

<b>AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT</b>	1. CONTRACT ID CODE	PAGE	OF	PAGES
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2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO. (If applicable)
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6. ISSUED BY	CODE	7. ADMINISTERED BY (If other than Item 6)	CODE
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8. NAME AND ADDRESS OF CONTRACTOR (No., street, county, State and ZIP Code)	(X)	9A. AMENDMENT OF SOLICITATION NO.
		9B. DATED (SEE ITEM 11)
		10A. MODIFICATION OF CONTRACT/ORDER NO.
		10B. DATED (SEE ITEM 11)
CODE		FACILITY CODE

**11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS**

The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers  is extended,  is not extended. Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods:

(a) By completing items 8 and 15, and returning \_\_\_\_\_ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment your desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)

**13. THIS ITEM ONLY APPLIES TO MODIFICATION OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.**

CHECK ONE	A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.
	B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(b).
	C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:
	D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor  is not,  is required to sign this document and return \_\_\_\_\_ copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)	16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print)
15B. CONTRACTOR/OFFEROR	16B. UNITED STATES OF AMERICA
(Signature of person authorized to sign)	(Signature of Contracting Officer)
15C. DATE SIGNED	16C. DATE SIGNED

1. The specifications and drawings for Invitation No. DACW64-03-B-0009, Dredging, Turnstake Island to Rattlesnake Point in Aransas and Calhoun Counties, Texas, advertised 25 February 2003, and for which bids are to be opened on 27 March 2003, are hereby modified as follows:

**QUESTIONS FROM CONTRACTORS AND ANSWERS BY THE GALVESTON DISTRICT TEAM.**

QUESTION 1. On Drawing No. 14 of 14, access channel is shown leaving Intracoastal. Which side of Stone Breakwater can access channel be excavated?

ANSWER 1. Sheet No. 14 of 14, revised in this Amendment No. 0001, shows the entire access channel location.

QUESTION 2. Does access channel have to be backfilled after Breakwater is completed?

ANSWER 2. Specification SECTION 02379 entitled GEOTEXTILE TUBES, enclosed with this Amendment No. 0001, has been revised to indicate the portion of the channel to be backfilled.

QUESTION 3. On what bid item does contractor include cost of digging access channel for Stone Breakwater?

ANSWER 3. Specification SECTION 02385 entitled RIPRAP AND BLANKET STONE FOR BREAKWATER has been revised by this Amendment No. 0001 to state that the payment for excavation of the access channel is to be included in the contract lump sum price for "Mobilization and Demobilization (Dewatering, Geotubes, Access Channels, and Stone Breakwater)."

QUESTION 4. On what bid item does contractor include cost for Mobilization and Demobilization on access channel for Stone Breakwater?

ANSWER 4. Specification SECTION 02385 entitled RIPRAP AND BLANKET STONE FOR BREAKWATER has been revised by this Amendment No. 0001 to state that the payment for Mobilization and Demobilization is to be included in the contract lump sum price for "Mobilization and Demobilization (Dewatering, Geotubes, Access Channels, and Stone Breakwater)."

QUESTION 5. Page 02379-5 Sect 2.1.1 3<sup>rd</sup> line Borrow Area for filling tubes as shown. Where is Borrow Area shown in drawings?

ANSWER 5. The location of the borrow area is added to the revised Sheet 9 of 14, Typical Section A, by this Amendment No. 0001.

QUESTION 6. Drawing Sheet 9 of 14, can access be excavated along entire length of new Geo-tube installation. Lines and grades for access channel are not shown on drawing 9 of 14.

ANSWER 6. Sheet 9 of 14 has been revised by this Amendment No. 0001 to show the entire access channel location. The bottom width is given on this drawing. Slope and depth information is added to the Specification SECTION 02379 GEOTEXTILE TUBES revised by this Amendment No. 0001.

QUESTION 7. Page 02379-9 3.2 access channels, this addresses access channel at Stone Breakwater not Geo-tube location.

ANSWER 7. Specification SECTION 02379 entitled GEOTEXTILE TUBES has been revised by this Amendment No. 0001 to include the reference to the Geo-tube location.

QUESTION 8. Does access channel at Geo-tubes have to be backfilled after Geo-tubes are completed?

ANSWER 8. Specification SECTION 02379 entitled GEOTEXTILE TUBES, enclosed with this Amendment No. 0001, has been revised to indicate the portion of the channel to be backfilled.

QUESTION 9. Please verify that all 2,043' of Geo-tubes are 45' circumference.

ANSWER 9. The drawings indicate only one size (45' circumference) for the geotextile tubes.

QUESTION 10. Why are anchor tubes only on 1 side of scour apron?

ANSWER 10. Sheet 9 of 14 has been revised by this Amendment No. 0001 to indicate anchor tubes on both sides of the scour apron..

QUESTION 11. The access channel to be dredged out has what type of soil in it and what is the minimum or maximum elevation, can it be? Can this channel be hydraulically dredged and how far from the channel has the material to be placed? Can this access channel be carried on along the entire perimeter of the geotube placement area for access and if so how close to the geotube can this channel be?

ANSWER 11. No information is included in this contract regarding the type of soil located along the access channel alignments. The material for the access channel has to be mechanically dredged and has to be placed adjacent to the channel. Revised Sheet 9 of 14, included in this Amendment No. 0001, shows that the access channel can be placed along the entire length of the tube and the distance away from the tube it has to be.

QUESTION 12. Where on the site can material be dredged from, that is used to fill the geotubes and what type of material is it? Is there any soil investigations done on the borrow area? How deep can one excavate in this borrow area?

ANSWER 12. The Sheet 9 of 14, enclosed with this Amendment No. 0001, has been revised. No information is included in this contract regarding the type of soil located within the borrow area. The specifications have been revised to allow for use of coarse-grained material and clay or silt cuttings to fill tubes. The depth limit to the borrow excavation is in the specifications.

QUESTION 13. The specs indicated that the prep work where the geotubes are to be placed has a certain elevation to start. What is that elevation or does one just ensure that the final geotube grade is to EL + 3' MLT and one follows the virgin lie of the soil to start placement of the geotubes? Is there a + or - elevation tolerance allowed for the final geotube grade?

ANSWER 13. Sheet 9 of 14, enclosed with this Amendment No. 0001, shows a required minimum final top of tube elevation. There is no maximum elevation limit.

QUESTION 14. The anchor tube circumference is 4' or 5'? The scour apron is 28' or 30' wide; minus the anchor tube?

ANSWER 14. The anchor tube circumference is 4' and the scour apron is 32' as shown on the revised Sheet 9 of 14, enclosed with this Amendment No. 0001.

QUESTION 15. There is a reference on Surveys that talks about "short tubes". What is a short tube and where are they located?

ANSWER 15. The reference to short tubes has been deleted from the revised Specification SECTION 02379 entitled GEOTEXTILE TUBES, enclosed with this Amendment No. 0001.

QUESTION 16. Page 2379-6, Table 1.

The fabric specification for the geotube scour apron and anchor tubes carry the same physical requirements.

With all due respect to the specifier, the scour apron should be designed with a combination filter fabric and re enforcement fabric such as a 200X200 300X300 or 400X400 wide width ASTM 4595. A particle retention of 40 mesh and a respectable water flow.

The last project had a grab tensile requirement of 300lb, which left the specification wide open for someone to use a 300 LB slit film tape at about \$.40 a square yard.

The tube fabric cost is about ten times that and surely four time what the appropriate design would call for.

ANSWER 16. Yes, the scour apron for the breakwater is intended to be the same fabric as is used for the tubes.

We do specify 400 lb/in fabric at other sites. However, since it is possible that rock or cellular mattress may be placed on top of the scour apron - and across the tube at some point in the future, use of the higher strength material is justified.

The recommendation of #40 AOS is suitable for materials at some sites; however, we prefer to go with smaller AOS on this site.

In the last project there was an error in the required minimum test value table for a previous contract which referred to "grab" strength, rather than "wide width tensile" strength. The correct test is referenced in these tables.

QUESTION 17. In addition, the liner (non-woven) for the anchor tubes has been changed from a filter with 100 A.O.S. to a specification that demands a 10oz/sy fabric per square yard in order to meet the trap tear and tensile strength.

The 50 feet of fabric to construct the scour apron and anchor tubes will make the scour aprons more costly per linear foot than the tubes themselves.

ANSWER 17. The 10 oz/sy fabric per square yard shall be used.

QUESTION 18. While I am on a role hear, I might add that the 15% minimum elongation for the high tenacity woven polyester fabric will definitely present a major problem as most high tenacity polyester yarns have a maximum elongation of under 15%

ANSWER 18. Yes, the 15% strain shown in the table is meant to be a "MAX" and a note has been added to the revised Specification SECTION 02379 entitled GEOTEXTILE TUBES, enclosed with this Amendment No. 0001.

QUESTION 19. One more thing. The original design with an anchor tube attached to the scour apron was to sink the anchor tube below the scour line in order for the filter fabric scour apron not to be undermined.

Some place over time the anchor tube has re surfaced. This could and often times does allow the surf to get under especially where part of the anchor tube has scoured below and part remains on top level with the tube, allowing surge under the apron.

ANSWER 19. Yes, it is intended that the anchor tube slide below the scour line.

(a) Specifications.

(1) BIDDING SCHEDULE, Pages 00010-1 Through 00010-3. - The enclosed new Bidding Schedule, Pages 00010-1 through 00010-3 supersedes that issued with this Invitation..

(2) Page 01100-6, Paragraph 17. - At the end of this Paragraph, add the following new Paragraph 18:

**“18. FUEL PRICE ADJUSTMENT (CESWG).**

(a) For the purpose of this provision, the term fuel cost per contract unit means that part of the total price per unit that is attributable solely to the cost of fuel.

(b) The fuel cost per contract unit for Bid Item 0011 is estimated to be \$.30 per cubic yard. The cost is based on a price of fuel of \$1.27 per gallon for No. 2 diesel fuel, which includes all applicable taxes.

(c) If at any time after award, there is an increase or decrease in the fuel price established, by the Department of Energy, Energy Information Center - [www.eia.doe.gov](http://www.eia.doe.gov), for No. 2 diesel fuel, the unit price of Bid Item 0011 will be adjusted by 70 percent of any increase or decrease in excess of 10 percent of the applicable fuel cost set forth in (b) above. Fuel price adjustments will be calculated for each calendar month and will be based upon the price applicable for the period the work is performed. Fuel price adjustments will be paid whenever the Contractor requests a progress payment, (but not before the data becomes available for the period that work is performed) and when final payment is made.

(d) Upward fuel price adjustment will not be made beyond the period specified in the Contractor performance of the work, plus any approved extension of time. Downward adjustments will be made at any time in accordance with Item (c) above, if the fuel price decreases.”

(3) SECTION 02303 EARTHWORK FOR DEWATERING. - The enclosed new SECTION 02303 entitled EARTHWORK FOR DEWATERING supersedes that issued with this Invitation.

(4) Page 02335-2, Paragraph 3.7. - At the end of this Subparagraph, add the following sentence: "The crown width shall be restored to 10 feet at the existing crown elevation after compaction."

(5) SECTION 02379 GEOTEXTILE TUBES. - The enclosed new SECTION 02379 entitled GEOTEXTILE TUBES shall supersede that issued with this Invitation.

(6) SECTION 02385 RIPRAP AND BLANKET STONE FOR BREAKWATER. - The enclosed new SECTION 02385 entitled RIPRAP AND BLANKET STONE FOR BREAKWATER shall supersede that issued with this Invitation.

(7) Page 02482-8, Subparagraph 3.4.2.1. - Delete this Subparagraph and substitute the following new Subparagraph:

"3.4.2.1 Beneficial Use Site "A". The three (3) Discharge Areas shown shall be prominently marked by the Contractor with conspicuous buoys or stakes at each corner. The Contractor shall use a spreader on the end of the discharge pipe to support material build-up and reduce scour. The discharge point shall be re-directed within each Discharge Area as often as necessary to retain the maximum amount of material within the confined area. The Contractor shall move the point of discharge to a succeeding Placement Corridor after every 2,000 feet of dredge advancement so that each of the three (3) Placement Corridors receive approximately one-third (1/3) of the dredged material. Placement operations into each Placement Corridor shall be performed in ascending order. The Government will make periodic inspections of the placement operations. The Contractor may be directed to move the discharge point. The Contractor shall deposit material using a method to fill the entire Area to within 3 feet of the top of the perimeter embankment. No material shall be allowed to flow over the earthen containment levees. Effluent shall be allowed to flow only over the weir. The weir is of fixed height; therefore, some material loss may occur. No water quality monitoring is required. If excess dredged material exists, it shall be allowed to mound higher than the existing perimeter embankment by discharging near the center of the Area. Dikes and ditches shall be constructed as necessary to control interior flows so that maximum settling is attained while effluent is released. The Contractor shall have suitable earthwork equipment at the site, capable of maintaining the levees and required weir operation."

(8) SECTION 02615 DEWATERING PIPE. - Delete this Section in its entirety.

(b) Drawings.

(1) Sheet 9 of 14. - The enclosed new Sheet 9 of 14 shall supersede that issued with this Invitation.

(2) SKETCH NO. 1. - The enclosed SKETCH NO. 1 shall be added to and become part of Sheet 11 of 14 of this Invitation.

(3) SKETCH NO. 2. - The enclosed SKETCH NO. 2 shall be added to and become part of Sheet 14 of 14 of this Invitation.

2. This amendment shall be attached to, and become a part of, the specifications.

3 Encls

1. Bd Sched, Pgs 00010-1 thru 00010-3
2. Section 02303
2. Section 02379
2. Section 02385
3. SKETCHES NOS. 1 & 2

File 8259S

INVITATION NO. DACW64-03-B-0009

**GULF INTRACOASTAL WATERWAY, TEXAS,  
TURNSTAKE ISLAND TO RATTLESNAKE  
POINT IN ARANSAS AND CALHOUN  
COUNTIES, TEXAS, DREDGING**

**BIDDING SCHEDULE  
(TO BE ATTACHED TO STANDARD FORM 1442)**

Item No.	Description	Estimated Quantity	Unit	Unit Price	Estimated Amount
<b><u>SCHEDULE NO. 1</u></b>					
0001	Mobilization and Demobilization (Dewatering, Geotubes Access Channels, and Stone Breakwater)	1	L.S.	\$ _____	\$ _____
0002	Dewatering	1	L.S.	\$ _____	\$ _____
0003	Ditch Excavation	58,500	L.F.	\$ _____	\$ _____
0004	Scarifying, Grading, and Compaction	2,500	L.F.	\$ _____	\$ _____
0005	Geotextile	10,300	S.Y.	\$ _____	\$ _____
0006	Geotextile Tubes	2,000	L.F.	\$ _____	\$ _____
0007	Surveys	1	L.S.	\$ _____	\$ _____
0008	Blanket Stone (1/2"-6")	6,000	TON	\$ _____	\$ _____
0009	Riprap (25-420 lbs)	14,000	TON	\$ _____	\$ _____
0010	Mobilization and Demobilization (Dredging)	1	L.S.	\$ _____	\$ _____
*0011	Dredging \$ _____	1,155,000	C.Y.	\$	

00010-1

(To Accompany Amendment No. 0001 to Invitation No. DACW64-03-B-0009)



**BIDDING SCHEDULE (Cont'd)**  
**(TO BE ATTACHED TO STANDARD FORM 1442)**

**1. ARITHMETIC DISCREPANCIES (EFARS 52.214-5000).**

(a) For the purpose of initial evaluation of bids, the following will be utilized in resolving arithmetic discrepancies found on the face of bidding schedule as submitted by the bidder:

- (1) Obviously misplaced decimal points will be corrected;
- (2) Discrepancy between unit price and extended price, the unit price will govern;
- (3) Apparent errors in extension of unit prices will be corrected;
- (4) Apparent errors in addition of lump-sum and extended prices will be corrected.

(b) For the purpose of bid evaluation, the Government will proceed on the assumption that the bidder intends his bid to be evaluated on the basis of the unit prices, the totals arrived at by resolution of arithmetic discrepancies as provided above and the bid will be so reflected on the abstract of bids.

(c) These correction procedures shall not be used to resolve any ambiguity concerning which bid is low.

**2. MODIFICATIONS (CESWG).** If a modification to a bid based on unit prices is submitted, which provides for a lump sum adjustment to the total estimated cost, the application of the lump sum adjustment of each unit price in the bid schedule must be stated. If it is not stated, the bidder agrees that the lump sum adjustment shall be applied on a pro rata basis to every unit price in the bid schedule.

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**SITE WORK**

**SECTION 02303 - EARTHWORK FOR DEWATERING**

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**SECTION 02303 - EARTHWORK FOR DEWATERING**

**PART 1 - GENERAL**

**1.1 SCOPE OF WORK.** The work covered in this Section consists of draining existing ponds and excavating ditches within the Placement Areas as shown. The work includes placing the excavated material on the slopes of existing levees and shaping and grading the material to promote surface drainage. The work also includes removal of slumped material from completed ditches to allow water to drain from locations throughout the sites, to the discharge locations.

**1.2 LOCATION.** Placement Areas Nos. 127, 129, 130A, 130B and 131, Gulf Intracoastal Waterway, Aransas National Wildlife Refuge, located near the City of Rockport in Aransas County, Texas.

**1.3 NOTIFICATION PRIOR TO COMMENCEMENT OF DITCHING OPERATIONS.** The Contractor shall notify the Area Engineer, Southern Area Office, at 1920 N. Chaparral, Corpus Christ, Texas 78401, in writing of the commencement of ditch excavation at least 5 days before starting. Also, at least 5 days before commencing work on Refuge property, the Manager of the Aransas Wildlife Refuge shall also be notified by telephone at (361) 286-3559

**1.4 SUBMITTALS.** Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with the SECTION entitled SUBMITTAL PROCEDURES.

1.4.1 SD-09 Reports.

1.4.1.1 Surveys. GA. Promptly upon completing a survey, the Contractor shall submit the originals of field notes and other records relating to the survey or to the layout of the work.

1.4.1.2 Progress Reports: GA. Daily and monthly summary reports of operation containing a list of personnel and equipment on the work site shall be prepared, maintained, and submitted

**1.5 UTILITIES ACROSS THE CONSTRUCTION SITES.** No known utilities cross the area to be dewatered.

## **1.6 CHARACTER OF MATERIALS.**

1.6.1 Material to be excavated primarily consists of soil that has been deposited over time in conjunction with disposal of dredged material from maintenance dredging of the Gulf Intracoastal Waterway. Some virgin material may be encountered within the prescribed depth. Bidders are expected to examine the worksite to determine for themselves the characteristics of the material likely to be encountered.

1.6.2 Debris. Materials, including scrap, rope, wire cable, lumber, snags and stumps may be encountered within the limits of the ditch excavation. These materials shall be removed and discarded off-site using an approved method. No separate payment will be made for separating debris from soil and subsequent disposal.

## **1.7 MEASUREMENT.**

1.7.1 Dewatering shall not be measured for payment.

1.7.2 Ditch Excavation shall be measured by the linear foot of completed and accepted ditch. The length shall be the summation of perimeter ditches, interior ditches, and ditches to drop-outlet structures.

## **1.8 PAYMENT.**

1.8.1 Mobilization and Demobilization. The contract lump sum price for "Mobilization and Demobilization (Dewatering, Geotubes, and Stone Breakwater)" shall include costs for mobilizing and demobilizing the equipment necessary to execute the work covered in this Section, transportation, and other costs incidental to delivery of the plant and equipment to the worksite in a condition ready for operation and, after completion of the work, for removal of the plant and equipment from the worksite. Payment for this item will be made pursuant to the conditions of the SPECIAL CONTRACT REQUIREMENTS, STANDARD CLAUSE entitled PAYMENT FOR MOBILIZATION AND DEMOBILIZATION.

1.8.2 Dewatering at each existing drop-outlet structure to accomplish drainage of existing ponds within the Placement Areas will be paid at the contract lump sum price for "Dewatering." This price shall include the costs for removal of spillway boards, excavation of sumps, excavation of ditches to remove standing water prior to the excavation of required dewatering ditches, placement and grading of excavated material, and the costs of equipment, personnel, and material needed to accomplish the work. Acceptance of the work shall be based on effective accomplishment of the required drainage of ponds at the sites.

1.8.3 Ditch Excavation. Payment for required dewatering ditches, including perimeter ditches, interior ditches, and ditches to drop-outlet structures will be made at the contract unit price per linear foot for "Ditch Excavation." This price shall

include the costs for measurement and acceptance surveys, placement and grading of excavated material and costs of equipment, personnel, and materials needed to accomplish the work. Monthly payments will be made based on the amount of completed and accepted ditch.

**PART 2 - PRODUCTS (NOT APPLICABLE)**

**PART 3 - EXECUTION**

**3.1 ESTIMATED QUANTITIES.** The approximate total feet of required ditch excavation and the approximate total neat line excavation quantity, is provided below. This estimate is based on the assumption that the average depth of the ditches is 4 feet, and the actual side slopes, determined by the slope of repose of the materials, will average 1 Vertical on 4 Horizontal, which is slightly flatter than the minimum required slope shown. The ditches shall be constructed along the alignments and to the minimum elevation, lines, and grades shown, to provide for drainage of water from the sites. However, the Contractor may be directed to modify the ditch alignments or lengths where appropriate to facilitate dewatering of the Placement Area interior.

3.1.1 Neat Line Volumes. For cost estimating purposes, the following lengths, and the average per-foot of ditch, and total required excavation quantity, based on the above assumed template were used. The “neat line” volumes, which were used to prepare the Government estimate, are provided for use by the Contractor as an initial estimate only. The Contractor is responsible for interpretation of these volume numbers, calculating and verifying these numbers, based on available contract information, and for making and applying additional, reasonable assumptions to these and other “raw” quantities to arrive at a bidding estimate.

3.1.1.1 Definition. “Neat Line” Volumes is defined as the unadjusted, raw quantities computed from the assumed templates. The selection of percentages to cover additional excavation work required for items including initial over-excavation, side slope slumping, sloughing or sliding and required amount of re-excavation to restore ditch bottom elevation to the required depths are the responsibility and decision of the Contractor.

Ditch Type	Total Length	CY Excavation Per Foot of Ditch	CY Excavation
Perimeter and Interior Cross Ditch	40,750	3.6	147,000

For estimating purposes, it was assumed that four (4) sumps at existing drop-outlet structures will be required.

**3.2 ORDER OF WORK.** The Contractor shall complete work in the following order, at each site:

- (1) The Contractor shall degrade the training levees, at the locations shown, and excavate sumps as required at drop outlet structures.
- (2) The Contractor shall excavate drainage ditches, and perform other required work necessary to allow for removal of water from the site, once drainage to the discharge location is established.
- (3) After draining existing ponded water, the Contractor shall excavate the following required dewatering ditches: (1) perimeter dewatering ditches, (2) interior cross ditches and (3) dewatering ditches to drop outlet structures, at the locations shown, to the required minimum dimensions and depths. The sequence and directions of excavation may be as elected by the Contractor.
- (4) Prior to acceptance of the site, and demobilization of excavation equipment from the site, the Contractor shall re-excavate reaches of the previously completed ditches, which, since initial excavation, have become partially re-filled as a result of sloughing of material from the slopes and are therefore, no longer open to the minimum required depths.

The Contractor may initiate work included in a later order of work, prior to completing the work in a preceding order, as long as work completion is in accordance with specified order. Changes to the specified order of work shall be requested and approved in writing.

### **3.3 EXCAVATION.**

#### **3.3.1 Sumps.**

3.3.1.1 General. The Contractor shall excavate sumps adjacent to existing drop-outlet structures for gathering drainage and removal from the site, as specified herein.

3.3.1.2 Existing Drop-Outlet Structures. An drainage sump area 20 feet wide in front and to the sides of the existing drop-outlet structures shall be excavated to the top of slab elevation or if there are deep-buried slabs, to a depth of at least 3 feet below the bottom elevation of the adjacent new dewatering ditch to the spillway. Spillway boards shall be removed to the top of the slab or depth of the adjacent sump, as applicable. Removed boards shall be stacked adjacent to the walkway, on the levee

embankment. Excavated material shall be stockpiled and sloped to drain on existing embankment slopes. Appropriate equipment and methods shall be utilized to prevent damage to the structure.

3.3.2 Drainage Ditches shall be excavated at the locations, sizes, and depths required to drain ponded water from side-ditch borrow areas and other existing ponds within each Placement Area to the drop-outlet structure. Drainage ditches shall be completed at each Placement Area as soon as possible after mobilization to provide for maximum drying time prior to excavation of the required ditches. Drainage ditches may be excavated as “pilot” ditches along the required drainage ditch alignment or at other locations selected by the Contractor.

3.3.3 Required Ditches shall be excavated where shown to the minimum depth, width, and side slopes shown. Excavation below minimum required depth will be required at some locations to ensure flow of water throughout the dewatering ditch system. The actual depth, of the ditches, below the minimum required depths, shall be determined by the Contractor to ensure that a final grade is established along the ditch invert that effectively provides drainage of the entire site to the discharge location. Some soil that is likely to be encountered in the ditch excavation will be of soft consistency, water saturated, and of low shear strength, which can precipitate sloughing or collapsing of the ditch walls. Therefore, at some exceptionally wet locations, where the side slopes of the excavated ditch tend to slough into the ditch after it has been initially excavated, the Contractor shall be required to complete excavation in some areas in stages, and possibly with side slopes flatter than the minimum required slope. It may be necessary to excavate these ditches in several passes or steps, beginning with a shallow ditch and then deepening it in stages until the required depth and cross section is obtained. Sloughing or collapsing of the sides of the ditch, thereby causing the depth of the ditch to become shallower after it has been properly constructed to the minimum template shown, will not relieve the Contractor of the requirement to excavate the ditch to the required template. Acceptance of the completed ditch construction will be contingent upon the Contractor achieving the minimum ditch template. Additional work necessary to maintain the completed ditches or re-excavation necessary to restore the completed ditches to the required template shall be at the expense of the Contractor. No allowance for additional construction time will be made for this maintenance and re-excavation. Spur ditches shall also be excavated between old borrow ditches and the new dewatering ditch to allow for continued drainage in the future.

### **3.4 DISPOSITION OF MATERIALS.**

3.4.1 Excavated Material. Material from the initial temporary ditching for draining ponds, and from required dewatering ditch excavation shall be placed on the existing levee slopes, as shown. The existing levee crowns and the surface of the placed material shall be sloped to drain. The surfaces of the existing levee crown and the placed material shall be graded smooth to eliminate holes or depressions that can

trap runoff. Pockets or depressions where water can pond will not be allowed in the finished surface of the placed material.

3.4.1.1 Unauthorized Placement of Excavated Material. Prior to acceptance of ditches, excavated material from the ditch that is deposited in the areas shall be placed as specified. The Contractor shall be required to remove misplaced material and deposit it where directed without cost to the Government.

3.4.1.2 Debris. Prior to completion of the work, the Contractor shall remove debris, wire rope, scrap metal, timber, or other rubbish encountered within the area of excavation and shall dispose these materials offsite, as approved. The Contractor shall not discard debris or trash within or along the banks of the Channel.

### **3.5 RESTORATION OF DAMAGED IMPROVEMENTS OR STRUCTURES.**

3.5.1 Damages. Fences, levee embankment, roads, ditches, private or public grounds, and other structures or improvements damaged as a result of the Contractor's operations during prosecution of the work under this contract shall be repaired or rebuilt by the Contractor at its expense. Other than as shown and specified herein, existing levee embankment areas degraded or otherwise damaged or disturbed by the Contractor shall be re-shaped and compacted in 12-inch lifts using a crawler-type tractor weighing not less than 30,000 pounds and exerting a unit tread pressure of not less than 7 pounds per square inch. Restoration of existing levee or reconstruction of damaged structures or improvements will be subject to approval.

3.5.2 Drainage. Existing levee crowns and other areas disturbed by the Contractor's activity which affect drainage shall be restored, sloped, and shaped to provide positive flow of surface water where these areas can potentially impound water.

### **3.6 SURVEYS.**

3.6.1 General. The Contractor shall conduct the surveys for periods when progress payments are requested and shall make the computations based on these surveys. The surveys shall consist of locations of PIs along the required ditch alignments, and before and after excavation cross sections of the completed ditch, as specified, to confirm excavation to the required depth and dimensions. Surveys conducted by the Contractor shall be conducted under the direction of the Contracting Officer, unless the Contractor Officer waives this requirement in a specific instance. Promptly upon completing a survey, the Contractor shall submit the originals of field notes and other records relating to the survey or to the layout of the work to the Contracting Officer, who will use them to determine the amount of progress payments due. The Contractor shall retain copies of the material submitted.

3.6.2 Cross Section Surveys. The before and after excavation cross section surveys taken at maximum intervals of 200 feet shall be the basis for acceptance of completed ditch excavation. To provide necessary information for acceptance of the completed work, additional cross sections shall be taken as directed or as determined necessary by the Contractor. Reaches of ditches requiring re-excavation, due to slope failures after initial acceptance of the completed excavation, shall be re-surveyed after restoration of the required template has been accomplished.

### **3.7 ACCEPTANCE.**

3.7.1 General. Acceptance of completed work, in accordance with specified requirements, shall be required prior to payment for the work.

3.7.2 Dewatering. Acceptance of dewatering at each Placement Area, consisting of excavation of sumps and dewater ditches for draining of existing ponded water from the site will be based on accomplishing the drainage of existing ponds at each site.

3.7.3 Required Ditching will be initially accepted at each site based on initial acceptance cross section surveys. Final acceptance of required ditching at each Placement Area will be based on effective re-excavation of required areas, and establishment of the required continuous network for drainage of water from the Placement Area.

3.7.4 Quantity Surveys. Surveys of successfully completed ditches shall be taken as specified hereinafter, and submitted by the Contractor. The data derived from these surveys shall be used to determine the actual construction completed and provide a basis for acceptance of completed portions of the required ditches.

**3.8 REPORTING REQUIREMENTS.** The Contractor shall prepare and maintain a daily and monthly summary report of operations and submit copies. The report shall include progress made for that day with approximate station markers, plus problems or delays encountered for that day. The report shall also include a list of all personnel and equipment on the work site.

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**SITE WORK**

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**SECTION 02379 - GEOTEXTILE TUBES****PART 1 - GENERAL**

**1.1 SCOPE OF WORK.** The work covered in this Section consists of furnishing plant, labor, material, and equipment and performing the operations required to furnish, test, haul, and place and fill geotextile tubes.

**1.2 REFERENCES.** The publications listed below, form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designations only.

American Society for Testing and Materials (ASTM) Publications.

D 2487-98	Classification of Soils for Engineering Purposes (Unified Soil Classification System)
D 3884-92	Abrasion Resistance of Textile Fabrics (Rotary Platform, Double-Head Method)
D 4354-96	Sampling of Geosynthetics for Testing
D 4355-92	Deterioration of Geotextiles from Exposure to Ultraviolet Light and Water (Xenon-Arc Type Apparatus)
D 4491-96	Water Permeability of Geotextiles by Permittivity
D 4533-91 (R 1996)	Trapezoid Tearing Strength of Geotextiles
D 4595-86 (R 1994)	Tensile Properties of Geotextiles by the Wide-Width Strip Method
D 4632-91 (R 1996)	Grab Breaking Load and Elongation of Geotextiles
D 4751-95	Determining Apparent Opening Size of a Geotextile
D 4759-88 (R 1996)	Determining the Specification Performance of Geosynthetics

D 4833-88 (R 1996) (E1-1996)	Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products
D 4873-95	Identification, Storage, and Handling of Geotextiles
D 4884-96	Strength of Sewn or Thermally Bonded Seams of Geotextiles
D 5261-92 (R 1996)	Mass Per Unit Area of Geotextiles.

**1.3 SUBMITTALS.** Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with the SECTION entitled SUBMITTAL PROCEDURES.

1.3.1 SD-01 Data.

1.3.1.1 Geotextile: GA. Manufacturers data for each geotextile shall be submitted prior to purchase and manufacturing of the geotextile tubes.

1.3.1.2 Construction Plan. GA. The Construction Plan shall include specific installation procedures for each of the component parts of the geotextile tube containment system, including but not limited to sequence, equipment, and a listing of personnel experienced in installation of geotextile tubes.

1.3.1.3 Quality Control Plan. GA. The Contractor's Quality Control Plan shall include details regarding execution of the specified Quality Control actions required for this contract, including surveys, testing of geotextiles, and elevation control of installed tubes. The Plan shall also include information regarding the Geotextile Testing Laboratory selected by the Contractor which shall include the certification, personnel, experience, and description of the testing equipment.

1.3.2 SD-13 Certificates.

1.3.2.1 Geotextiles: GA. A written certificate of compliance shall be submitted upon delivery of the geotextiles. The certificate shall state that geotextiles shipped to the site meet or exceed the minimum average roll values listed in the TABLE below and meet the chemical, physical, and manufacturing requirements specified herein.

1.3.2.2 Geotextile Seams: GA. A written certificate of compliance shall be submitted upon delivery of the geotextiles. The certificate shall state that geotextile factory seams meet or exceed the minimum average roll values listed in the TABLE below.

1.3.3 SD-14 Samples. The Contractor shall arrange for the geotextile manufacturer to provide the following listed samples, along with or prior to, the delivery of each tube. These samples shall be used in Quality Control and Quality Assurance testing. Upon delivery of each pair of samples, specified below, the Contractor shall deliver one of the samples for Government Quality Assurance purposes. The Contractor shall deliver the second sample to the Contractor's independent Geotextile Testing Laboratory, for with or prior to, the delivery of each tube. These samples shall be used in Quality Control testing.

1.3.3.1 Geotextile, Type I: EIO. Two (2) samples of material used to manufacturer geotextile tubes are required. The samples shall be taken from the same roll of material used to manufacture the tube, shall be the full manufactured width of the geotextile, and a minimum of 8 feet in length. Each sample shall be indelibly marked at both ends and in the center, with the manufacturer's information for the roll.

1.3.3.2 Geotextile Tube Seam: EIO. Two (2) samples of the factory seam of the material used to manufacturer each of the geotextile tubes are required. The samples shall consist of two 4-foot by 4-foot pieces of Type I and Type III material, sewn together in a typical seam, along the same weave direction as is sewn for the geotextile tube fabrication. Alternate sample sizes shall be approved in advance.

1.3.3.3 Geotextile, Type II and III: EIO. Two (2) samples of each type of material. The samples shall be taken from the same rolls of material used to manufacture the geotextile products for this contract and shall be the full manufactured width of the geotextile and a minimum of 5 feet each, in length.

1.3.3.4 Anchor Tube Seam: EIO. Two (2) samples of typical factory anchor tube seam shall be submitted by the manufacturer, at or prior to the time of delivery of the first section of scour apron. . The samples shall consist of two 4-foot by 4-foot pieces of material, sewn together in a typical seam, along the same weave direction as is sewn for the geotextile tube fabrication. Each sample shall be indelibly marked for identification. Alternate sample sizes shall be approved in advance.

#### 1.3.4 SD-18 Records.

1.3.4.1 Surveys: EIO. The original survey field book shall be submitted within 7 calendar days of survey data collection.

### **1.4 DELIVERY, STORAGE, AND HANDLING.**

1.4.1 General. Geotextiles shall be labeled, shipped, stored, and handled in accordance with ASTM D 4873 and as specified herein. Each roll shall be wrapped in an opaque and waterproof layer of plastic during shipment and storage. The plastic wrapping shall be placed around the geotextile roll in the manufacturing facility and shall not be removed until installation. Each roll shall be labeled with the manufacturer's name, geotextile type, lot number, roll number, and roll dimensions, including length, width, or gross weight. Also, rolls of sewn geotextile tubes shall be labeled with the Geotextile Tube Number, as assigned by the Contractor and shown on

the Construction Plan. The Geotextile Tube Number, as assigned by the Contractor, included in the Construction Plan and as shown. The Geotextile Tube Number shall be indicated both on the manufacturer's label and marked on the outside of the plastic wrapping. Geotextile or plastic wrapping damaged as a result of delivery, storage, or handling prior to receipt by the Contractor shall be repaired or replaced, as directed, at no additional cost to the Government.

1.4.2 Handling. No hooks, tongs, or other sharp instruments shall be used for handling the geotextiles. Geotextiles shall not be dragged along the ground. The surface upon which it is to be installed shall be smooth and free of burrs or protrusions that can snag and tear the fabric.

1.4.3 Storage. 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. Geotextile shall not be exposed to temperatures in excess of 140 degrees F or less if recommended by the manufacturer. Outdoor storage shall exceed the period recommended by the manufacturer or 6 months, whichever is less. Prior to installation geotextile shall not be exposed to direct sunlight for more than 14 days.

## **1.5 MEASUREMENT.**

1.5.1 Scour Aprons shall be measured by the linear foot.

1.5.2 Geotextile Tubes shall be measured along the centerline to the nearest linear foot of acceptable filled geotextile tubes in-place.

1.5.3 Testing shall not be measured for payment.

1.5.4 Surveys shall not be measured for payment.

## **1.6 PAYMENT.**

1.6.1 Mobilization and Demobilization of the Contractor's plant and equipment for installation of Geotextile and associated work required to perform this work and the costs in connection therewith will be included in the contract lump sum price for "Mobilization and Demobilization (Dewatering, Geotubes, Access Channels, and Stone Breakwater."

1.6.2 Scour Aprons will be included in the contract unit price per linear foot for "Geotextile Tubes."

1.6.3 Geotextile Tubes. Payment will be made at the contract unit price per linear foot for "Geotextile Tubes," which constitutes full compensation for furnishing plant, labor, material, and equipment and for furnishing and satisfactorily placing the geotextile tubes, geotextile shroud, scour apron with sand filled anchor tube, and the required earthwork and foundation preparation.

1.6.4 Surveys. Payment for surveys will be made at the contract lump sum price for "Surveys," which shall include the cost associated with establishing control points, completing surveys, and submitting the data.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS.**

2.1.1 Fill Materials. The geotextile tubes and anchor tubes may be filled with coarse-grained materials, including sand, shell hash and shell, or cuttings of fine-grained material, including silt and clay located within the limits of the Borrow Area for Filling Tubes, as shown. The Contractor shall investigate materials at the locations where the material is to be obtained for tube filling, to determine in advance the material loss than can be expected during the filling process, with the Contractor's selected equipment and procedures.

2.1.2 Geotextile Materials. The Type I geotextile shall be used for fabricating the geotextile tubes, scour apron, and anchor tube; the Type II non-woven geotextile shall be used for protective shrouding of the top half of the Type I geotextile tubes; and the Type III geotextile shall be used as a anchor tube liner. The Type I geotextile shall be woven pervious sheets of polymeric yarn. The Type II and III geotextiles shall be non-woven polypropylene materials. Fibers used in the manufacture of the geotextiles shall consist of long-chain synthetic polymers composed of at least 85 percent by weight polyolefins, polyesters, or polyamides. Stabilizers and inhibitors shall be added to the base polymer of the geotextiles if necessary to make the filaments resistant to deterioration by ultraviolet light and heat exposure. Reclaimed or recycled fibers or polymer shall not be added to the formulation. Geotextiles shall be formed into a network so that the filaments or yarns retain dimensional stability relative to each other, including the edges. The geotextile shall be manufactured to the largest loom width possible. Geotextile tube seams shall be factory sewn. The non-woven geotextile shroud shall be factory sewn to the proper half of the geotextile tube, along the tube seams, with openings for the inlet sleeves. The geotextile physical properties shall equal or exceed the Minimum Average Roll Values (MARV) listed in Tables 1, 2, and 3 below. Acceptance of geotextiles shall be in accordance with ASTM D 4759.

2.1.3 Ultraviolet Ray Protection. The geotextiles tube shall be installed with approved protection of the upper half of the filled geotextile tube from Ultraviolet (UV) degradation. The protection shall cover, as a minimum, the upper portion of the filled tube, corresponding to a 90-degree arc, with apex located at the approximate center of the tube. Ultraviolet protection may be accomplished using a protective shroud, composed of the specified material, and attached securely around it's edges, in an approved manner. Other alternatives, which are documented to provide similar, 100 percent protection from UV, during a period typical of the life span of the specified shroud, may be proposed by the Contractor, and shall be included in the Construction Plan. Alternative UV protection shall be approved in writing prior to it's use on this contract.

**TABLE 1 - GEOTEXTILE, TYPE I (GEOTEXTILE TUBE AND SCOUR APRON)  
PHYSICAL PROPERTIES  
(WOVEN)**

<b>PROPERTY</b>	<b>TEST METHOD</b>	<b>UNIT</b>	<b>MINIMUM TEST VALUE</b> (Except where noted)
Apparent Opening Size	ASTM D 4751	U.S. Sieve	#60
Puncture Strength	ASTM D 4833	lbs	400
Wide Width Tensile - In any principal direction	ASTM D 4595	lbs/in	1,000
Wide Width Tensile Elongation - In any principal direction	ASTM D 4595	% Max.	15
Trapezoidal Tear Strength	ASTM D 4533	lbs	550
Seam Strength	ASTM D 4884	lbs/in	500

**TABLE 2 - GEOTEXTILE, TYPE II (UV SHROUD) PHYSICAL PROPERTIES  
(NON-WOVEN)**

<b>PROPERTY</b>	<b>TEST METHOD</b>	<b>UNIT</b>	<b>MINIMUM TEST VALUE</b> (Except where noted)
Mass Per Unit Area	ASTM D 5261	oz/SY	16
Apparent Opening Size	ASTM D 4751	U.S. Sieve	100
Permittivity	ASTM D 4491	sec <sup>-1</sup>	0.7
Puncture Strength	ASTM D 4833	lbs	225
Grab Tensile Strength	ASTM D 4632	lbs	350
Flow Rate	ASTM D 4491	gal/min/ft <sup>2</sup>	50
Trapezoidal Tear Strength	ASTM D 4533	lbs	130
Ultraviolet Degradation (Percent strength retained at 500 hours)	ASTM D 4355	%	70

**TABLE 3 - GEOTEXTILE, TYPE III (ANCHOR TUBE LINER)  
PHYSICAL PROPERTIES  
(NON-WOVEN)**

<b>PROPERTY</b>	<b>TEST METHOD</b>	<b>UNIT</b>	<b>MINIMUM TEST VALUE</b>
Mass Per Unit Area	ASTM D 5261	oz/SY	N/A
Apparent Opening Size	ASTM D 4751	U.S. Sieve	100
Permittivity	ASTM D 4491	sec <sup>-1</sup>	1.0
Puncture Strength	ASTM D 4833	lbs	N/A
Grab Tensile Strength	ASTM D 4632	lbs	250
Flow Rate	ASTM D 4491	gal/min/ft <sup>2</sup>	75
Trapezoidal Tear Strength	ASTM D 4533	lbs	100
N/A = Not Applicable			

## **2.2 MATERIALS AND MANUFACTURING REQUIREMENTS.**

2.2.1 General. The Contractor shall be responsible for providing the material and manufacturing requirements to the geotextile manufacturer, and assuring that manufacturing and fabricating details meet specifications. Prior to installation of geotextile, the Contractor shall inspect the materials to ensure that the materials conform to the required manufacturing requirements and details. Geotextiles that do not meet fabrication requirements shall be removed from the site and replaced.

### 2.2.2 Scour Apron.

2.2.2.1 General. Scour apron dimensions shall be as shown. The required 30-foot width does not include anchor tube material, which shall be constructed with additional fabric.

2.2.2.2 Anchor Tube. The anchor tubes shall be continuously attached to the scour apron by a seam verified to be in conformance to the strength requirement specified herein. The anchor tube shall be completely lined with the specified material, and shall have filling ports and sleeves fabricated, with minimum diameter of 8 inches and a minimum length of 18 inches, sewn at each end and at minimum 50-foot intervals along the entire anchor tube. If requested by the Contractor, loops may be sewn along the edges of the scour apron for handling and temporary anchoring. As an alternative to using a sand-filled anchor tube, the Contractor may include, in the Construction Plan, a proposal for an alternative anchorage system. Proposed alternative anchorage shall consist of continuous anchorage of a minimum 70 pounds per lineal foot of scour pad edge (buoyant weight) or individual 220 pound anchorage weights (buoyant weight) placed at intervals not to exceed 3 feet along the edge of the scour pad. The individual weights can consist of rock, concrete or some other approved material, which are securely attached along the edge of the scour pad, as approved. Pockets sewn along the

edge of the scour pad or some other approved method of ensuring the weights remain attached to the scour pad edges shall be provided.

### 2.2.3 Geotextile Tube.

2.2.3.1 General. The required circumference of the tubes is shown. The tube number and corresponding length and location of the tubes shall be included in the Construction Plan. Loops or straps may be incorporated along the sides of the tube to facilitate installation and anchoring.

2.2.3.2 Ultra-Violet Shrouds. If used, the non-woven shroud shall be attached so that it will cover no less than the specified required upper portion of the geotextile tube after placement. The shroud shall be attached by a continuous seam to the woven geotextile tube material along both sides and ends of the tube, and around each of the port sleeves, or by combinations of sewn seams and epoxy glue attached edges. If shroud seam is combined with the geotextile tube seam, the composite seam, shall be designed and manufactured so that it complies with the wide width strength requirement when tested by tensile stress applied to the ends of the woven materials. If epoxy glue is used, the Contractor shall ensure procedures are followed in accordance with manufacturer's recommendations, including complete saturation of both materials with the glue, and effective means of securing glued seam in place until glue sets. The manufacturer shall supply the Contractor with a design and sufficient materials and instructions by which the shroud material can be completely and permanently secured across the port sleeve after filling is complete, and the port has been permanently secured. The closure shall completely cover the shroud opening for the port and have no loose edges or openings which may allow wave action or debris to snag a loose edge, tearing or otherwise opening the shroud closure. The manufacturer's recommendations to accomplish the sleeve closure and the shroud cover closure shall be included in the Construction Plan.

## **2.3 TESTS, INSPECTIONS, AND VERIFICATIONS.**

2.3.1 Manufacturer. For minimum test value requirements that are not included in the standard manufacturer certification, including the anchor-tube seam, the results of a minimum of five (5) tests shall be submitted by the manufacturer to verify compliance.

2.3.2 Contractor. The Contractor shall employ the services of a fully qualified, approved Geotextile Testing Laboratory to perform the required testing listed in the TABLE OF REQUIRED TESTING below. The laboratory shall be capable of performing each test and providing the results within 2 days of receipt of the sample and test assignment. The tests shall be performed on the samples which will be provided to the Contractor by the manufacturer. The required tests will be assigned by the Contracting Officer and shall be submitted in writing or by FAX transmission within 24 hours of verbal request by the Contractor. Additional tests, beyond the number listed may be required to be performed if determined necessary by the Contracting Officer to ensure satisfactory Quality Control. The Contractor shall be responsible for the arrangements

to accomplish the required testing on each of the numbered geotextile tubes prior to placing and filling the tube.

<b>TABLE OF REQUIRED TESTING</b>		
<b>Property</b>	<b>Test Method</b>	<b>Number of Tests</b>
Apparent Opening Size	ASTM D 4751	2
Trapezoid Tear Strength	ASTM D 4533	2
Seam Strength	ASTM D 4884	2
Wide Width Tensile	ASTM D 4595	2
Grab Tensile Strength	ASTM D 4632	1
Puncture Strength	ASTM D 4833	1

### **PART 3 - EXECUTION**

**3.1 SURFACE PREPARATION.** The underlying surface to receive the geotextile scour apron shall be graded to the required elevation at the locations shown, leveled and prepared to a relatively smooth condition free of ruts, erosion rills, obstructions, depressions, or debris greater than 6 inches in height. A shallow swale or cradle may be constructed along the centerline, if required, to prevent geotextile tubes from rolling during the filling operation.

**3.2 ACCESS CHANNELS.** Access channels for transport and installation of geotextile tubes shall be excavated at the location and to the maximum bottom width as shown. Side slopes for the channel shall not be steeper than the slope of repose of the bay bottom material, so that a minimum distance from the geotextile tube to the top of the cut is not less than the distance shown. Depth of the channel shall not exceed 5 feet below the bay bottom. Material excavated from the channel may be used to fill geotextile tubes or may be stockpiled along the interior of the channel. After completion of tube installation, the portion of the channel extending from the end of the new geotextile tube to the Gulf Intracoastal Waterway shall be backfilled using stockpiled material. The portion of the channel adjacent to the geotextile tube shall not be backfilled.

### **3.3 INSTALLATION.**

3.3.1 **General.** The Contractor shall visually inspect the geotextiles, prior to installation, for damage and imperfections. Defective geotextiles shall be marked and repaired in accordance with the manufacture's specifications. Trimming shall be performed using only an upward cutting hook blade. The scour pads and geotextile tubes shall be placed at the locations indicated in the Construction Plan. Deviations from the work as outlined in the Construction Plan shall be requested in writing and approved in advance. The Contractor shall not commence placement of the geotextile scour pads or of geotextile tubes until completion of the assigned Quality Control test on the corresponding numbered sample, for verification of the required physical property of

the material. Tubes inadvertently placed and filled by the Contractor, which are determined to be fabricated of unacceptable material not meeting the required test criteria, or non-compliance with fabrication and manufacturing requirements, shall be removed and replaced as specified herein.

3.3.2 Scour Aprons shall be laid smooth to minimize tension, stress, folds, wrinkles, or creases. The edges of each adjacent pad sheets shall be overlapped a minimum of 10 feet. Prior to filling the anchor tube, the pad shall be held in place by anchor weights or stakes along the front and back edges of the sheets. Stakes shall be used in conjunction with pre-sewn loops along the edge of the scour pad. At no time shall stakes be driven through the scour pad. The scour apron shall be installed and the anchor tubes filled prior to placing and filling of the geotextile tube thereon.

3.3.3 Anchor Tube or Alternative Anchorage. The anchor tube shall be filled using the port sleeves. No slits shall be made on the anchor tube. After filling, the sleeve shall be secured by an approved method, including a second, back-up securing action. Alternative anchorage which meets the specified criteria shall be installed as indicated in the approved Construction Plan.

3.3.4 Geotextile Tube. Material for use in filling geotextile tubes shall be obtained from the interior of the geotextile tube breakwater protected area at the minimum distance from the new geotextile tube as shown. The area available for use to obtain borrow material may coincide with or overlap the channel excavation or may be located further to the interior of the site. Borrow area slopes and depths within the access channel area shall conform to the requirements specified for excavation of the access channel. The slopes and depths of borrow excavation at locations to the interior of the access channel may be determined by the Contractor. Before and during filling, the geotextile tubes shall be prevented from rolling or shifting from the alignment shown. The geotextile tubes shall be filled until the required minimum elevations have been achieved, the sleeves shall be temporarily tied and excess water then allowed to drain. The tubes shall be monitored for settlement for a minimum of 5 days after the initial filling is complete. After the 5-day monitoring period, settled areas, below minimum elevation or height shall be refilled to bring the elevation to within tolerance. The port sleeves shall remain tied closed until it is clear to the Contractor that no further re-filling of the tubes will be required. Prior to completion of this contract, the Contractor shall fold over and sew, or otherwise permanently secure the sleeves, prior to covering the port with shroud material.

**3.4 GEOTEXTILE TUBE JOINTS.** Joints of the ends of two (2) new geotextile tubes or a new tube and existing tube, shall be accomplished using an overlap joint or butt joint, or other approved joint described in the Construction Plan. Completed joints shall maintain continuous minimum elevation across the joint.

**3.5 PROTECTION OF GEOTEXTILES.** The geotextiles shall be protected during installation from blinding, clogging, penetration, tears, or other damage and shall not be subjected to sunlight for more than 14 days.

**3.6 REPAIRS.** Damaged or defective geotextiles shall be replaced or repaired using approved methods included in the Construction Plan.

**3.7 SURVEYS.**

3.7.1 General. The Contractor shall maintain full continuous surveying capabilities at the sites during geotextile tube placement.

3.7.1.1 Layout Surveys include staking or placing buoys at all points of intersection along the perimeter and at 200-foot intervals along the alignment and the points of intersection and end points of the discharge corridors and required ditches, and other locations shown or specified. Buoys or stakes shall be clearly marked and identified and shall be maintained until completion and acceptance of construction.

3.7.1.2 Profile Surveys. "Before-Construction" elevation profile surveys shall be taken along the geotextile tube alignment before placing the scour apron. "As-built" elevation profile surveys shall be taken after filling the tube to the required elevation. Elevation shots shall be taken every 50 feet, as a minimum, with additional shots taken at joints, low spots, uneven areas, and other locations required to produce an accurate, continuous top of tube profile. Station locations of joints and ends of short tubes shall be determined and recorded. Additional elevation shots shall be taken along the tubes during filling for elevation control; however, only the final survey elevations shall be included in the "As-built" profile. For acceptance of the tubes, the final "As-built" profile shall be taken after a minimum of 2 weeks has been allowed for settlement of the pumped fill. Plots of "Before-Construction" and "As-built" elevations shall be submitted for review prior to the request for acceptance of completed work as specified herein.

**3.8 GEOTEXTILE TUBE ACCEPTANCE** will be based on the "As-built" elevation profile and the Quality Control and Quality Assurance documentation of work being performed as specified herein and as shown.

**3.9 CONTRACTOR QUALITY CONTROL.**

3.9.1 General. The Quality Control Plan shall include the information and details regarding the conduct of Quality Control specified herein, including the Quality Control surveys and the conduct of required geotextile testing. The Contractor shall ensure that the materials meet the specified standards and that Quality Control surveys, verification testing, and inspections for compliance with contract requirements are carried out and documented as specified. Records of verification, testing, and inspections and the survey data shall be provided as scheduled and specified. Inspection of the work to ensure conformance as specified herein shall include but not be limited to:

- (1) Borrow excavation locations for filling tubes
- (2) Correct alignment and location of tubes, scour aprons and alignment staking.

- (3) Top of breakwater profile, continuous minimum elevations
- (4) Closure of the port sleeves, and closure of the shroud port sleeve covers.
- (5) Performance and submittal of required Quality Control testing of geotextiles.

3.9.2 Contract Specifications. The on-site Quality Control Supervisor shall have a copy of these specifications at the site at all times for use in performance of Quality Control activities. The specifications shall be referenced directly during Government Quality Assurance inspections with regards to questions or discussions about performance of work or quality requirements.

3.9.3 Records. Copies of the records of inspections, as well as the records of corrective actions taken, shall be submitted as specified or directed.

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**SECTION 02385 - RIPRAP AND BLANKET STONE FOR BREAKWATER**

**PART 1 - GENERAL**

**1.1 SCOPE OF WORK.** The work in this Section covers blanket stone and riprap, labor, equipment, and materials for construction of a breakwater as shown or as specified herein.

**1.2 RIGHTS-OF-WAY AND ACCESS TO WORK SITE.** Rights-of-way for construction will be furnished without cost to the Contractor. Access to the construction site can be obtained by way of the Gulf Intracoastal Waterway.

1.2.1 **Transportation.** The Contractor shall furnish transportation to and from the job site for U.S. Army Corps of Engineers personnel, as required during this contract period.

**1.3 REFERENCES.** The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

American Society for Tests and Materials (ASTM) Publications.

C 127-88  
(R 2001)                      Specific Gravity and Absorption of Coarse Aggregate

C 535-96  
(E1-1996)                      Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine

D 75-97                         Sampling Aggregates.

U.S. Army Corps of Engineers (CRD) Handbook for Concrete and Cement.

C 103-96                         Sieve Analysis for Fine and Coarse Aggregates.

**1.4 SUBMITTALS.** Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with SECTION entitled SUBMITTAL PROCEDURES.

#### 1.4.1 SD-09 Statements.

1.4.1.1 Scale Ticket: GA. The original printed scale ticket or a certified copy prepared in ink or indelible pencil shall be submitted promptly after a railroad car or truck is weighed and before the riprap and blanket stone is placed.

#### 1.4.2 SD-14 Samples.

1.4.2.1 Samples of Riprap and Blanket Stone: GA.. Suitable samples of riprap and blanket stone to be used shall be submitted prior to delivery of the material to the work site.

**1.5 STORAGE OF CONSTRUCTION MATERIALS.** During Construction, materials with certified weights and which are unloaded from barges, trucks, and railroad cars but cannot be used immediately for construction shall be stored in approved off-site storage areas. The approved storage area shall be reasonably near the job site and shall be a relatively smooth area so that the stored material may later be recovered free from dirt or other foreign materials.

#### **1.6 MEASUREMENT.**

1.6.1 General. Measurement paragraphs only provide the means for measuring the stone for pay purposes and are not a representation of accessibility of the site. Other methods of measurement may be used when approved.

1.6.2 Riprap and Blanket Stone Transported By Rail or Truck. Riprap and blanket stone shall be measured in short tons of 2,000 pounds each. Certified railroad or truck weights will be accepted for determination of the weight of stone placed in the finished section. The weight of riprap and blanket stone which is rejected will be estimated by the Contracting Officer and be deducted from the carload or truckload weights. If the Contractor desires to have rejected stone weighed, the actual weight will be used for the deduction from railroad or truck weights. The riprap and blanket stone shall be weighed on standard railroad track scales by a Certified Weighmaster. At the Contracting Officer's request, the Contractor shall have the scales tested in the presence of a Government inspector. The original printed scale ticket or a certified copy prepared in ink or indelible pencil shall be submitted promptly after a car or truck is weighed and before the stone is placed in the areas to be protected. The report of weight for each carload or truckload shall show the gross, tare, and net weight, and erasures or changes on a report shall be explained by a memorandum made on or attached to the report and signed by the Weigher. If deemed advisable, the Government will employ an inspector at the scales and the Contractor shall furnish the necessary facilities for the inspector to observe the weighing and for recording the scale weights and stenciled light weights on the rail cars or trucks. Expense of weighing riprap and blanket stone and testing scales shall be borne by the Contractor. Other methods of measurement may be used when approved.

1.6.2.1 Sideboards, Stakes, and Skips. The weight of sideboards, stakes, and skips will be determined by actual weighing or by estimates, mutually agreed upon by the Contracting Officer and the Contractor. The weights so determined, together with the tare weight of the car or truck shall be deducted from the gross weight to determine the net weight of stone delivered.

1.6.3 Measurement by Barge Displacement. Riprap and blanket stone shall be measured in short tons of 2,000 pounds each. Barge displacement measurements will be accepted for determination of the weight of riprap and blanket stone placed in the finished section. The barge will be gaged at a protected location near the site as approved. For this purpose each barge shall be fitted by the Contractor, at Contractor's expense, with gages graduated either to inches or tenths of a foot, located either inside or outside of the hull, as the Contracting Officer may direct, and attached solidly to the hull. These gages shall be located two (2) near each end of the vessel on opposite sides, and two (2) additional gages amidship if deemed necessary by the Contracting Officer. If located inside the hull, provision shall be made for the free passage of the outside water to a transparent tube placed, or capable of being placed, in contact with the gage. If located outside upon wooden hulls, the gages shall be protected by solid fenders or recessed into the planking, or if upon steel hulls, the gage marks may be placed directly on the plates and identified by punch marks. Gages shall be placed so that their zeros are below water when the vessel is in its normal trim, light, and free from water. In lieu of the gages in the interior of the barge, the Contractor may, at Contractor's option, provide an equal number of wells for determining the amount of the load. Wells shall be located as specified for interior gages and shall be constructed as approved.

1.6.3.1 Fore and Aft Displacements, due to load, shall not differ more than 10 percent from their mean for the determination of tonnage of each barge load of riprap and blanket stone ready for placement. In determining the tonnage of a cargo, the change in gage readings due to discharge of the cargo will be used.

1.6.3.2 Barge Preparation. The barges shall be fitted for the work sufficiently ahead of the time fixed for commencement to enable the Contracting Officer to measure them accurately before work is commenced. The Contractor will be required, at Contractor's expense, to place the barges in dry dock for measurement and furnish materials and facilities for taking the necessary measurements for preparing barge displacement tables. The Contractor shall pump the water from the barges when so requested but no pumping of a barge shall be done between the time it is gaged loaded and light to determine the amount of a barge load.

1.6.3.3 Repairs or Additions made to the barges during the progress of the work shall be promptly reported to the Contracting Officer. During the progress of the work, when the Contracting Officer deems it advisable or necessary, each barge shall be re-measured at the expense of the Contractor and under the supervision of the Contracting Officer. No barge shall be used which is not in a seaworthy condition or which leaks excessively. The barges used shall be so constructed that when loaded they do not bend or warp making the gages unreliable. Each barge load shall contain only one (1) class of riprap and blanket stone.

1.6.3.4 Load. To determine the load, measurements will be taken immediately before a barge starts for its point of unloading and immediately after it returns from that point. The gages will be read by the Contracting Officer and the Contractor is invited to be present when the readings are taken. Disagreements on the part of the Contractor as to the weight of stone will be reported by the Contractor to the Contracting Officer in writing within 10 days of their occurrence. Disputes will be handled in accordance with the CONTRACT CLAUSE entitled DISPUTES. To ensure the use of the proper weight of surrounding water in calculating the weight of riprap and blanket stone from the barge gage readings, hydrometer measurements will be made alongside each barge when it is gaged loaded and light. Other methods of measurement may be used when approved.

**1.7 RE-MEASUREMENT.** Where a loss of material due to stockpiling, rehandling, or hauling is possible, the Contracting Officer shall have the alternative to require re-measurement prior to placement.

## **1.8 PAYMENT.**

1.8.1 Mobilization and Demobilization of the Contractor's plant and equipment for installation of the breakwater, associated work required to perform this work, and the costs in connection therewith will be included in the contract lump sum price for "Mobilization and Demobilization (Dewatering, Geotubes, Access Channels, and Stone Breakwater)."

1.8.2 Riprap and Blanket Stone. Payment for furnishing and placing the new breakwater and blanket stone will be made at the applicable contract unit price per net short ton for "Blanket Stone (1/2"-6)" and "Riprap (25-420 lbs)" of acceptable breakwater and blanket stone placed, which price shall include the costs of labor and equipment required to complete the work specified herein.

1.8.3 Excavation. No separate payment will be made for excavation and disposal of materials.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS.**

2.1.1 General. Riprap and blanket stone for use in the work shall be durable natural stone as approved. The sources where the Contractor proposes to obtain the material shall be selected well in advance of the time when the material will be required in the work.

2.1.2 Quality. Suitable tests and service records will be used to determine the acceptability of the riprap and blanket stone. If suitable test reports and a service record that are satisfactory to the Contracting Officer are not available, as in the case of newly-operated sources, the material shall be subjected to tests necessary to determine its acceptance for use in the work. Suitable samples of stone to be used shall be submitted for approval prior to delivery of the material to the work site. Unless otherwise specified, test samples shall be obtained by the Contractor, supervised by the

Contracting Officer, and delivered at the Contractor's expense to a point designated by the Contracting Officer at least 60 days in advance of the time shipment of the stone is expected to begin. Acceptable stone shall meet the minimum and maximum physical requirements when tested in accordance with the procedures listed below:

<u>Test Designation</u>	<u>Riprap and Blanket Stone</u>	
	<u>Min</u>	<u>Max.</u>
(1) Sampling shall be performed in accordance with ASTM D 75.		
(2) The absorption of the stone determined in accordance with ASTM C 127		3.0%
(3) The weight per cubic foot calculated from the bulk specific gravity saturated surface dry in accordance with ASTM C 127	150 lbs	
(4) The loss by abrasion of the stone determined in accordance with ASTM C 535, when processed and tested for No. 1 grading.		40.0%

Acceptance tests will be made by or under the supervision of the Government at Government expense. Riprap and blanket stone shall be durable and of a suitable quality to ensure permanence in the structure and in the climate in which it is to be used. It shall be free from cracks, clay pockets, seams, and other defects that may increase unduly its deterioration from natural causes. The inclusion of objectionable quantities of dirt, sand, clay, and rock fines will not be permitted.

### **PART 3 - EXECUTION**

**3.1 ACCESS CHANNELS.** Locations of access channels are shown. Excavation of access channels for the placement of riprap and blanket stone at the new breakwater site shall be to the lines and grades shown. Access channels shall be excavated mechanically, and materials temporarily stockpiled adjacent to the excavation, as shown.

#### **3.2 BLANKET STONE.**

3.2.1 General. Blanket stone composed of crushed rock or stone shall be placed new shore protection within the limits as shown. The blanket stone shall conform to the requirements of the Paragraph: Quality above, as to quality and shall be reasonably well-graded from 1/2-inch to 6 inches, with not more than 5 percent passing the 1/2-

inch screen square opening. Reasonably well-graded stone shall include essentially the stone sizes between the two (2) extremes specified which will result in a dense, fairly well-graded material not having noticeable voids or a lack of the larger sizes.

3.2.2 **Placement.** Blanket stone shall be spread uniformly using a method that will result in the neat lines as shown. Placement of blanket stone using a method that will segregate particle sizes within the blanket will not be permitted. Blanket stone placed under water shall be lowered beneath the water to the existing excavated bottom and slopes before being released.

**3.3 RIPRAP.**

3.3.1 **Riprap** shall be placed within the limits shown or as directed. Either boulders or quarried rock may be used if conforming to the applicable requirements of the Paragraph: Quality above, as to quality. A maximum of 5 percent by weight of chips and fragments resulting from handling may be placed in the finished section. The inclusion of objectionable quantities of gypsum, shale, and chert in the breakwater stone will not be permitted. The riprap shall be reasonably well-graded. Reasonably well-graded riprap shall include essentially the stone sizes between the two (2) extremes specified which will result in a dense, fairly well-graded material not having noticeable voids or a lack of the larger sizes. The riprap shall conform to the gradation shown below:

Design Stone Size	Percent Stone by Weight Lighter Than Design Stone Size	Acceptable Range of Weight of Design Stone Size Lbs.
W (100)	100	420-165
W (50)	50	185-85
W (15)	15	[ 60-25

3.3.2 **Placement.** When placed, stone shall produce a reasonably well-graded mass or rock with the minimum practicable percentage of voids and shall be constructed to the lines and grades shown. Stone shall be placed using a method that will minimize displacing the blanket material. The larger stones shall be well distributed and the entire mass of stones in their final position shall be roughly graded to conform to the gradation specified above. The finished work shall be free from objectionable pockets of small stones and clusters of larger stones. The desired distribution of the various sizes of stones throughout the mass shall be obtained by selective loading of the material at the quarry or other source, by controlled dumping of successive loads during final placing, or by other methods of placement which will produce the specified results. Stone shall be placed in the dry to the extent practicable. Stone placed under water shall be lowered beneath the water to the excavated bottom and slopes before being released.

**3.4 CONTRACTOR QUALITY CONTROL.**

3.4.1 Compliance Inspection. The Contractor shall inspect for compliance with the contract requirements and record the inspection of operations. The Contractor, at Contractor's expense, shall perform inspections in accordance with the following schedule:

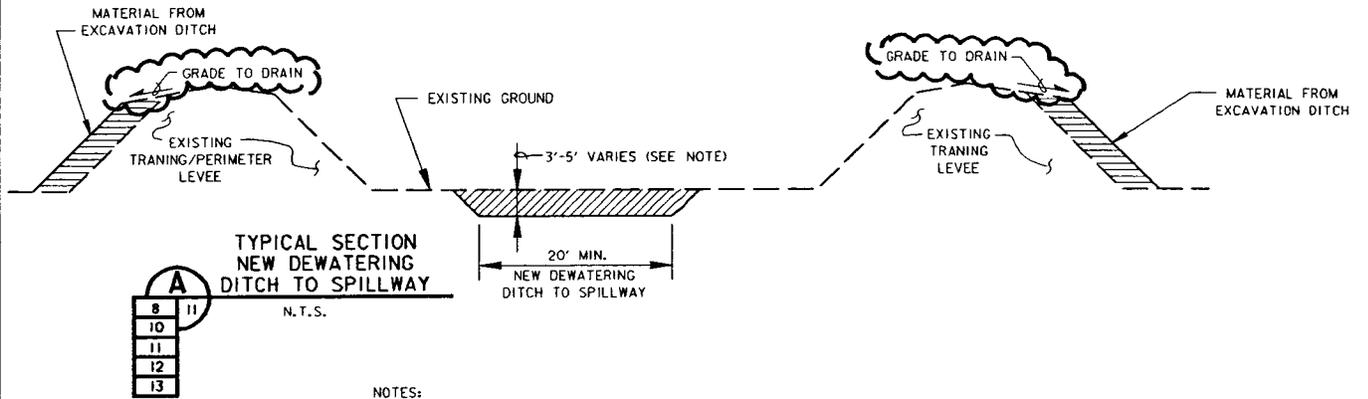
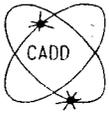
- |  |   |
|--|---|
| (1) <u>Blanket Stone</u> -<br>[(1/2" to 6")] | Gradation - one (1) gradation test to be performed in accordance with CRD-C 103.<br><br>Placement - continuous check of placement to ensure proper thickness and that material is not segregated. |
| (2) <u>Riprap</u> -<br>[(25-420 lbs)]        | Quality - one (1) set of quality tests.<br><br>Placement - continuous check of placement to ensure proper size and compliance with grade lines shown.   |
| (3) <u>Excavation</u> -                      | Lines and grades, disposition of materials, drainage.   |

3.4.2 Check Tests. The Government will, as it deems necessary, make check tests at Government expense from representative samples of the stone being furnished for the work.

3.4.3 Contract Specifications. The on-site Quality Control Supervisor shall have a copy of these specifications at the site at all times for use in performance of Quality Control activities. The specifications shall be referenced directly during Government Quality Assurance inspections with regards to questions or discussions about performance of work or quality requirements.

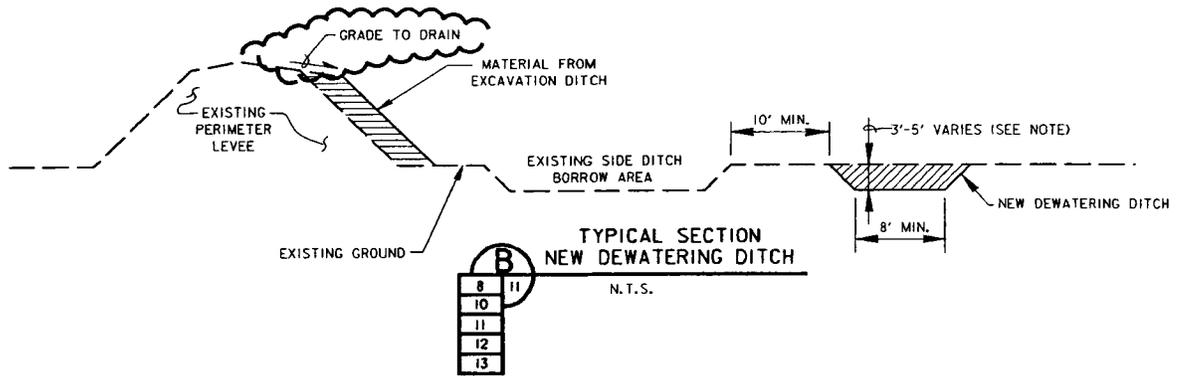
3.4.4 Records. A copy of the records of inspection, as well as the records of corrective action taken, shall be submitted as directed.

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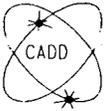
**NOTES:**

1. COMPLETED DITCH EXCAVATION SHALL BE TO THE DEPTHS REQUIRED TO PROVIDE AN INVERT GRADE WHICH WILL DRAIN TOWARD THE EXISTING DROP OUTLET STRUCTURE.
2. THE DEWATERING DITCHES SHALL BE EXCAVATED TO A MINIMUM DEPTH OF 3 FEET BELOW ADJACENT EXISTING GROUND AT ALL LOCATIONS ALONG THE ALIGNMENT. DEEPER EXCAVATION WILL BE REQUIRED AT SOME LOCATIONS TO ACCOMPLISH DRAINAGE, AS SPECIFIED.



TO BE ADDED TO SHEET NO. 11 OF 14

"THIS SKETCH ACCOMPANIES AMENDMENT NO. 0001  
TO INVITATION NO. DACW64-03-B-0009."



DUNHAM POINT

XY=2,634,136.17  
13,232,490.59

XY=2,634,086.44  
13,231,600.49

NEW STONE BREAKWATER

USE SITE "J"

NEW 50' BOTTOM WIDTH ACCESS CHANNEL



200' TYP.

XY=2,635,097.84  
13,321,437.72

XY=2,634,390.37  
13,231,236.63

840+000

ARANSAS BAY

TO BE ADDED TO SHEET NO. 14 OF 14

"THIS SKETCH ACCOMPANIES AMENDMENT NO. 0001 TO INVITATION NO. DACW64-03-B-0009."