "Y-valve" to allow control of the rate of filling. The Y-valve system must be fitted with an

internal mechanism such as a gate, butterfly valve, ball valve, or pinch valve to allow the contractor to regulate discharge into the geotextile tube. Any excess discharge shall be directed away from the tubes toward the borrow area. The discharge pipe shall also be fitted with a pressure gage as an aid to monitor pressure within the tube.

Note 5: The gage can be attached to the discharge pipe continuously or only at times when excessive pressure is obvious. It should be noted that internal pressure and stress on the tube fabric can vary along the length of the tube, therefore stress failure of seams and fill ports is not precluded by simply monitoring discharge fill pressure.

Discharge pressures at the tube fill port shall not exceed 5 psi (35 kPa).

Note 6: As a rule of thumb, dredged discharge pipes should be limited to 10 inches (250 mm) diameter and smaller. This is due to the fact that as dredge discharge size increases, the flow rate being delivered by the pump increases greatly, increasing the potential for overstressing the tube. Dredge discharge pipes below 6 inches (150 mm) are often too small to adequately fill the tube to the proper height.

6.7.1 The dredge discharge pipe shall be free of protrusions that could tear the fill port. It is generally accepted practice to support the dredge discharge pipe above the fill port in a manner which reduces stress on the fill port seams. Excessive movement of the dredge discharge pipe during filling can result in damage to the fill port. If a diffuser is used at the end of discharge pipe, it should not extend beyond the outside diameter of the discharge pipe. It is good practice to fill long tubes from multiple ports along the length of the tube. This reduces stress on the fill port and reduces the risk of sand bridging which can cause local stress on the fabric.

6.7.2 After filling the tube, the port sleeves shall be closed and attached to the main tube in a manner sufficient to prevent movement of the sleeve by subsequent wave action or other disturbances.

6.8 External Tube Backfilling - If the tube is not to be externally backfilled, the area should be left in a neat and properly graded manner. If the tube is to be externally backfilled, the lines and grade on the Plan of Construction must be followed.

6.9 Height to Width Ratio - The height to width ratio of the fully deployed tube shall not exceed a value of 0.5.

Note 7: The height to width ratio is an indicator of the stability of the tube in coastal and riverine applications. The design engineer should evaluate stability with respect to sliding, overturning, bearing, global stability, and overtopping of waves and associated wave forces.

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*This GRI standard practice is developed by the Geosynthetic Research Institute through consultation and review by the member organizations. This specification will be reviewed at least every 2-years, or on an as-required basis. In this regard it is subject to change at any time. The most recent revision date is the effective version.

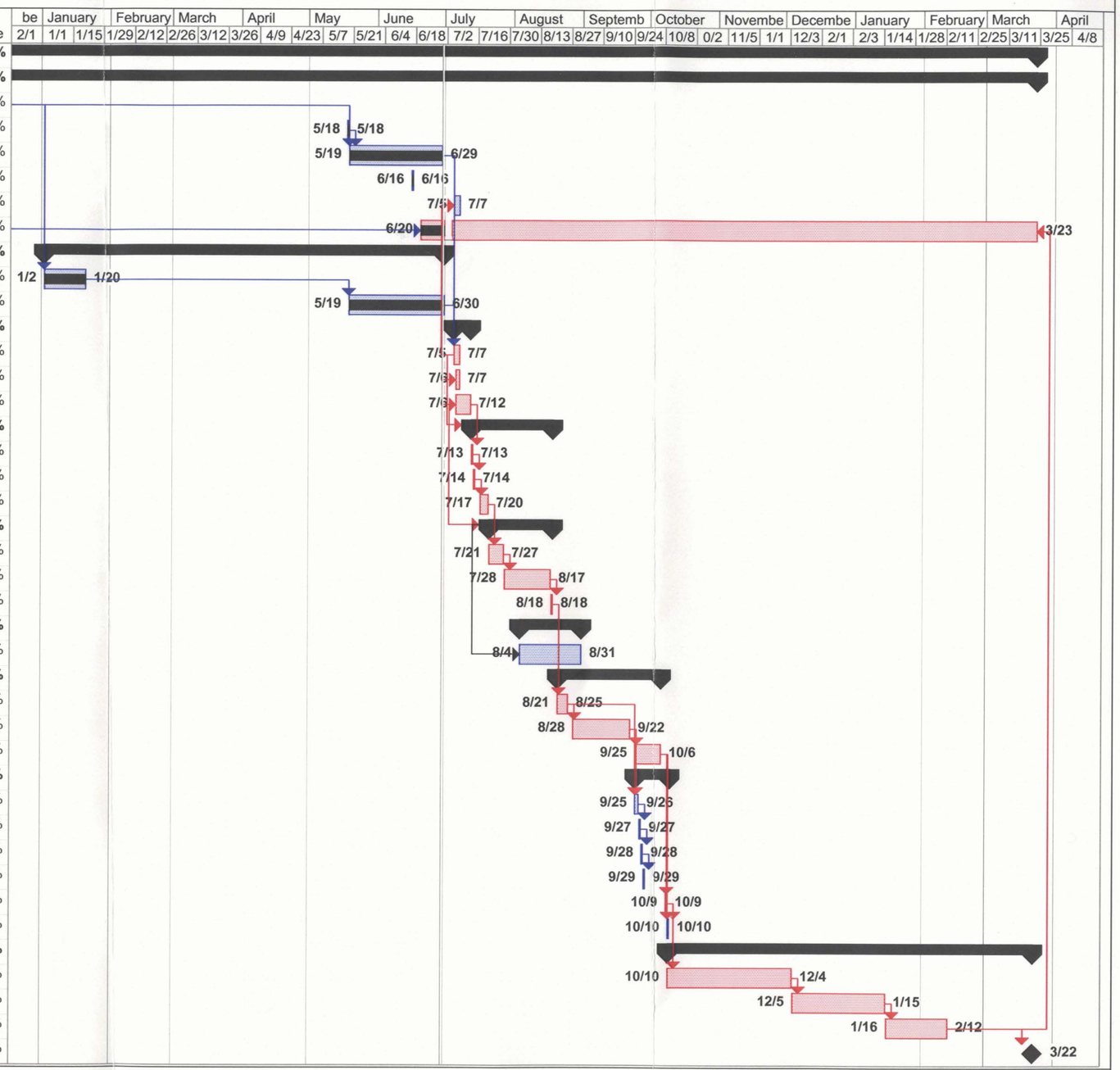
Appendix B

APPENDIX B

PROJECT SCHEDULE

CAX Site 7 Old Dupont Disposal Area
Shoreline Stabilization/Geotextile Tube Installation

ID	WBS	Task Name	Duration	Start	Finish	% Complete
1	**12.1**	**Project Summary**	**701 days**	**Fri 7/16/04**	**Fri 3/23/07**	**19%**
2	**12.01**	**Project Management**	**701 days**	**Fri 7/16/04**	**Fri 3/23/07**	**18%**
3	12.01.1	Notice to Proceed (Mod 2)	1 day	Fri 7/16/04	Fri 7/16/04	100%
4	1.1.2	Notice to Proceed (Mod 3)	1 day	Thu 5/18/06	Thu 5/18/06	100%
7	12.01.4	Subcontracts/Procurement/Security Clearances	30 days	Fri 5/19/06	Thu 6/29/06	100%
6	12.01.3	Precon Meeting	1 day	Fri 6/16/06	Fri 6/16/06	100%
8	12.01.5	Utility Clearance	3 days	Wed 7/5/06	Fri 7/7/06	0%
5	12.01.2	Monthly Progress Reports/Meetings/Invoicing	9 mons	Tue 6/20/06	Fri 3/23/07	5%
9	**12.02**	**Project Plan Development**	**130 days**	**Mon 1/2/06**	**Fri 6/30/06**	**100%**
10	12.02.1	Draft Project Plan Submittal	15 days	Mon 1/2/06	Fri 1/20/06	100%
11	12.02.2	Review Comments/Final Plan Submittal	31 days	Fri 5/19/06	Fri 6/30/06	100%
12	**12.03**	**Mobilization/Site Preparation**	**6 days**	**Wed 7/5/06**	**Wed 7/12/06**	**0%**
13	12.03.1	Site Mobilization	3 days	Wed 7/5/06	Fri 7/7/06	0%
14	12.03.2	Site Preparation/E&S Controls	2 days	Thu 7/6/06	Fri 7/7/06	0%
15	12.03.3	Initial Clearing and Grubbing	5 days	Thu 7/6/06	Wed 7/12/06	0%
16	**12.04**	**MEC Remediation**	**27 days**	**Thu 7/13/06**	**Fri 8/18/06**	**0%**
17	12.04.1	MEC Surface Clearance	1 day	Thu 7/13/06	Thu 7/13/06	0%
18	12.04.2	Additional Clearing & Grubbing	1 day	Fri 7/14/06	Fri 7/14/06	0%
19	12.04.1	Shoreline Clearance	4 days	Mon 7/17/06	Thu 7/20/06	0%
20	**12.04.2**	**Upland Remediation**	**21 days**	**Fri 7/21/06**	**Fri 8/18/06**	**0%**
21	12.04.2.1	Excavate/Stockpile soil & debris	5 days	Fri 7/21/06	Thu 7/27/06	0%
22	12.04.2.2	Screen Soil/Debris	15 days	Fri 7/28/06	Thu 8/17/06	0%
23	12.04.2.3	Demobilize UXO Staff	1 day	Fri 8/18/06	Fri 8/18/06	0%
24	**12.05**	**Solid Waste Management & Disposal**	**20 days**	**Fri 8/4/06**	**Thu 8/31/06**	**0%**
25	12.05.1	Documentation, Transportation & Disposal	20 days	Fri 8/4/06	Thu 8/31/06	0%
26	**12.06**	**Installation of Geotextile Tubes**	**35 days**	**Mon 8/21/06**	**Fri 10/6/06**	**0%**
27	12.06.1	Replace/Grade screened soil	5 days	Mon 8/21/06	Fri 8/25/06	0%
28	12.06.2	Install Geotube System	20 days	Mon 8/28/06	Fri 9/22/06	0%
29	12.06.3	Construct Beach	10 days	Mon 9/25/06	Fri 10/6/06	0%
30	**12.07**	**Site Restoration**	**12 days**	**Mon 9/25/06**	**Tue 10/10/06**	**0%**
31	12.07.1	Grind Trees/Stumps	2 days	Mon 9/25/06	Tue 9/26/06	0%
32	12.07.2	Spread mulch on site	1 day	Wed 9/27/06	Wed 9/27/06	0%
33	12.07.3	Place & grade topsoil	1 day	Thu 9/28/06	Thu 9/28/06	0%
34	12.07.4	Hydroseed topsoil area	1 day	Fri 9/29/06	Fri 9/29/06	0%
36	12.07.6	Remove Silt Fence/Patch Grass	1 day	Mon 10/9/06	Mon 10/9/06	0%
35	12.07.5	Demobilization	1 day	Tue 10/10/06	Tue 10/10/06	0%
37	**12.08**	**Closeout Report**	**118 days**	**Tue 10/10/06**	**Thu 3/22/07**	**0%**
38	12.08.1	Draft Report Preparation & Submittal	40 days	Tue 10/10/06	Mon 12/4/06	0%
39	12.08.2	Navy Review Comments	30 days	Tue 12/5/06	Mon 1/15/07	0%
40	12.08.3	Final Report Preparation & Submittal	20 days	Tue 1/16/07	Mon 2/12/07	0%
41	12.08.4	Project Closeout	0 days	Thu 3/22/07	Thu 3/22/07	0%



Start: Fri 7/16/04
Finish: Fri 3/23/07
Date: Fri 6/30/06

Task | Milestone | Rolled Up Critical Task | Split | Group By Summary
Critical Task | Summary | Rolled Up Milestone | External Tasks
Progress | Rolled Up Task | Rolled Up Progress | Project Summary

Appendix C

APPENDIX C

STORMWATER POLLUTION PREVENTION PLAN FOR CONSTRUCTION ACTIVITIES

STORM WATER POLLUTION PREVENTION PLAN
FOR CONSTRUCTION ACTIVITIES
SHORELINE STABILIZATION/GEOTEXTILE TUBE INSTALLATION AT IR SITE 7 – OLD DUPONT DISPOSAL AREA
NAVAL WEAPONS STATION YORKTOWN
CHEATHAM ANNEX
YORKTOWN, VIRGINIA

This template has been prepared based upon information contained in EPA 832-R-92-005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices, and on information contained in Virginia Discharge Elimination System Permit General Permit VAR10. An endorsement of this template by the Virginia Department of Environmental Quality is not to be implied.

SITE DESCRIPTION			
Project Title and Location: (Latitude and Longitude or Address)	Shoreline Stabilization/ Geotextile Tube Installation at IR Site 7 – Old Dupont Disposal Area Naval Weapons Station Yorktown Cheatham Annex Yorktown, Virginia Latitude: 37.29670 Longitude: -76.60775	Operator's Name and Address:	Bhate Environmental Associates 1608 13th Avenue South, Suite 300 Birmingham, Alabama 35205
Description: (Purpose and Types of Soil Disturbing Activities)	Geotextile tubes will be installed in an area 240 feet by 150 feet on the shoreline below the eroding embankment to prevent its further loss by wave action from the York River. In order to accommodate installation of the geotextile tubes, and to prevent them from being damaged or punctured after installation, all debris must be removed from the upland area of Site 7 to an approximate depth of 1 foot.		
Site Area:	Site 7 encompasses approximately one acre above the embankment, 100 feet along the embankment, and 240 feet of the shoreline below.		
Sequence of Major Activities:			
Clearing and Grubbing, soil sifting/removal/replacement, embankment grading, geotextile tube installation, and sand placement.			
Name of Receiving Water(s):	York River, VA		

CONTROLS	
See Section 4, Erosion and Sediment Control Plan, of the Work Plan	
Erosion and Sediment Controls	
Stabilization Practices	See Section 4, Erosion and Sediment Control Plan, of the Work Plan
Major Grading Activities	
See Section 2.7, Project Milestones and Schedule, of the Work Plan.	
Structural Practices	See Section 4, Erosion and Sediment Control Plan, of the Work Plan
Storm Water Management	
See Section 4, Erosion and Sediment Control Plan, of the Work Plan	
Other Controls	
Solid Waste Disposal:	All stockpiles except for woody debris will be placed on and covered by polyethylene sheeting to minimize contact with rainwater or the ground surface.
Offsite Vehicle Tracking:	If necessary, decontamination pads will be constructed of polyethylene sheeting and placed under trucks and equipment. Decontamination pads will be constructed to contain rinse waters and direct runoff back towards the landfill. The pads will be constructed so that they can be moved to other areas as needed.
Sanitary Waste Disposal	All sanitary waste will be placed in a dumpster for proper disposal.
TIMING OF CONTROLS/MEASURES	
See Section 4, Erosion and Sediment Control Plan, of the Work Plan	

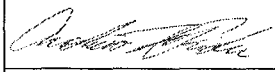
MAINTENANCE/INSPECTION PROCEDURES
Erosion and Sediment Control Inspection and Maintenance Practices
See Section 4, Erosion and Sediment Control Plan, of the Work Plan
Non-Storm Water Discharges
It is expected that the following non-storm water discharges will occur from the site during the construction period:

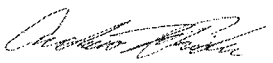
☐Discharges from fire fighting activities	☐Fire hydrant flushings
☐Waters used to wash vehicles where detergents are not used	☐Water used to control dust
☐Potable water sources including waterline flushings	☐Water used for hydrostatic testing of new pipeline construction
☐Routine external building wash down which does not use detergents	☐Pavement washwaters where spills or leaks of toxic or hazardous materials have not occurred (unless all spilled material has been removed) and where detergents are not used
☐Air conditioning condensate	☐Uncontaminated ground water or spring water
☐Foundation or footing drains where flows are not contaminated with process materials such as solvents	☒Not Applicable

INVENTORY FOR POLLUTION PREVENTION PLAN
Off-road diesel and oils and lubricants.
SPILL PREVENTION
Off-road diesel will be stored in a skid mounted tank with secondary containment. Oil and lubricants will be stored in a work trailer when not in use. Absorbent pads will be available on-site.
Material Management Practices

Good Housekeeping:	Oils and lubricants will be stored in a work trailer when not in use. Area will be policed daily.
Hazardous Products:	Off-road diesel will be stored in a skid mounted tank with secondary containment. Oil and lubricants will be stored in a work trailer when not in use. Absorbent pads will be available on-site.

Product Specific Practices	
Petroleum Products:	Off-road diesel will be stored in a skid mounted tank with secondary containment. Oil and lubricants will be stored in a work trailer when not in use. Absorbent pads will be available on-site.
Fertilizers:	NA
Paints:	NA
Concrete Trucks:	NA
Spill Control Practices	
Secondary containment for off-road diesel will be checked daily. If any sheen or evidence of a spill is detected, the product will be removed with absorbent pads. Before any discharge of rain water from the secondary containment is allowed, it will be checked for visible signs of a sheen.	
SITE MAP	
See Figure 1-2, Site Plan, in the Work Plan.	

POLLUTION PREVENTION PLAN CERTIFICATION	
I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.	
Signature	Date
	June 30, 2006

CONTRACTOR'S CERTIFICATION			
(Identify for each measure identified in the plan, the contractors or subcontractors who will implement the measure) I certify under penalty of law that I understand the terms and conditions of this Virginia Pollutant Discharge Elimination System (VPDES) general permit VAR10 that authorizes the storm water discharges from the construction activity identified as part of this certification.			
Signature	Title	Date	Company Name, Address, and Telephone Number
	Project Manager	June 30, 2006	Bhate Environmental Associates, Inc. 1962 Thorngate Lane Mascotte, FL 34753 804.347.8803

PROJECT_____

STORM WATER POLLUTION PREVENTION PLAN

INSPECTION REPORT FORM

To Be Completed Every 14 Days and Within 48 Hours of a
Rainfall Event of 0.5 Inches or More

INSPECTOR:_____
DATE:_____

INSPECTOR'S QUALIFICATIONS_____

_____

DAYS SINCE LAST RAINFALL_____

AMOUNT OF LAST RAINFALL_____INCHES

AREA INSPECTED (areas not finally stabilized, material storage areas, and areas where vehicles enter/exit the site) _____

_____

INCIDENCES OF NON-COMPLIANCE	CORRECTIVE ACTION TAKEN	BY WHOM	WHEN COMPLETE
Location(s) of discharges of sediment or other pollutants from the site			
Location(s) of BMP that need to be maintained			
Location(s) of BMP that failed to operate as designed or proved inadequate for location			
Location(s) where additional BMP is needed that did not exist at time of inspection			

Incidences of noncompliance were not identified and the facility is in compliance with the storm water pollution prevention plan. I certify under penalty of law that this attachment was prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

SIGNED_____DATE_____

PROJECT_____

STORM WATER POLLUTION PREVENTION PLAN

CHANGE(S) REQUIRED TO THE STORM WATER POLLUTION PREVENTION PLAN_____

_____

_____

_____

_____

_____

_____

_____

_____

REASON(S) FOR THE CHANGE(S)_____

_____

_____

_____

_____

_____

_____

I certify under penalty of law that this attachment was prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

SIGNED_____DATE_____

Appendix D

APPENDIX D

ACTIVITY HAZARD ANALYSIS

Activity Hazard Analysis (AHA) – 01

Task: Shoreline Stabilization	**Bhate Project Number:** 9030080	
Minimum Personal Protective Equipment (PPE): Level D PPE (Long pants, shirts with minimum 4" sleeve, steel toe boots, safety glasses, hard hat for overhead hazards, leather work gloves, and hearing protection, as required)	**Location:** Cheatham Annex, Yorktown, Virginia	
	Analysis Approved by: Judy McBride, CIH	**Date:** January 2006

Activity	Potential Hazards	Recommended Controls
Mobilization/Demobilization and Site Preparation General precautions presented in this section apply throughout site operations (i.e. slips, trips, and falls, thermal stressors, materials handling, inclement weather, etc.)	Slips, trips, or falls on walking and working surfaces	• Determine the best access route prior to transporting equipment and tools • Continuously inspect the work area for slip, trip, and fall hazards • Pay attention; ensure safe and secure footing • Maintain clean work areas by following good housekeeping procedures • Be alert for uneven and variable terrain • Wear slip resistant footwear when walking/working on slippery surfaces or slopes
	Site Traffic	• Be aware of potential vehicle traffic while on site • Follow posted warnings and rules for travel around site
	Eye injury	• Use approved safety glasses with rigid side shields
	Overhead hazards	• Personnel will be required to wear hard hats that meet American National Standards Institute (ANSI) Standard Z89.1 in all areas with overhead hazards
	Cuts, punctures, and abrasions	• Wear leather work gloves when handling materials or using tools
	Dropped objects	• Steel toe boots meeting ANSI Standard Z41 will be worn
	Thermal Stressors (i.e. heat stress, cold stress)	• Employees will have appropriate clothing for variable weather • Use of long sleeves or application of sunscreen with a high sun protection factor (SPF) on exposed skin encouraged • Employees will take breaks and drink plenty of fluids, as necessary, to prevent heat stress • Warming breaks will be permitted as necessary to prevent cold stress

AHA – 01 (continued)

Activity	Potential Hazards	Recommended Controls
Mobilization/Demobilization and Site Preparation (continued)	Back Injury from Materials Handling	• Use proper lifting techniques • Loads greater than 50 pounds require assistance or mechanical equipment • Prior to lifting, check the load for jagged or sharp edges • Avoid torso twisting motions while handling or moving loads
	Inclement weather (Thunderstorms and tornadoes)	• Halt activities immediately and take cover during thunderstorm or tornado warnings, shelter in a building if possible, stay away from windows • If outdoors, stay close to the ground • Listen to radio or television announcements for pending weather information • Do not try to outrun a tornado on foot or in a vehicle
	Biological hazards (spiders, snakes, etc.)	• Workers will inspect the work area carefully and avoid placing hands and feet into concealed areas

Surface Sweep	Unexploded Ordnance (UXO)	• Prior to conducting a surface sweep of the work area the SSHS shall consult with the ROICC for specific UXO notification procedures
		• Only certified UXO Technicians may handle, analyze or move any suspected UXO material
		• Conduct a surface sweep of the proposed work area using caution to visualize where you are stepping
		• Follow the three "R's" for UXO:
		  • Recognize it (it's potentially dangerous)
		  • Retreat form it (the same way that you entered the area)
		  • Report it (notify the ROICC or designated UXO support personnel)
		• "If you did not drop it-do not pick it up"

AHA – 01 (continued)

Activity	Potential Hazards	Recommended Controls
Clearing and Grubbing	Chainsaw operations	• Chainsaw shall not be fueled while running, hot, or near open flame • Operator must utilize both hands on the saw controls during all cutting operations • Operators must wear a minimum of safety glasses, hard hat and face shield, hearing protection, work gloves, safety shoes, and sawyer chaps • Chainsaw shall not be used for cuts above chest high • Chainsaw engine idle shall be such that the chain is not engaged at idle • Chainsaw shall be equipped with functioning automatic chain brake or kickback device
	Overhead hazard from felling of trees and limbs	• Site workers must wear a minimum of safety glasses, hard hat and face shield, hearing protection, work gloves, and safety shoes • Site workers shall maintain a safe distance from overhead work and the likely fall zone during cutting operations • Site workers must request clearance to approach downed material from saw operator prior to moving or collecting material for disposal
	Contact with moving equipment/vehicles	• Site workers shall utilize hand signals when verbal communication is not feasible • Any equipment operated on public roadways shall be equipped with functional head, tail, and signal lights • Establish eye contact with operator before approaching any moving equipment • Ensure heavy equipment is equipped with functioning backup alarms
	Faulty or damaged equipment	• All machinery and equipment shall be inspected daily by a qualified operator prior to use • Faulty or defective equipment shall be tagged and removed from service • Use of a spotter while backing shall be required
	Noise	• Hearing protection will be worn with a noise reduction rating capable of maintaining personal exposure below 85 decibels (dBA) (ear muffs or plugs) • The SSHS will determine the need for hearing protection • All equipment will be equipped with manufacturer's required mufflers

AHA – 01 (continued)

Activity	Potential Hazards	Recommended Controls
Soil Excavation	Overhead/buried utilities	• Area of excavation should be delineated and a utility locate performed prior to any excavation as applicable • Overhead utilities should be considered live until determined otherwise. • Maintain a minimum distance of 15 feet from overhead utilities • All underground utilities must be clearly marked before beginning work
	Heavy equipment operation	• Maintain awareness of vehicle movement in work area and exercise caution when approaching heavy equipment • Equipment will be equipped with functioning back-up alarms, signal lamps, and alerting horns • Operators are required to use seat belts • Signs, barricades, flagmen, and/or other traffic control devices will be used to control traffic as necessary • Buckets and attachments shall be placed on the ground if operator not at controls or if ground personnel approach
	Excavation Safety	• Ensure equipment is placed so as to not contribute to a cave-in situation • No personnel will be allowed to enter the excavation unless the excavation has been properly inspected, shoring and means of egress installed as necessary, all heavy equipment has been moved away from the affected edges, and any spoils have been removed from the edge • Personnel shall not enter an excavation that exhibits the characteristics of a confined space • Do not place spoil piles closer than 2 feet from the edge of the excavation
Installation, Filling, and Backfilling of the Geotextile Tubes and Scour Aprons	Back Injury from Materials Handling	• Use proper lifting techniques • Loads greater than 50 pounds require assistance or mechanical equipment • Prior to lifting, check the load for jagged or sharp edges • Avoid torso twisting motions while handling or moving loads

AHA – 01 (continued)

Activity	Potential Hazards	Recommended Controls
Installation, Filling, and Backfilling of the Geotextile Tubes and Scour Aprons (continued)	Heavy equipment operation	• Maintain awareness of vehicle movement in work area and exercise caution when approaching heavy equipment • Equipment will be equipped with functioning back-up alarms, signal lamps, and alerting horns • Operators are required to use seat belts • Signs, barricades, flagmen, and/or other traffic control devices will be used to control traffic as necessary • Buckets and attachments shall be placed on the ground if operator not at controls or if ground personnel approach
	Geotextile tube fasteners	• Any spikes or stakes used to hold the Geotextile tube in place shall be clearly marked so as to not present a trip hazard
	Dust from fill sand	• To the extent feasible handle the fill sand in a moist condition to minimize dust generation • Position body upwind if handling sand in a dry condition
	Sand slurry	• Suction hoses shall be adequately guarded to prevent capture of body parts or clothing • Taglines shall be affixed to suction hoses to facilitate control while maintaining a safe working distance • Ensure fittings of slurry pump and hoses are secure
Safety Equipment Used	**Inspection Requirements**	**Training Requirements**
Level D PPE First Aid Kit Fire Extinguisher	Informal daily work area inspections to be conducted by the SSHS	Site personnel have read and understand the Site safety and Health Plan Site personnel received site specific safety indoctrination for this project SSHS will have CPR and First Aid training

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Appendix E

APPENDIX E

EMERGENCY CONTACTS

EMERGENCY PHONE NUMBERS

Contact	Emergency Telephone Number
Local Agencies and Regional Agencies	
Local Fire, Police, Ambulance	911
Naval Weapons Station	
Fire, Police, Ambulance	(757) 887-4911
Safety	(757) 887-4661
Dispatch	(757) 887-4636
Hospital **Sentara Williamsburg Community Hospital** 301 Monticello Avenue Williamsburg, Virginia 23185 **Directions to the Hospital are included as Figure 5-1**	(757) 259-6000
Regional Poison Control Center	(800) 451-1428
Federal Agencies	
Agency for Toxic Substances and Disease Registry	(404) 639-0615 (24 hours)
National Response Center	(800) 424-8802
NAVFAC Mid-Atlantic ROICC: Mr. William Wells RPM: Ms. Linda Cole	 (757) 847-7952 (757) 444-3826
Bhate Environmental Associates, Inc. (Secondary Contacts)	
Senior Project Manager: Mr. Lenus Perkins	(205) 918-4000 (office) (205) 910-9260 (cell)
Project Manager: Mr. Andy Rider	(804) 347-8803 (cell)
Site Superintendent/Site Safety and Health Specialist: Mr. Jeff Dickson	(205) 999-7673 (cell)
Health and Safety Manager: Ms. Judy McBride, CIH	(205) 918-4000 (office)