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NCBC GULFPORT
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LETTER REPORT REGARDING INTERIM CORRECTIVE MEASURES DESIGN PACKAGE
FOR SITE 8 NCBC GULFPORT MS
9/5/1997
ABB ENVIRONMENTAL



September 5, 1997

Southern Division
Naval Facilities Engineering Command
ATTN: Mr. Art Conrad
P.O. Box 190010
2155 Eagle Drive
North Charleston, SC 29418

SUBJECT: Interim Corrective Measures (ICM) Design Package, Naval Construction Battalion Center (NCBC), Gulfport, Mississippi; Comprehensive Long-Term Environmental Action, Navy (CLEAN) District I, Contract No. N62467-89-D-0317/128

Dear Mr. Conrad:

Under contract to the U.S. Department of the Navy, Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM), this ICM Design Package was prepared for Site 8 located on the NCBC in Gulfport, Mississippi. This design was prepared under the CLEAN Contract No. N62467-89-0317, Contract Task Order No. 128.

Attached to this transmittal letter is the ICM Design Package. The major components of the design package include (1) the basis of design, (2) figures and drawings, including schedule of implementation, (3) technical specifications, (4) glossary, and (5) references/bibliography. The ICM Design Package was prepared in accordance with the ICM Workplan, Site 8, Former Herbicide Orange Storage Areas, NCBC Gulfport, Mississippi (ABB Environmental Services, Inc., 1996) to provide the rationale and assumptions used in the design of the upgrades to the sediment recovery trap (SRT) network. The technical specifications and drawings will be used in the near future to procure a construction subcontractor to install the ICM as detailed in this design package. Below is a summary of the major components of the ICM Design Package.

BASIS OF DESIGN

The purpose of this section is to document the rationale and assumptions that form the basis of this design. Additionally, the basis of design serves as supporting information for all project stakeholders to clearly understand the proposed design.

DRAWINGS

The purpose of the drawings is to provide a basis for bidding for the procurement of a construction contractor to install the ICM. Drawings for each location depicting site plan and sectional views for construction purposes are included in Attachment B.

ABB Environmental Services Inc.

TECHNICAL SPECIFICATIONS

The purpose of the technical specifications is to provide a basis for bidding for the procurement of a construction contractor to install the ICM. Specifications are included in Attachment C. The project consists mainly of sitework activities (Division 2) and general requirements (Division 1). The specifications are intended to provide further detail to the design drawings such that a construction contractor may use them to install the ICM.

SCHEDULE

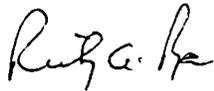
The ICM schedule (Figure 3, Attachment A) identifies the timetable for initiating and completing all critical path tasks and major milestones. The schedule also provides an estimate of the ICM completion date.

ABB-ES will be coordinating dates and locations for informational presentations of the ICM design to the project stakeholders, as you deem appropriate. Stakeholders who may have an interest in the ICM design include SOUTHNAVFACENGCOM, NCBC Gulfport, the Air Force Center for Environmental Excellence (AFCEE), the Mississippi Department of Environmental Quality (MSDEQ), and the Remediation Advisory Board (RAB).

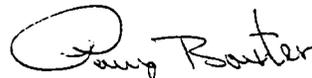
If you should have any questions concerning this design package, please do not hesitate to contact Rick Ryan or Louis Barrentine at (423) 531-1922.

Sincerely,

ABB ENVIRONMENTAL SERVICES, INC.



Ricky A. Ryan, P.E.
Project Engineer



Penny Baxter, P.G.
Project Manager

[08535-006]

pc: Gordon Crane, NCBC Gulfport
Bernie Walker, NCBC Gulfport
Louis Barrentine, ABB-ES

Attachment:

Interim Corrective Measures (ICM) Design Package
Attachment A: Figures
Attachment B: Drawings
Attachment C: Technical Specifications
Attachment D: Glossary
Attachment E: References

INTERIM CORRECTIVE MEASURES (ICM)

DESIGN PACKAGE

Table of Contents

Basis of Design

- Purpose
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- Predesign Activities
- Design Assumptions
- Locations for SRTs
- Materials Selection
- References/Bibliography

Attachments:

- Attachment A: Figures
- Attachment B: Drawings
- Attachment C: Technical Specifications
- Attachment D: Glossary
- Attachment E: References/Bibliography

BASIS OF DESIGN

PURPOSE

The following sections give the rationale and assumptions that form the basis for this Interim Corrective Measures (ICM) design.

PROJECT BACKGROUND

Four outfalls (#1, #2S, #3, and #4N) have been identified as release pathways for herbicide orange (HO) dioxin-contaminated sediment. Each of these outfalls is sourced by a drainage network consisting of a combination of open-channel ditches and underground concrete pipes, which originate at Site 8. The indications from ongoing sampling are that the dioxin contamination is dispersed through the drainageways and is mainly transported in the sediment bedload. Furthermore, it is noted from field observations, that transport likely occurs as a result of storm events. Storm events increase the flow velocity and quantity of surface water, thereby increasing the amount of suspended sediment derived from bedload. During periods of low flow (i.e., nonstorm events), the flow velocity and quantity is not sufficient to transport significant amounts of contaminated sediment. Vegetation in several portions of the drainageways also acts as a filtering mechanism to collect sediment, particularly in low flow situations. Figure 1 (Attachment A) shows the areas of concern for both the original contaminant source area and contaminated sediment transport pathways for the ICM.

The ICM design contained herein is a continuance of the corrective action program for Site 8. The ICM options were first proposed in the ICM Workplan (ABB Environmental Services, Inc. [ABB-ES], 1996). The purpose of the ICM is to reduce the further transport of sediment associated with the releases of HO dioxin from Site 8 while long-term remedies are pursued. The measures designed are intended to be performed onbase and in coordination with ongoing delineation activities.

INTERIM CORRECTIVE MEASURES

The ICM consists of sediment recovery traps (SRTs) acting as in-stream check dams to reduce the hydraulic velocity of flow in the drainageways of concern. The flow reduction will promote settlement of contaminated sediment via gravity. Related efforts include selective ditch widening and cleanout to increase storage capacity and construction of a sediment handling area to temporarily store excavated sediment. A conceptual description of SRT installation is as follows: SRT locations are excavated along the ditch bottom to remove the fine-grained, saturated material. The excavated area is then filled with gravel and covered with a nonwoven geotextile material. A prefabricated gabion is placed on top of the prepared surface and filled with gabion stone (3- to 6-inch diameter). The ends of the gabions are anchored into the bank. SRTs will be broadcrested in shape to maintain more uniform velocity conditions as water passes over the structure during storm events. The ICM design includes five locations for proposed SRT construction. Three locations will be replacement or rehabilitation of an existing SRT. Two locations will be construction of a new SRT structure.

A second component of the ICM is a sediment handling area (SHA) that will be used to store any excavated material associated with SRT installation. The SHA is designed to reduce the total volume of waste through dewatering of the saturated material from excavation activities. Based on past experience, the SHA is expected to eliminate the need to dispose of the fluids from dewatering by using a built-in filtration system to remove the fine-grained organic material and associated dioxin. The SHA will be constructed by excavating a shallow V-shaped trench that slopes to one end. The trench will then be lined with a 40-mil liner. Perforated pipe wrapped in nonwoven geotextile will be installed along the bottom of the trench to allow for dewatering of sediments and filtering of associated fluids.

PREDESIGN ACTIVITIES

The following section summarizes predesign activities that were conducted to support the design development. Predesign activities included engineering evaluations, reconnaissance, and data collection to better understand existing conditions and support the design basis.

Engineer Site Reconnaissance. An engineer site reconnaissance was conducted by the senior project engineer and project engineer to inspect the drainageways of concern and to also inspect the conditions of the existing SRTs. The site reconnaissance was used to strategically select future SRT locations and determine which existing SRTs would be replaced or rehabilitated. The observations made during the site reconnaissance and preliminary recommendations for future ICM activities were conveyed to NCBC personnel at an Engineers Update meeting held on May 2, 1997, and subsequently in meeting minutes.

Topographic Survey. A topographic survey was conducted under the direction of the project engineer to confirm topographic conditions in the areas proposed for new or replacement SRT construction. Additionally, profile surveys were taken along all drainageways of concern. This information was used in designing SRT configurations and in producing a design drawing of each location of proposed construction. Concurrent with this effort, spot measurements of the flow velocity of water flowing in the drainageways of concern were taken to confirm computer simulations. All information from the topographic survey is contained in the ABB-ES project file.

Stormwater Modeling. HydroCAD™ stormwater modeling software was used to conduct a predictive analysis of the rainfall/response relationship of the subcatchments, reaches, and ponds. Output data from the model such as velocity, flow, and water levels were used in the design of the SRTs. Design criteria included structural stability and minimization of flooding, based on the anticipated flows and velocities associated with the 2-year storm event at different locations in the drainageways. All information from the stormwater modeling task is contained in the ABB-ES project file.

SRT Baseline Performance Sampling. Existing SRT locations were sampled to assess their performance in collecting and promoting settlement of dioxin-contaminated sediment. At each location, one sample was collected both immediately upstream and immediately downstream of the SRT. In general, the existing SRTs demonstrated positive collection efficiencies. Detailed results are presented in a separate letter report, which is currently under production.

DESIGN ASSUMPTIONS

SRTs will function as weirs to reduce the hydraulic velocity of flow in the drainageways of concern. The flow reduction will promote settlement of contaminated sediment via gravity. Their selection as an interim measure was based on their degree of flexibility, expediency, cost, and space requirements. They are intended only as an interim measure, which will be followed up by complimentary long-term remedial actions.

It was observed that in several SRT locations the drainageway immediately upstream of the SRT is acting as a mini-settling pond. Cleanout and selective widening of these drainageways will increase their storage capacity, thereby increasing the effectiveness of the SRT. Information from the topographic survey and interviews with base personnel indicates that many of the drainageways of concern were originally V-shaped. Modifying the shape to trapezoidal upstream of selected SRTs will increase the cross-sectional area. This increase in area will result in more storage capacity as well as velocity reduction, which will promote sediment settlement. Based on HydroCAD™ modeling, flow velocities for the 2-year storm event in the drainageways of concern range from 1.5 to 2.8 feet per second. Velocities for the 10-year storm event do not show an appreciable increase, ranging from 1.6 to 3.2 feet per second. Field observations and interviews with base personnel indicate that Canal #1 (Outfall #1) controls the majority of flow leaving the base from the drainageways of concern. Because of this constraint and flat topography of the area, the larger storm events result in flooding conditions, but no appreciable increase in velocity.

LOCATIONS FOR SRTS

Five locations are included in the scope of this design (Figure 2, Attachment A). Three locations will consist of activities that include reconstruction or repair of the existing structure. Two locations will consist of the construction of a new SRT structure. Three of the five locations will also include general site improvements. The rationale for the locations and a brief scope of construction activity for each location is provided below. Details on materials and methods of construction are provided within the attached drawings and specifications (Attachments B and C, respectively).

SRT 5 (reconstruction). This existing SRT functions well for sediment recovery, but can be improved by reconstruction further downstream in the ditch. It is a small-diameter gravel structure located in a 175-foot-long section of open channel ditch. The ditch has a culvert on the upstream and downstream ends. This SRT will be reconstructed of gabion stone contained within gabion cages. It will be moved closer to the downstream culvert to ensure better cleanout of that culvert and to maximize storage capacity upstream of the SRT structure. The upstream portion of the ditch will be cleaned out and widened to increase storage capacity. The channel and banks will be seeded and lined with a turf-reinforcing geotextile to provide ditch bottom stability and erosion control.

SRT 6 (reconstruction). This existing SRT functions well for sediment recovery, but it can be improved by reconstruction further downstream in the ditch. It is a small-diameter gravel structure located in a 200-foot-long section of open channel ditch. The ditch has a culvert on the upstream end and intersects with a feeder ditch on the downstream end. This SRT will be reconstructed of gabion stone contained within gabion cages. It will be moved closer to the downstream feeder ditch to maximize storage capacity upstream of the SRT structure. The upstream portion of the ditch will be cleaned out and widened to increase storage capacity. The channel and banks will be seeded and lined with a turf-reinforcing geotextile to provide ditch bottom stability and erosion control.

SRT 13 (improvement). This existing SRT was installed last year and shows early indications of effective sediment recovery. This is a gabion structure constructed of two lifts of gabion cages filled with large-diameter stone. The structure is notched in the center so that under normal or moderate storm conditions flow of water is through the notch. The SRT does not meet existing grade on the adjacent banks, resulting in flow around the structure during storm events. The structure is located immediately downstream of the intersection of two drainageways of concern and immediately upstream of Outfall #3. The top lift of the structure will be removed and replaced with a lower profile gabion cage. This will result in a broadcrested shape for the structure rather than a notched shape. The broadcrested shape will promote a more uniform flow of water over the structure during storm events. The top lift will extend to meet grade on the adjacent banks so that flow around the structure will be minimized.

SRT 14 (new). This will be a new structure located upstream of Outfall #4. Currently, there are no SRTs in this drainageway that discharge to Outfall #4. The structure will be constructed of gabion cages filled with 2- to 6-inch gabion stone. It will be broadcrested in shape and extended to meet grade on the adjacent banks. Any disturbed banks will be seeded and lined with turf-reinforcement geotextile.

SRT 15 (new). This will be a new structure located in the drainageway immediately west of Building 219. It is intended to serve as the first line of defense for collecting sediment in the Outfall #4 drainageway. It will be located in the drainageway, which eventually discharges to Outfall #4. The structure will be constructed of gabion cages filled with 2- to 6-inch gabion stone. It will be broadcrested in shape and extended to meet grade on the adjacent banks. It is located in a 250-foot-long section of ditch. The ditch has a culvert on the upstream end and intersects with another main ditch on the downstream end. The new structure will be located immediately upstream of the intersection to maximize storage capacity upstream of the SRT structure. The upstream portion of the ditch will be cleaned out and widened to increase storage capacity. The channel and banks will be lined with a turf-reinforcing geotextile to provide ditch bottom stability and erosion control.

MATERIALS SELECTION

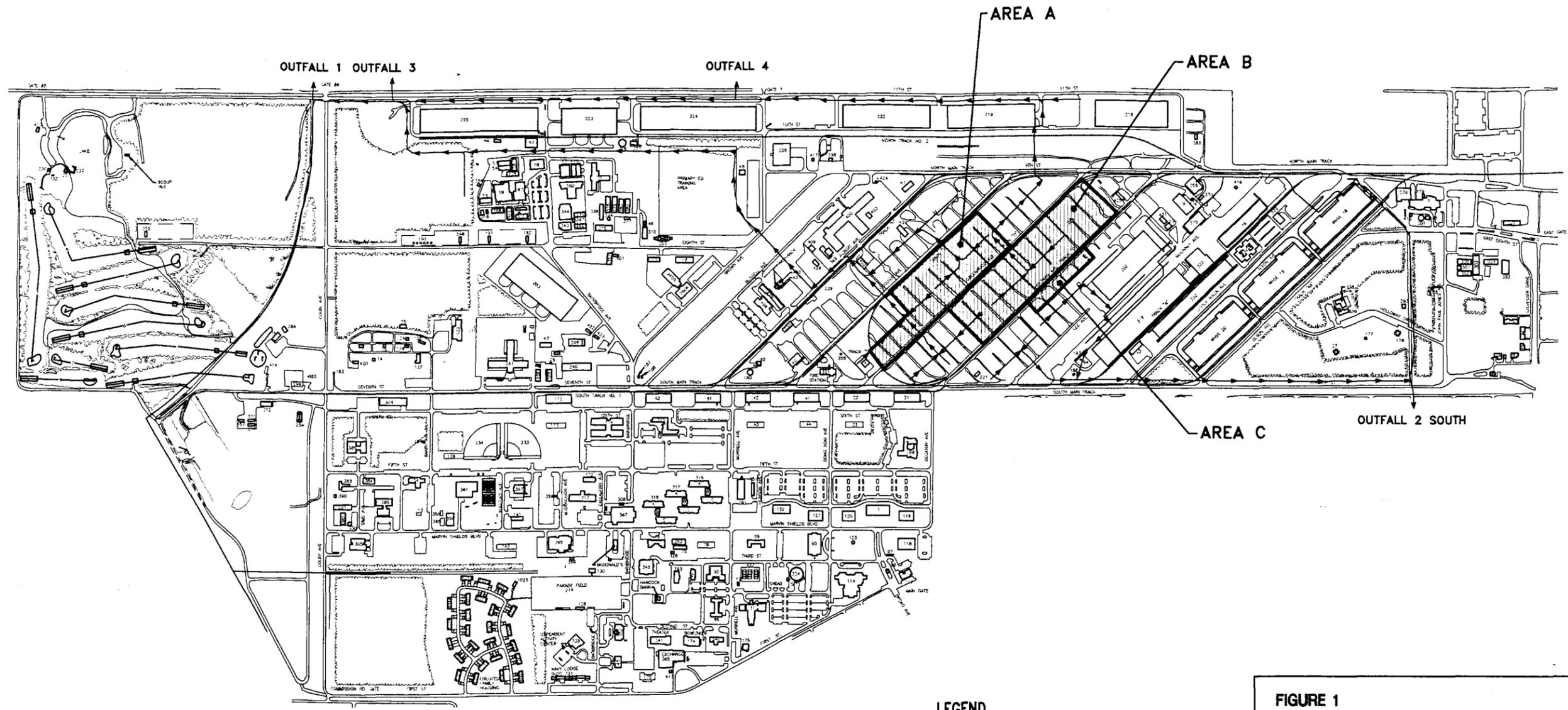
Rock gabion structures were selected because of their structural stability as well as their ability to allow water to flow through and over the structure. Past experience has shown that uncontained small-diameter gravel will not withstand the intense and frequent storm events associated with the site. Turf-reinforcing geotextile, otherwise known as a soft-armor system, was selected as an alternative to rip-rap, otherwise known as a hard-armor system. The geotextile is less expensive to purchase and install, and it effectively prevents erosion of banks and channel bottoms. Once the turf is established, the turf-reinforced area will have a better aesthetic appearance than a rip-rap reinforced area. It is intended to be used with seeding to result in a stable bank condition.

REFERENCES

Several project-related reports were used to establish the design basis for the ICM design contained in this package. Several technical references were used in the ICM design. These references are included in Attachment D.

ATTACHMENT A

FIGURES



LEGEND

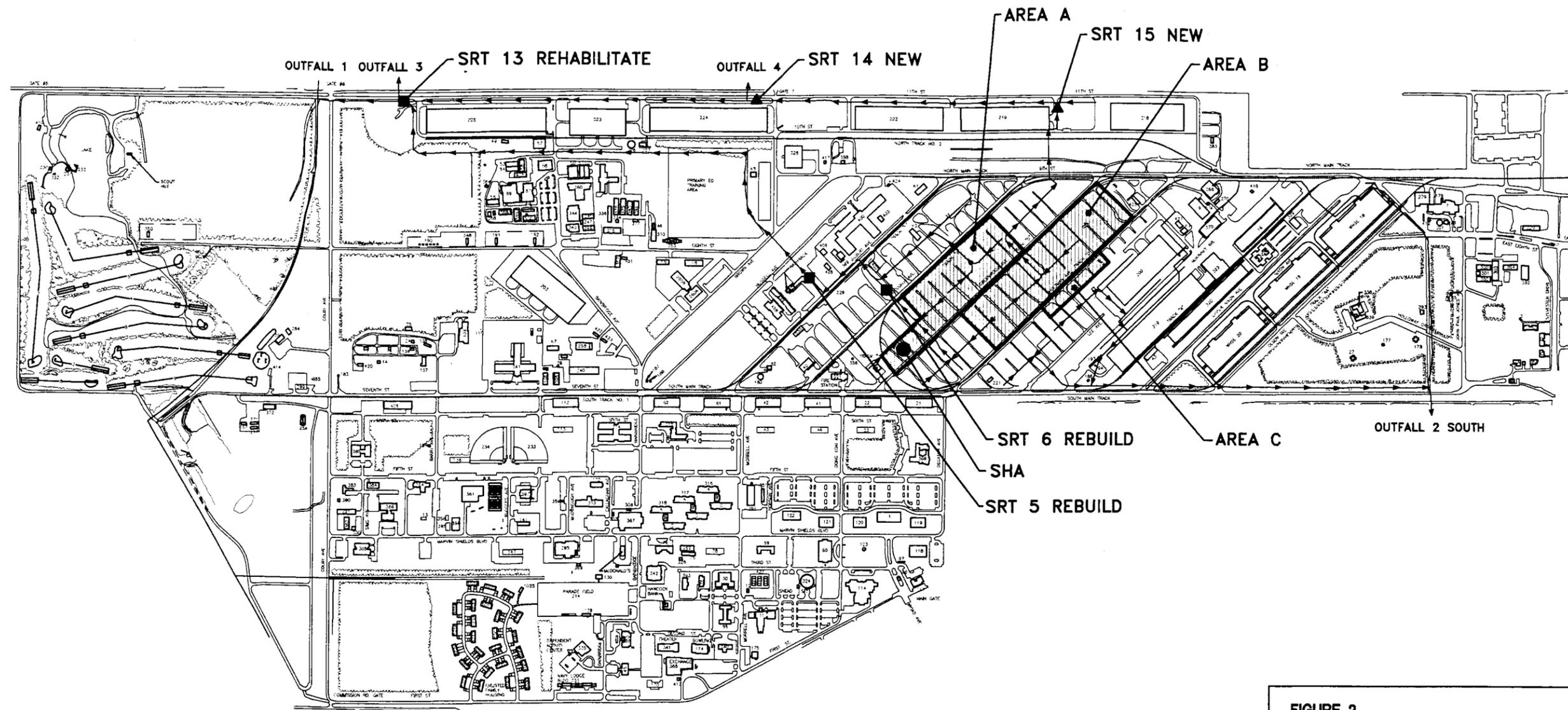
- ← → DRAINAGEWAYS OF CONCERN
-  SITE 8 (SOURCE AREA)

FIGURE 1
INTERIM CORRECTIVE MEASURES
AREAS OF CONCERN



INTERIM CORRECTIVE MEASURES
DESIGN
NAVAL CONSTRUCTION
BATTALION CENTER
GULFPORT, MISSISSIPPI

0 500 1000
SCALE: 1" = 1000'



LEGEND

- ▲ NEW SRT
- SEDIMENT HANDLING AREA (SHA)
- REBUILD/REHABILITATE EXISTING SRT
- DRAINAGEWAYS OF CONCERN
- ▭ SITE 8 (SOURCE AREA)

FIGURE 2
INTERIM CORRECTIVE MEASURES LOCATIONS
FOR SEDIMENT RECOVERY TRAP (SRT)
NETWORK IMPROVEMENTS



INTERIM CORRECTIVE MEASURES
DESIGN
NAVAL CONSTRUCTION
BATTALION CENTER
GULFPORT, MISSISSIPPI

0 500 1000
 SCALE: 1" = 1000'

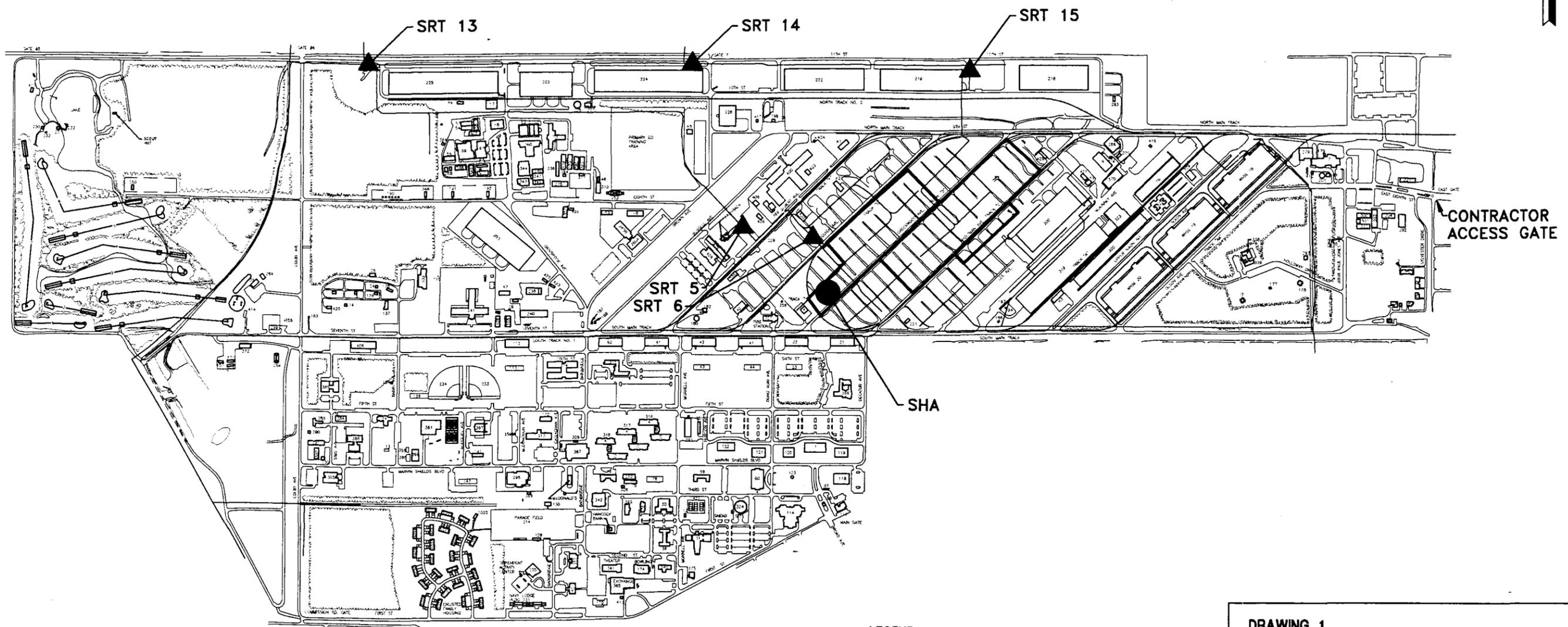
Activity Description	Start	Early Finish	Orig Dur	1997												
				AUG			SEP			OCT						N
				1	8	15	22	29	5	12	19	26	31	7		
Construction Services Procurement	02SEP97	29SEP97	20	←————→												
Pre-Bid Conference	17SEP97		0			◆										
Construction Contract Award	30SEP97		0					◆								
Materials Procurement	01OCT97	20OCT97	14					←————→								
Mobilization	20OCT97		0								◆					
Construction	21OCT97	31OCT97	9									←————→				
Completion	31OCT97		0											◆		

Project Start 01SEP97  Early Bar
 Project Finish  Progress Bar
 Data Date 01SEP97
 Run Date 14AUG97
 © Primavera Systems, Inc.

GULF
 Interim Measure
 Construction Schedule
 NCBC Gulfport, MS
 Sheet 1 of 1



ATTACHMENT B
DRAWINGS



LEGEND

-  SEDIMENT RECOVERY TRAP (SRT)
-  SEDIMENT HANDLING AREA (SHA)

**DRAWING 1
AREAS OF CONSTRUCTION**



**INTERIM CORRECTIVE MEASURES
DESIGN**

**NAVAL CONSTRUCTION
BATTALION CENTER
GULFPORT, MISSISSIPPI**

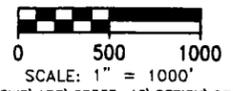


TABLE 1 – EXCAVATION AND MATERIALS QUANTITIES

SRT	EXCAVATION (C.Y.)	GABION STONE (T)	FOUNDATION STONE (T)	TURF REINFORCEMENT GEOTEXTILE (STANDARD ROLLS 6.5'x138.5')	NON-WOVEN GEOTEXTILE (S.F.)	SEEDING AREA (S.F.)	GABION CAGE 6'x3'x1.5' (EACH)	GABION CAGE 6'x3'x1' (EACH)
5	171	19	5	6	364	3885	3	3
6	52	18	5	5	364	3546	3	3
13	0	20	0	0	0	0	0	4
14	2	8	4	0	286	0	0	4
15	159	18	5	8	364	5050	3	3
TOTAL	384	83	19	19	1378	12481	9	17

GENERAL NOTES:

1. GABION STONE FOR ALL WORK PERFORMED UNDER THIS SCOPE OF WORK WILL BE A WELL GRADED, 3-INCH TO 6-INCH, LIMESTONE ROCK.
2. FOUNDATION STONE FOR ALL WORK PERFORMED UNDER THIS SCOPE OF WORK WILL BE A WELL GRADED, 2-INCH, LIMESTONE ROCK.
3. THE GABION BASKETS UTILIZED FOR THE PROJECT SHALL VARY IN HEIGHT DIMENSION AS EITHER 1.5 OR 1.0 FEET AND SHALL BE PLACED AS PER THE DRAWINGS. THE LENGTH AND WIDTH DIMENSIONS SHALL BE 6 AND 3 FEET RESPECTIVELY. GABION BASKETS SHALL BE MACCAFERRI PVC COATED 8X10 MESH (OR APPROVED EQUAL).
4. DOWNSTREAM AND UPSTREAM APPROACHES WILL BE BACKFILLED WITH GABION STONE AT AN APPROXIMATE 1:1 SLOPE.
5. EACH END OF THE GABION STRUCTURES SHALL MATCH EXISTING GRADE (SECTION A-A' VIEWS). THE ENDS MAY BE BACKFILLED WITH GABION STONE AT THE ENGINEERS DISCRETION.
6. A NON-WOVEN GEOTEXTILE WILL LINE THE EXCAVATION BENEATH THE FOUNDATION STONE. IT WILL BE CUT 10 FEET LONGER THAN THE LENGTH AND WIDTH DIMENSIONS OF THE FOUNDATION FOOTPRINT. THE NON-WOVEN GEOTEXTILE SHALL BE SYNTHETIC INDUSTRIES 1201 OR APPROVED EQUAL.
7. DEWATER THE SRT FOUNDATION EXCAVATION AS REQUIRED TO AVOID THE PLACEMENT OF GEOTEXTILE AND GABION STONE INTO SATURATED SOIL.
8. THE ESTIMATED MATERIALS AND EXCAVATION ASSOCIATED WITH EACH SRT LOCATION ARE PROVIDED IN TABLE 1.
9. ALL DISTURBED AREAS WILL BE SEEDED AND LINED WITH A TURF REINFORCEMENT GEOTEXTILE, LAND LOK TRM 1060 OR APPROVED EQUAL, AS PER SPECIFICATIONS.
10. MATERIALS AND EXCAVATION HAVE NOT BEEN ESTIMATED FOR THE SOILS HANDLING AREA. CONTRACTOR SHOULD PERFORM A MATERIALS TAKEOFF FOR THE SOILS HANDLING AREA TO BE USED AS A BID BASIS.

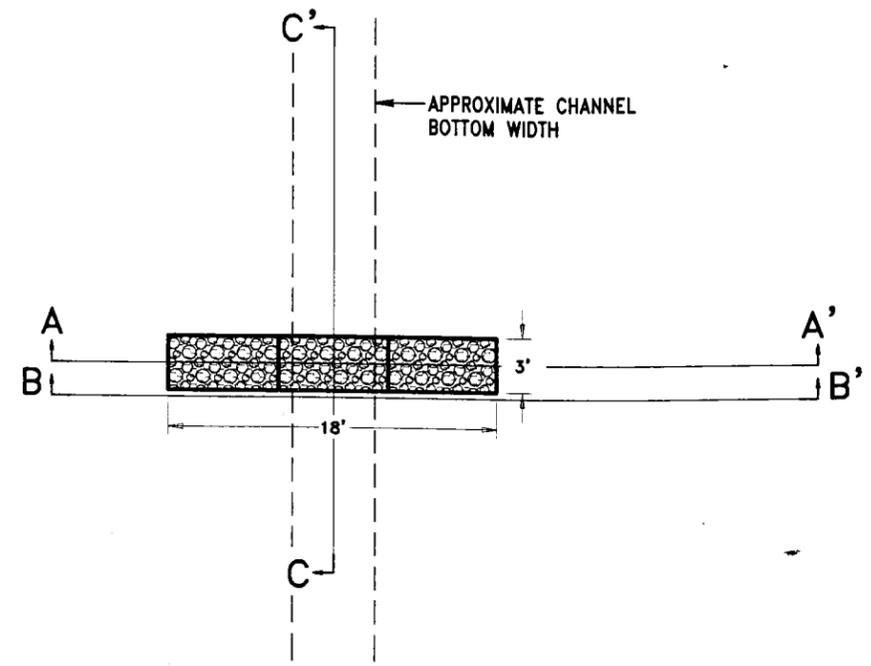
**DRAWING 2
GENERAL NOTES**



**INTERIM CORRECTIVE MEASURES
DESIGN**

**NAVAL CONSTRUCTION
BATTALION CENTER
GULFPORT, MISSISSIPPI**

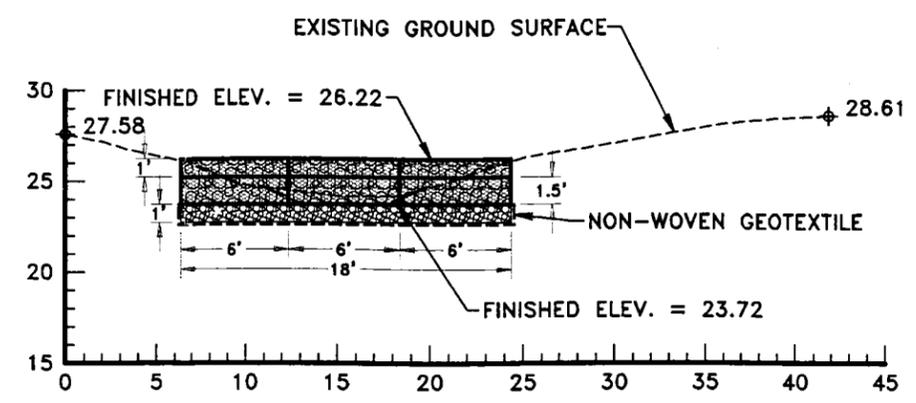
*Disc
Modification
Remove existing*



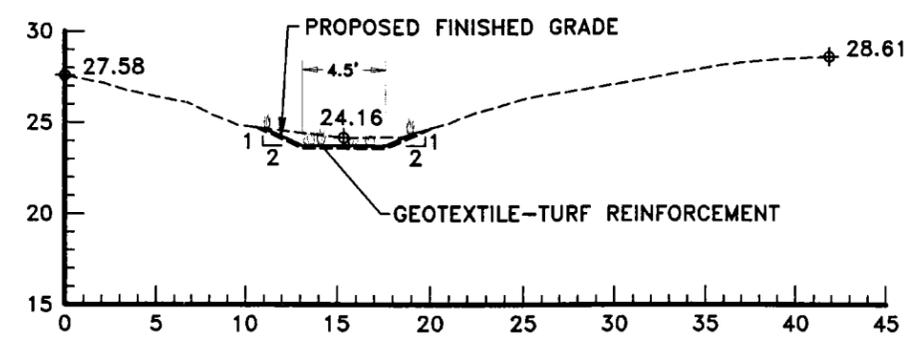
PLAN VIEW (SRT 5)
SCALE: 1" = 10'

- LEGEND**
- GABION BASKETS
 - FOUNDATION STONE
 - GABION STONE ON APPROACHES

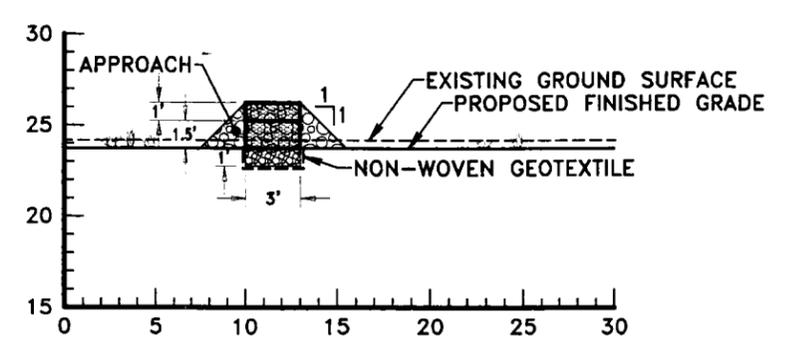
NOTE:
DITCH MODIFICATION ACTIVITIES WILL OCCUR ALONG THE DITCH APPROXIMATELY 100' UPGRADIENT AND APPROXIMATELY 75' DOWNGRADIENT OF THE SRT LOCATION. THESE DITCH MODIFICATIONS ARE TYPICAL IN SHAPE OF SECTION B-B' BUT VARY IN DIMENSIONS ALONG THE DITCH AT THE ENGINEERS DISCRETION. GENERAL NOTES CONTAIN CONSERVATIVE EXCAVATED MATERIAL QUANTITIES TO BE USED IN BID ESTIMATES.



CROSS SECTION A-A' (SRT 5)
SCALE: 1" = 10'



CROSS SECTION B-B' (SRT 5)
SCALE: 1" = 10'



CROSS SECTION C-C' (SRT 5)
SCALE: 1" = 10'

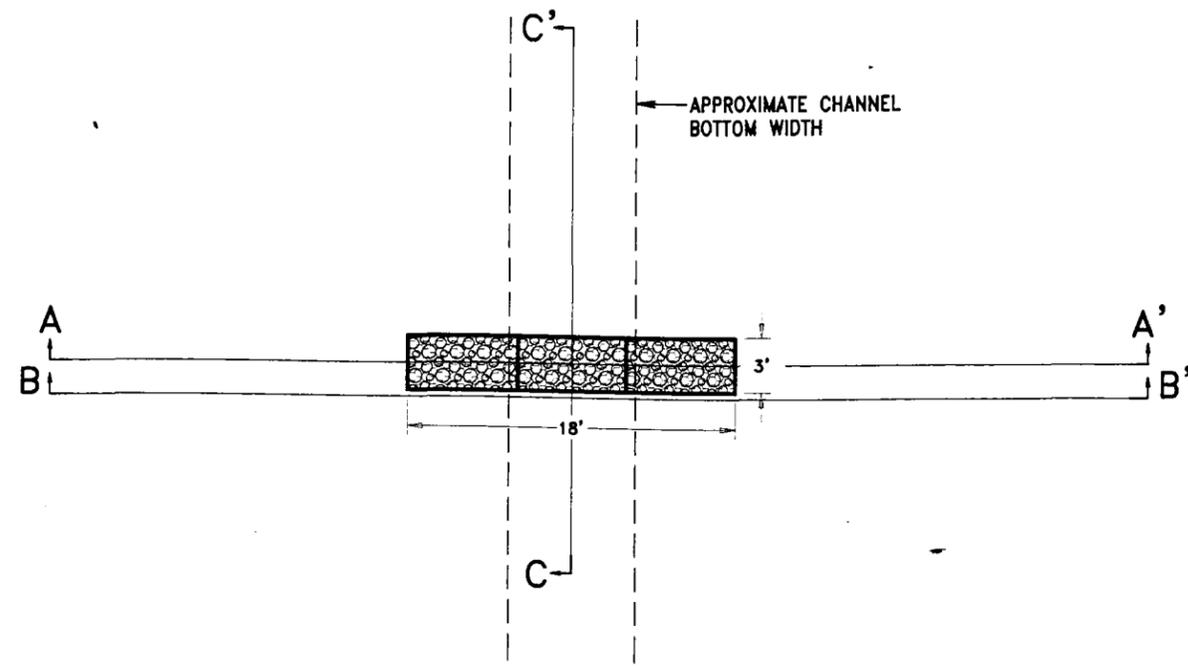
DRAWING 3
SRT 5 DETAILS

INTERIM CORRECTIVE MEASURES DESIGN

NAVAL CONSTRUCTION BATTALION CENTER
GULFPORT, MISSISSIPPI

Upgradient Invert 8' 11"
 Distance to start 170'
 Distance to SRT 145'
 Elev. of SRT 24.73
 Elevation = 1.5' = 10' 0"

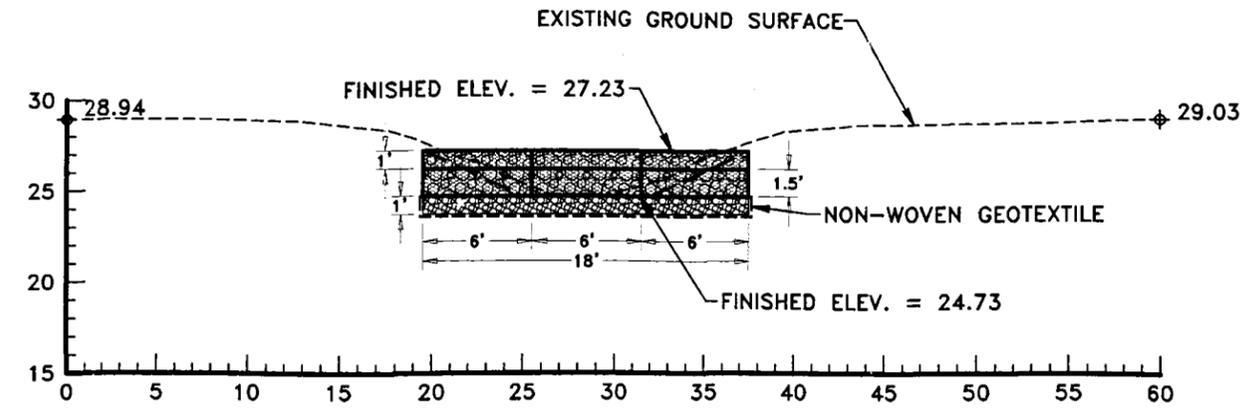
Ditch Modification
 Repair existing gabion



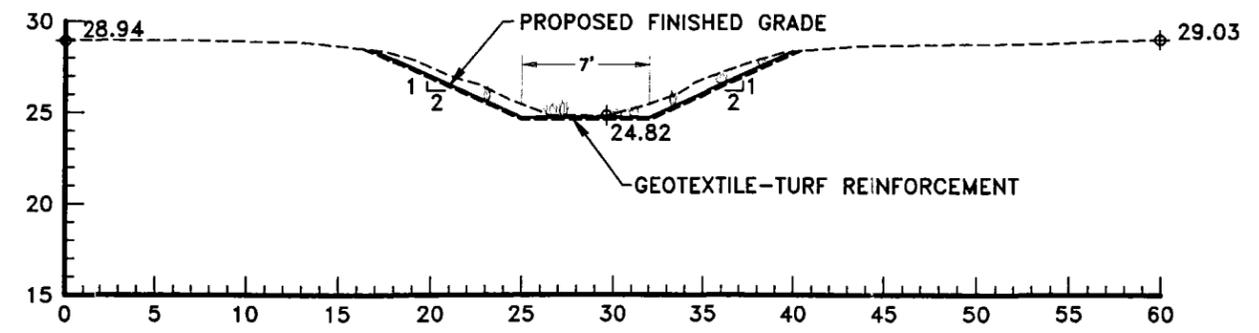
PLAN VIEW (SRT 6)
 SCALE: 1" = 10'

- LEGEND**
- GABION BASKETS
 - FOUNDATION STONE
 - GABION STONE ON APPROACHES

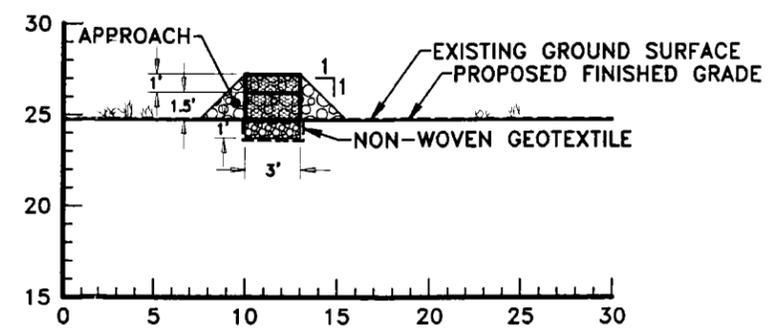
NOTE:
 DITCH MODIFICATION ACTIVITIES WILL OCCUR ALONG THE DITCH APPROXIMATELY 125' UPGRADIENT AND APPROXIMATELY 25' DOWNGRADIENT OF THE SRT LOCATION. THE DITCH MODIFICATIONS ARE TYPICAL IN SHAPE OF SECTION B-B' BUT MAY VARY IN DIMENSIONS ALONG THE DITCH AT THE ENGINEERS DISCRETION. GENERAL NOTES CONTAIN CONSERVATIVE EXCAVATED MATERIAL QUANTITIES TO BE USED IN BID ESTIMATES.



CROSS SECTION A-A' (SRT 6)
 SCALE: 1" = 10'



CROSS SECTION B-B' (SRT 6)
 SCALE: 1" = 10'



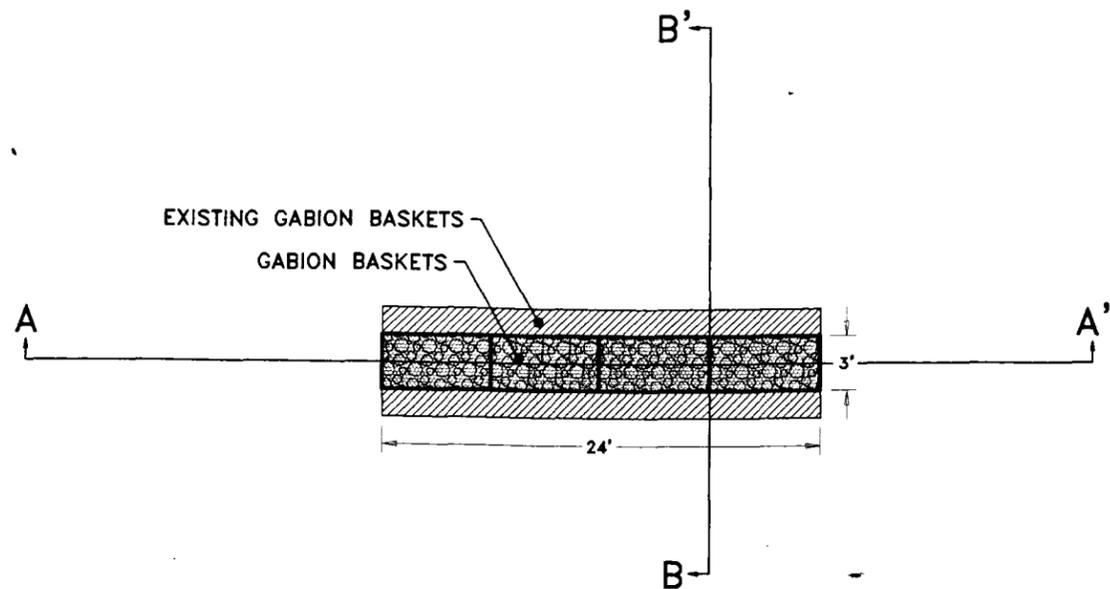
CROSS SECTION C-C' (SRT 6)
 SCALE: 1" = 10'

DRAWING 4
SRT 6 DETAILS

INTERIM CORRECTIVE MEASURES DESIGN

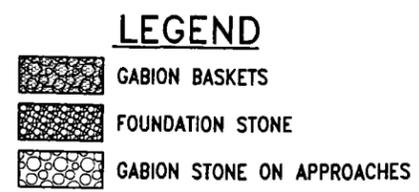
NAVAL CONSTRUCTION BATTALION CENTER
GULFPORT, MISSISSIPPI

Remove top 1.5' high
replace w/ 1' high
gabion



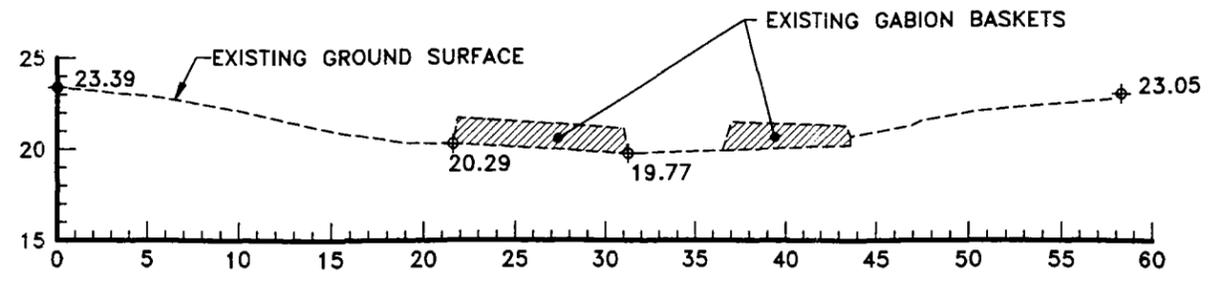
PLAN VIEW (SRT 13)

SCALE: 1" = 10'



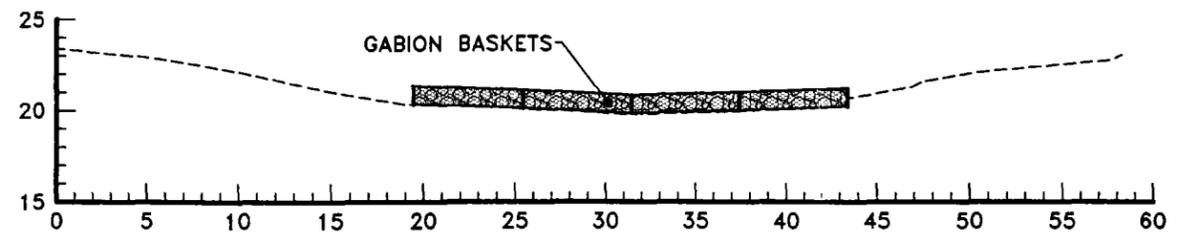
NOTES:

1. THE EXISTING 1.5-FOOT HIGH GABION BASKET SHALL BE REMOVED AND REPLACED WITH 1-FOOT HIGH BASKETS. (SECTION A-A').
2. GABION STONE REMOVED FROM EXISTING BASKETS MAY BE REUSED AT THE ENGINEERS DISCRETION.



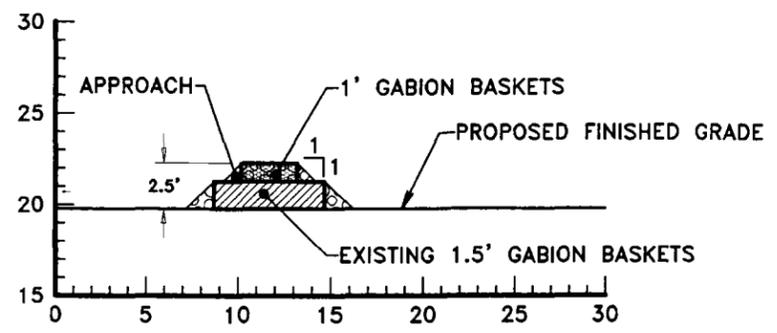
CROSS SECTION A-A' - EXISTING CONDITIONS (SRT 13)

SCALE: 1" = 10'



CROSS SECTION A-A' - REBUILD SECTION (SRT 13)

SCALE: 1" = 10'



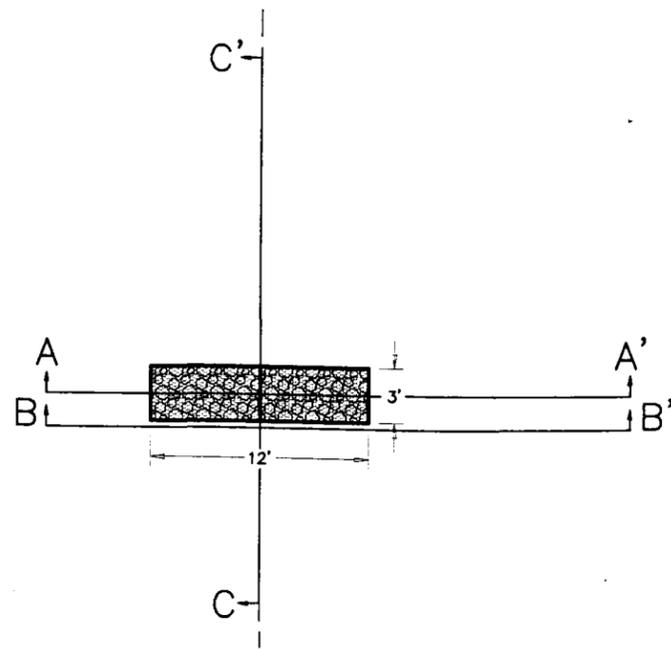
CROSS SECTION B-B' (SRT 13)

SCALE: 1" = 10'

DRAWING 5
SRT 13 DETAILS



INTERIM CORRECTIVE MEASURES
DESIGN
NAVAL CONSTRUCTION
BATTALION CENTER
GULFPORT, MISSISSIPPI



PLAN VIEW (SRT 14)

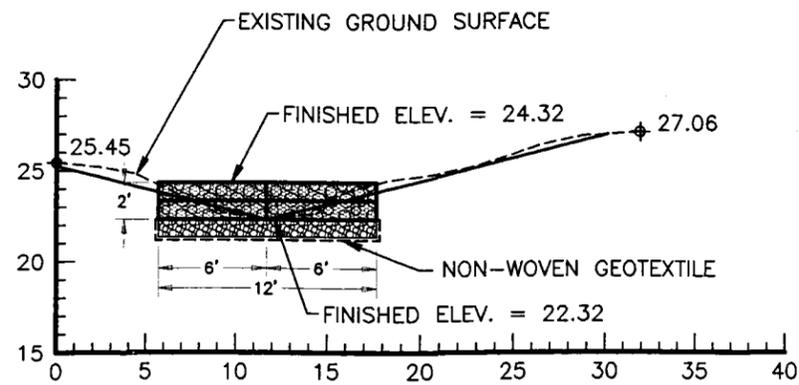
SCALE: 1" = 10'

LEGEND

-  GABION BASKETS
-  FOUNDATION STONE
-  GABION STONE ON APPROACHES

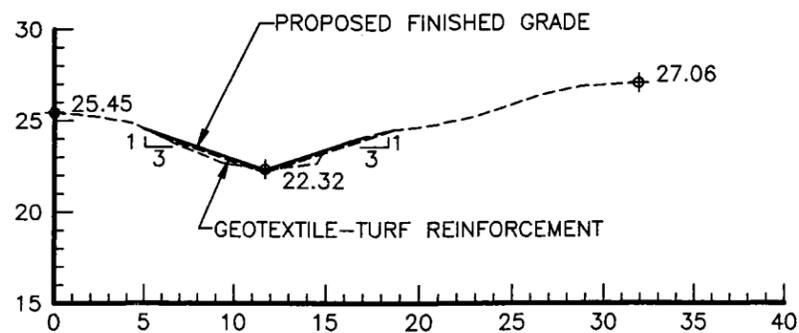
NOTE:

DITCH MODIFICATION ACTIVITIES ARE NOT ANTICIPATED AT THIS LOCATION.



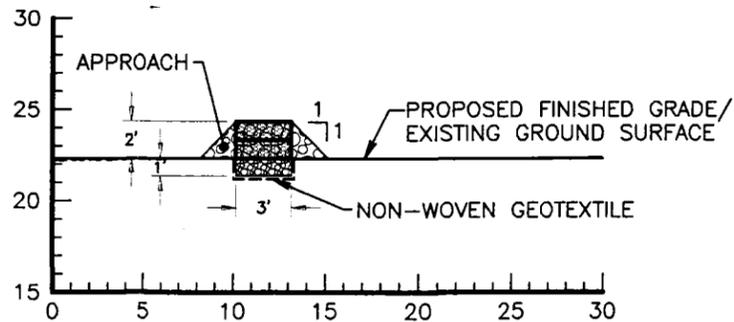
CROSS SECTION A-A' (SRT 14)

SCALE: 1" = 10'



CROSS SECTION B-B' (SRT 14)

SCALE: 1" = 10'



CROSS SECTION C-C' (SRT 14)

SCALE: 1" = 10'

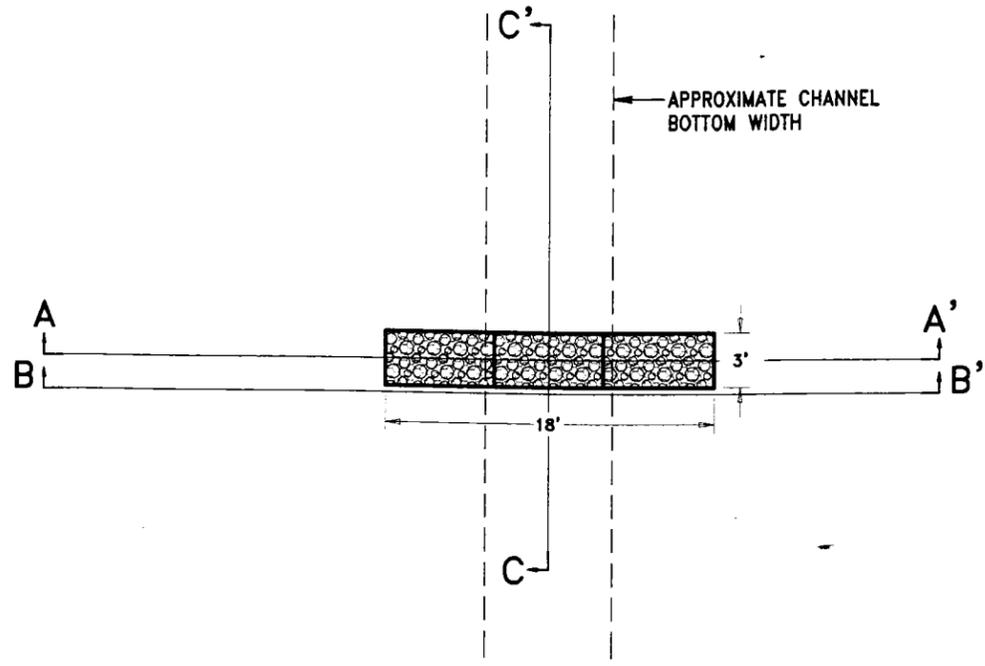
DRAWING 6
SRT 14 DETAILS



INTERIM CORRECTIVE MEASURES
DESIGN

NAVAL CONSTRUCTION
BATTALION CENTER
GULFPORT, MISSISSIPPI

Ditch
Modification

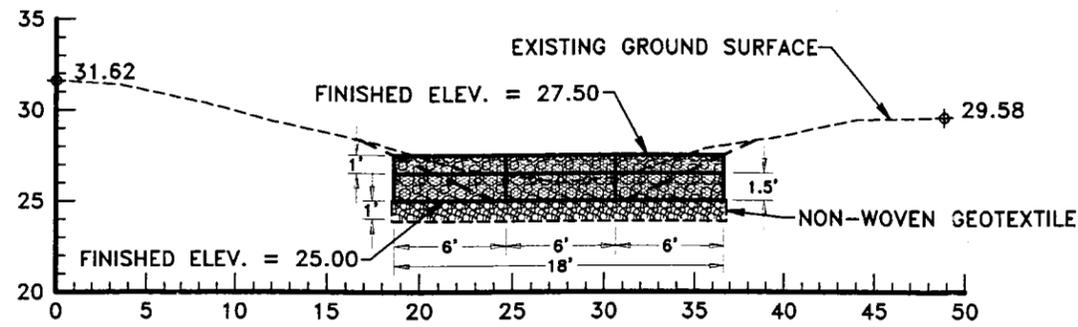


PLAN VIEW (SRT 15)
SCALE: 1" = 10'

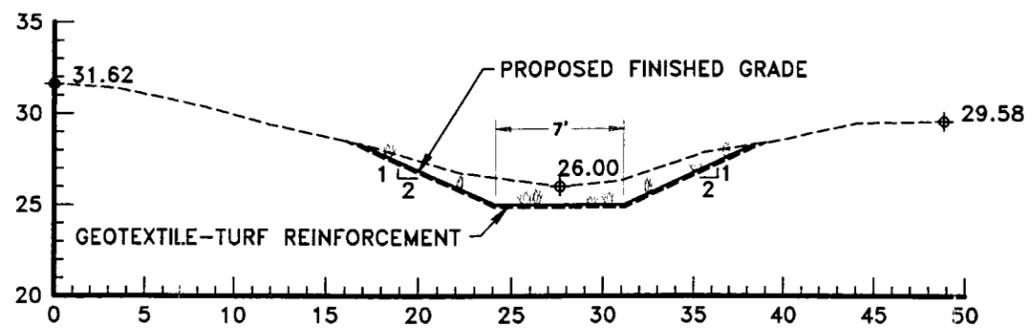
- LEGEND**
-  GABION BASKETS
 -  FOUNDATION STONE
 -  GABION STONE ON APPROACHES

NOTE:

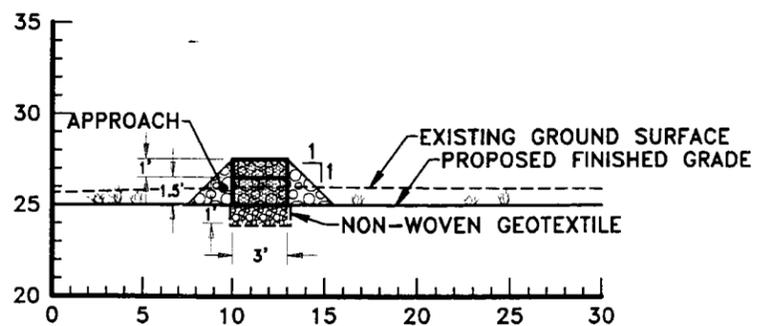
DITCH MODIFICATION ACTIVITIES WILL OCCUR ALONG THE DITCH APPROXIMATELY 170' UPGRADIENT AND APPROXIMATELY 25' DOWNGRADIENT OF THE SRT LOCATION. THE DITCH MODIFICATIONS ARE TYPICAL IN SHAPE OF SECTION B-B' BUT VARY IN DIMENSIONS ALONG THE DITCH AT THE ENGINEERS DISCRETION. GENERAL NOTES CONTAIN CONSERVATIVE EXCAVATED MATERIAL QUANTITIES TO BE USED IN BID ESTIMATES.



CROSS SECTION A-A' (SRT 15)
SCALE: 1" = 10'



CROSS SECTION B-B' (SRT 15)
SCALE: 1" = 10'

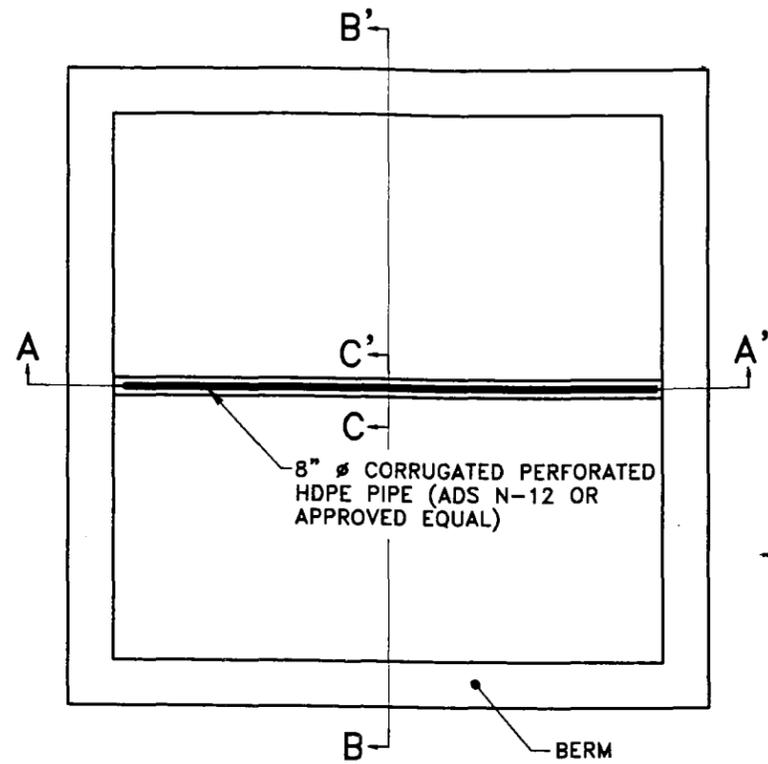


CROSS SECTION C-C' (SRT 15)
SCALE: 1" = 10'

DRAWING 7
SRT 15 DETAILS

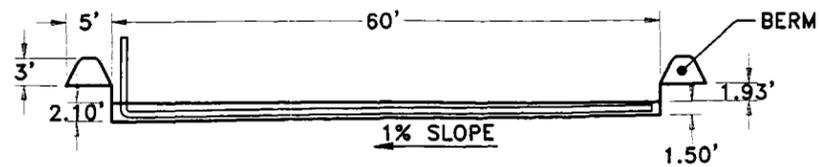


INTERIM CORRECTIVE MEASURES DESIGN
NAVAL CONSTRUCTION BATTALION CENTER GULFPORT, MISSISSIPPI



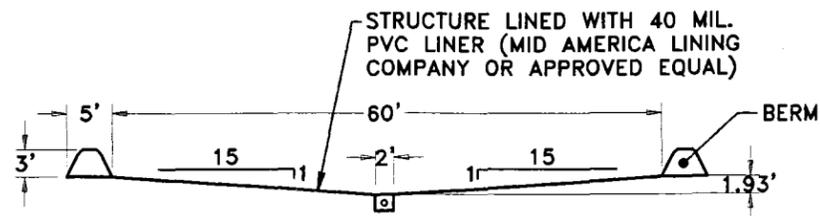
PLAN VIEW

SCALE: 1" = 20'



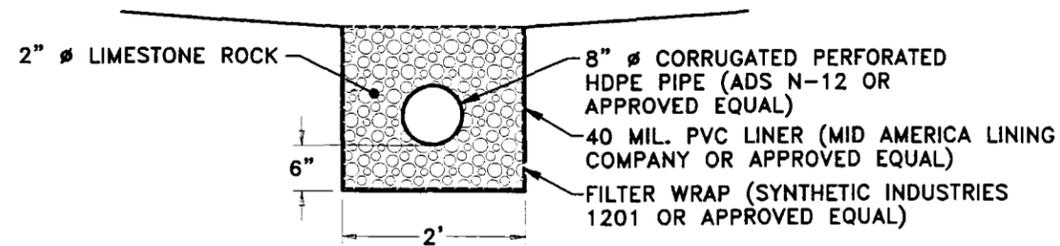
CROSS SECTION A-A'

SCALE: 1" = 20'



CROSS SECTION B-B'

SCALE: 1" = 20'



CROSS SECTION C-C'

SCALE: 1" = 2'

NOTE:

1. PVC LINER WILL BE DRAPED OVER TOP OF BERM AND EMBEDDED INTO THE BERM.
2. EXCESS SPOIL MATERIAL FROM CONSTRUCTION OF SOILS HANDLING AREA CAN BE SPREAD ON SITE AT THE DISCRETION OF THE ENGINEER.
3. A COVER SHEET FOR THE SOILS HANDLING AREA OF 20 MIL. PVC (MID AMERICA LINING COMPANY OR APPROVED EQUAL) WILL BE PROVIDED AND WILL BE 90' BY 90' IN SIZE.

DRAWING 8
SOILS HANDLING AREA



INTERIM CORRECTIVE MEASURES DESIGN

NAVAL CONSTRUCTION BATTALION CENTER GULFPORT, MISSISSIPPI

ATTACHMENT C
TECHNICAL SPECIFICATIONS

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- 01010 SUMMARY OF WORK
- 01025 MEASUREMENT AND PAYMENT
- 01041 PROJECT COORDINATION
- 01070 ABBREVIATIONS
- 01091 REFERENCE CODES AND STANDARDS
- 01125 SPECIAL PROJECT PROCEDURES
- 01210 PRECONSTRUCTION MEETING
- 01220 PROGRESS MEETINGS
- 01310 CONSTRUCTION SCHEDULES
- 01340 SUBMITTALS
- 01510 TEMPORARY FACILITIES
- 01567 POLLUTION CONTROL
- 01570 MAINTENANCE AND TRAFFIC
- 01600 MATERIAL CONTROL
- 01700 PROJECT CLOSEOUT
- 01710 CLEANING

DIVISION 02 -- SITE CONSTRUCTION

- 02016 EXISTING UTILITIES AND UNDERGROUND STRUCTURES
- 02140 DEWATERING
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02271 EROSION CONTROL

02272 GABIONS

02273 GEOTEXTILES

02274 GABION STONE

02711 SUBDRAINAGE SYSTEM

02775 POLYVINYL CHLORIDE (PVC) FLEXIBLE MEMBRANE LINER

02930 LAWNS AND GRASSES

SECTION 01010

SUMMARY OF WORK

PART 1 GENERAL

1.1 RELATED DOCUMENTS

The provisions of the Contract, including General Terms and Conditions, apply to the work specified in this Section.

1.2 SCOPE

1.2.1 General

The scope of work for this project consists primarily of excavation activities associated with the construction of Sediment Recovery Traps (SRTs) and a Sediment Handling Area (SHA). The SRTs will be utilized to help control sediment transport in drainage ditches, which occurs in stormwater runoff from precipitation events. The SRTs are designed to reduce the velocity of water flow through the ditches. This is required to help prevent the movement of dioxin contamination from the installation, which may be attached to the sediment material. The SHA will be used to stockpile the saturated soils generated from excavation activities involved with SRT construction.

The SHA construction consists of excavating an area into which saturated soils, removed as part of SRT construction and ditch modifications, may be placed for dewatering (See Drawing 8, Attachment B). The sump will be lined with a 40-mil thick polyvinyl chloride (PVC) liner, and shaped such that its construction will facilitate drainage from the soil to a collector pipe from which the water may be extracted and pumped into temporary holding tanks. The tanks and water extraction will be executed by others.

The SRT construction consists of a rectangular-shaped excavation into which the structure will be built utilizing limestone rock and gabion baskets (See Drawings 3 through 7, Attachment B). Depending upon the location at which the structure is being built, the dimensions will be either 2 or 2.5 feet tall with a length of either 12, 18, or 24 feet. The foundation of the structure will be placed upon a 12-ounce nonwoven geotextile for stability. The individual gabion baskets shall be of dimensions 3 feet wide by 6 feet long, and the height will be either 1 or 1.5 feet.

Associated work with the SRT construction will be ditch modifications, which consist of the excavation of soil to either (1) restore the original constructed shape of the ditch or (2) alter the original V-shape into a trapezoid shape to increase ditch cross-sectional area to increase capacity and slow velocity that will facilitate the capture of sediment. The exposed soil will then be sown with grass seed, covered with a soft armor geotextile, which will be soil filled, and then sown again with grass seed and mulched.

There will be a total of four SRTs constructed. Two of these will follow the removal of two existing SRTs, which is a part of this scope

of work. Finally, one SRT will be modified by removing the existing top layer of 1.5-foot-tall, rock-filled gabion baskets, and replacing them with 1-foot-tall baskets.

1.2.2 SHA

The shape and dimensions of the SHA shall be as depicted in Drawing 8, Attachment B. The structure shall have a maximum depth (excluding the drain) of approximately 2 feet and a maximum width of 60 feet. The V-shape shall terminate into a drain trench (drain). The trench drain will be a maximum of 2 feet wide and sloped toward one end at 1 percent slope. The drain shall be fitted with an 8-inch-diameter, perforated, high density polyethylene (HDPE) pipe. The backfill around the pipe shall be a uniform size gravel equal to or less than 2 inches in diameter. The gravel fill shall extend to the top of the drain. The drain shall be lined and covered with a 12-ounce nonwoven geotextile to prevent both puncture from the gravel fill and fouling due to the fine-grained sediment. The end of the pipe located at the low end of the drain shall be fitted with a 90 degree elbow and fitted with pipe to form a riser from which water may be extracted with a pump. The entire SHA including the drain shall be lined with a 40-mil PVC liner. A cover sheet over the SHA of dimensions 90 feet by 90 feet and constructed of 20-mil PVC shall be provided for use as a cover sheet.

1.2.3 SRT REMOVAL

Two existing SRTs shall be removed; they are SRT 5 and SRT 6 as shown in Drawing 1, Attachment B. The structures are constructed of #57 stone, wire mesh (chicken wire), and a nonwoven geotextile. Each structure contains approximately 15 cubic yards of stone. However, for this project, all excavation is unclassified, and the material shall be placed into the SHA with all other excavated material.

1.2.4 SRT INSTALLATION

Four SRTs will be constructed; and they are SRTs 5, 6, 14, and 15. As stated earlier, SRTs 5 and 6 are replacements for those removed. The dimensions of the SRTs are as follows:

SRT	Length (as measured across ditch)	Width (as measured along center line of ditch)	Height
5	18 feet	3 feet	2.5 feet
6	12 feet	3 feet	2.5 feet
14	18 feet	3 feet	2 feet
15	18 feet	3 feet	2.5 feet

The height of an SRT is measured from the top of the foundation. The foundation will be constructed by digging to a depth 1 foot below the specified bottom elevation for a given SRT (See Drawings 3 through 7, Attachment B). A nonwoven geotextile will be placed on the bottom of the cut to provide stabilization. The void will then be filled with a well graded 3- to 6-inch gabion stone placed in two lifts to the specified elevation. The structure will then be completed by placing gabions as shown in the drawings and placing the stone on the upstream and downstream approaches to create the shape as shown in the drawings.

The excavation for these structures will require dewatering as specified in Dewatering, Section 02140.

1.2.5 Ditch Modification

At SRT locations 5, 6, and 15, the shape of the ditches will be modified to provide a more uniform slope of the ditch and to provide more area for storage and facilitate the settling out of sediment from the streamflow. The total estimated volume of soil to be removed is 422 cubic yards. The exposed earth will be sown with grass seed and covered with a soft armor geotextile; the geotextile will then be soil filled, sown with grass seed, and mulched. The estimated amount of soft armor is 18 standard rolls (6.5 feet by 138.5 feet per roll). The placement of soft armor shall be placed in strict accordance with the manufacturer's recommendations or as specified in Geotextiles, Section 02273 using the most stringent guidance.

The excavation for these modifications will require dewatering as specified in Dewatering, Section 02140.

1.2.6 MODIFICATION OF SRT 13 ✓

The modification of SRT 13 will include the effort to remove the existing top layer of 1.5 feet tall gabion baskets and replace them with 1-foot-tall baskets. The stone removed from the baskets may either be reused in the replacement basket or spoiled in the ditch immediately upstream and downstream of the SRT, at the ENGINEER'S discretion.

1.2.7 Transport of Excavated Sediment

Prior to loading the excavated material from the SRT and ditch modifications, the truck and/or container shall be lined with a plastic liner (prefabricated preferred) to prevent spillage and leakage of sediment and water onto the roadways.

1.3 SITE ACCESS

- A. Access to the site shall be limited to the use of Pass Road through the Pass Road gate located on the east boundary of the base.
- B. Access shall be limited to the subcontractor and other personnel involved with the construction activities.
- C. Construction activities shall be limited to the hours 7 a.m. to 5 p.m. unless otherwise approved by ABB-ES.
- D. The subcontractor and associated personnel must have personal identifications, Social Security numbers, and proof of vehicle registration and insurance to obtain access to the base.

1.4 CONTRACT DOCUMENT REVIEW

- A. Before execution of work, review all Drawings and Specifications and immediately report all errors, discrepancies, and omissions to the ABB-ES in writing, with one set of Contract Documents marked in red pencil clearly indicating discrepancies.

- B. Omissions from Drawings and Specifications or errors in details of work that are necessary to carry out intent of Drawings and Specifications, or are customarily performed, shall not relieve CONTRACTOR from performing such omitted or misdescribed details of work; but shall be performed as if fully and correctly set forth and described in Drawings and Specifications, using the most appropriate method, with final approval issued by ABB-ES to alleviate conflicts of scheduling, Drawings, Details, and Specifications.
- C. In case of conflict between the Drawings and Specifications, the most stringent requirement shall govern. CONTRACTOR shall immediately notify ABB-ES of any conflict.
- D. Design Intent:
 - 1. Purpose of Drawings is to graphically depict characteristics and extent of work.
 - 2. Specifications are included to state material type, function, and source of materials.

PART 2 PRODUCTS

Any products and/or materials specified by name shall be considered a standard of quality and may be substituted for with approval from ABB-ES. Approval can be obtained by submitting manufacturer's cut sheets, specifications, etc., which illustrate the substitution to be equal to or better than the material specified.

PART 3 EXECUTION

Not Applicable

--END OF SECTION--

SECTION 01025

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.1 RELATED DOCUMENTS

The provisions of the Contract, including General and Supplementary Conditions and General Requirements (if any), apply to the work specified in this Section.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. Bid Proposal
- B. General Conditions
- C. Supplementary Conditions
- D. Summary of Work: Section 01010

1.3 DESCRIPTION

- A. For unit price items, the CONTRACTOR will be paid for the actual amount of work accepted and for the actual amount of materials in place during the period of construction. After the work is completed and before final payment is made therefore, the ENGINEER will make final measurements to determine the quantities of the various items of work accepted as the basis for final payment.
- B. For lump sum items, the CONTRACTOR will be paid on the basis of actual work accepted until the work item is completed. Upon completion of the item, 100 percent of the lump sum price may be paid, subject to the terms of the General Conditions or Supplementary Conditions.
- C. All units of measurement shall be standard United States convention as applied to the specific items of work by tradition and as interpreted by the ENGINEER.

1.4 SCOPE OF PAYMENT

- A. Payments to the CONTRACTOR will be made for the actual quantities of the contract items performed and accepted in accordance with the Contract Documents. Upon completion of construction, if these actual quantities show either an increase or decrease from the quantities given in the Bid, the contract unit prices will still prevail, except as provided hereinafter.
- B. The CONTRACTOR shall accept in compensation, as herein provided, in full payment for furnishing all materials, labor, tools, equipment, and incidentals necessary to the completed work and for performing all work contemplated and embraced by the Contract; also for all loss or damage arising from the nature of the work, or from the action of the elements, or from any unforeseen difficulties that may be encountered during the prosecution of the work and until its final acceptance by the ENGINEER; and for all risks of every description connected with the prosecution of the

work, except as provided herein; also for all expenses incurred in consequence of the suspension of the work as herein authorized.

- C. No extra payment shall be made to the CONTRACTOR for any delays caused by lack of progress, defective workmanship, or rescheduling of work by other contractors, subcontractors, or equipment and material suppliers.
- D. No additional payment will be allowed because of differences between field dimensions and those shown on the Drawings should work be conducted before notifying ENGINEER of these differences.
- E. Additional costs caused by ill-timed or defective work, or work not conforming to Contract Documents, including costs for additional services of ENGINEER shall be paid for by the party causing the rejected or non-conforming work.
- F. Work done on written instructions by the ENGINEER, other than defective or non-conforming work shall be paid for by ABB-ES.

1.5 PAYMENT FOR INCREASED OR DECREASED QUANTITIES

When alterations in the quantities of work not requiring Change Orders, as herein provided for, are ordered and performed, the CONTRACTOR shall accept payment in full at the contract price for the actual quantities of work done. No allowance will be made for anticipated profits. Increased or decreased work involving Change Orders will be paid for as stipulated in such Change Orders.

1.6 ELIMINATED ITEMS

- A. Should any unit price items contained in the proposal form be found unnecessary for the proper completion of the work contracted, the ENGINEER may eliminate such unit price items from the Contract, and such action shall in no way invalidate the Agreement, and no allowance will be made for items so eliminated in making final payment to the CONTRACTOR.
- B. Should any equipment or material be eliminated under a lump sum item then a Change Order shall be issued as stipulated in the General Conditions.

1.7 FINAL PAYMENT

- A. The CONTRACTOR will make, as soon as practicable after the entire completion of the project, a final quantity invoice of the amount of the work performed and the value of such work and the ENGINEER will then pay the sum found to be due, after deducting therefrom all previous payments. All amounts to be paid under the provisions of the Contract may be held by the ENGINEER for a period of 60 days after the completion of the final quantity invoice, or until such time as the CONTRACTOR submits satisfactory evidence that all bills for labor and materials used under this Contract have been paid and all required documents have been submitted to the ENGINEER as required by the General Conditions.
- B. CONTRACTOR shall provide notarized releases of lien from all material suppliers and subcontractors with the final invoice. The

final invoice shall not be paid prior to receipt of such releases of lien.

1.8 INCIDENTAL WORK

A. Incidental work items for which separate payment is not measured include, but are not limited to, the following items:

1. Clearing, grubbing and stripping.
2. Dust control.
3. Dewatering.
4. Cleanup.
5. Signs.
6. Restoration of property.
7. Cooperation with other Contractors and others.
8. Utility crossings and relocations, unless otherwise paid for.
9. Minor items - such as replacement of fences, guard rails, rock wall, etc.
10. Temporary facilities.
11. Project record drawings.

1.9 DESCRIPTION OF PAY ITEMS

- A. The pay items listed in Section 1.10 describe the measurement of and payment for the work to be performed under the respective items listed in the Bid.
- B. Each unit or lump sum price stated in the Bid shall constitute full compensation, as herein specified, for each item of the work completed.

1.10 PAY ITEMS

Item No. 1 - Installation of SRTs, Ditch Modifications, Installation of SHA

- A. Method of Measurement: Lump sum for purchased items, including labor.

- B. Payment: Payment shall be made at the contract unit price, which shall be full compensation for furnishing all labor, equipment, and tools required for completion of (1) SRT installation and modification, (2) ditch modification, (3) SHA installation, and for all other work and expense incidental thereto for which payment is not provided under other items.

--END OF SECTION--

SECTION 01041

PROJECT COORDINATION

PART 1 GENERAL

1.1 DESCRIPTION

- A. Coordinate all work under this Contract with the ENGINEER in regard to schedules of SRT construction activities to include excavation and traffic control, as required.
- B. Coordinate with the ENGINEER prior to start of work on the subject sites.
- C. Coordinate with the ENGINEER for temporary storage of materials and supplies and for timely delivery to the job site.
- D. Assist the ENGINEER as required in the review of construction, testing of materials, traffic control, and construction survey.
- E. Maintain up-to-date progress records and record drawings.
- F. Maintain the project site in a neat and safe condition.
- G. Coordinate with the ENGINEER activities involving all utilities, and notify the ENGINEER when excavation is scheduled in areas that may affect existing utilities. The utilities requiring coordination are water/sewer, gas, electrical, phone, and cable.
- H. Coordinate the work of subcontractors, equipment, and material suppliers.
- I. Prior to commencing work on site, coordinate with the ENGINEER and the Naval Construction Battalion Center (NCBC) base for access and procedures to be followed.

1.2 SURVEY

- A. ABB-ES (if required) will provide periodic benchmarks for construction activities.
- B. CONTRACTOR will locate all utilities within the construction area.

--END OF SECTION--

SECTION 01070

ABBREVIATIONS

PART 1 GENERAL

1.1 DESCRIPTION

A. Whenever an abbreviation is used, it shall be understood to mean the full name of the respective organization or term as listed below.

1.2 ABBREVIATIONS

Whenever the following abbreviations are used in the Contract, their meanings shall be as follows:

ac	acre
ABB-ES	ABB Environmental Services, Inc.
AGC	Associated General Contractors of America
ANSI	American National Standards Institute
AOS	apparent opening size
ASCE	American Society of Civil Engineers
ASTM	American Society for Testing and Materials
bgs	below ground surface
BOCA	Building Officials and Code Administrators - "Basic Building Code"
CFR	Code of Federal Regulations
cfs	cubic feet per second
cm/sec	centimeter per second
°F	degrees Fahrenheit
fpm	feet per minute
fps	feet per second
G/sqm	grams per square meter
gpm	gallons per minute
gpm/ft ²	gallons per minute per square foot
HDPE	high density polyethylene
in	inch
kN/m	kiloNewton per meter
kPa	kiloPascal
ℓ/min/m ²	liter per minute per square meter
lbs	pounds
lb/ft	pound per foot
lbs/in	pounds per inch
lf	linear feet
max	maximum
mm	millimeter
mph	miles per hour
NCBC	Naval Construction Battalion Center
NEC	National Electrical Code
OD	outside diameter
OSHA	Occupational Safety and Health Administration
oz/sy	ounce per square yard
PLS	pure live seed
psf	pounds per square foot
psi	pounds per square inch

psig	pounds per square inch gauge
PVC	polyvinyl chloride
scfm	standard cubic feet per minute
sec	second
SCH	Schedule
SHA	sediment handling area
SRT	sediment recovery trap
TDH	total discharge head
USDA	U.S. Department of Agriculture
UV	ultraviolet

--END OF SECTION--

SECTION 01091

REFERENCE CODES AND STANDARDS

PART 1 GENERAL

1.1 RELATED SECTIONS

As referenced throughout the applicable sections of this specification.

1.2 DESCRIPTION

A. Comply with all local, State, and national codes applicable to the proposed construction including, but not limited to, the following:

1. OSHA - National Occupational Safety and Health Act.
2. BOCA - Building Officials and Code Administrators - "Basic Building Code."
3. AGC - Associated General Contractors of America - "Manual of Accident Prevention in Construction."
4. NFPA - National Fire Protection Association.
5. Southern Building Code Congress International.

B. Applicable standards, tests, and recommended methods from trade, industry, and professional organizations specified in technical specifications of this Contract determine quality and methods of design, fabrication, and testing.

1.3 EDITION DATES

Edition dates of standards and codes specified in this Contract shall be those that are current at the time of execution of work.

--END OF SECTION--

SECTION 01125

SPECIAL PROJECT PROCEDURES

PART 1 GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

1.2 DESCRIPTION

- A. Special project procedures are required of the CONTRACTOR to conduct the work in a professional manner and provide a safe environment. These include the following procedures:
1. Health and Safety
 2. Spill Prevention and Control
- B. Provide controls and measures for the prevention of water and air pollution and the protection of natural resources during the execution of work included in this Contract. Environmental protection shall include, but not be limited to, measures for erosion and sediment control, spill prevention and control, and dust control.
- C. Control operations to provide environmental protection in conformance with all local, State, and Federal permits, licenses, and regulations.

1.3 SUBMITTALS

- A. Spill Control and Contingency Plan: Prepare a Spill Control and Contingency Plan that includes provisions for cleanup of any spills that may occur during construction activities and include provision for disposal of material affected by the spill.
- B. Health and Safety Plan: The Health and Safety Plan shall include procedures for onsite care in the event of an accident, location and directions to the nearest hospital, and local emergency response contact information.

1.4 REFERENCES

Occupational Safety and Health Administration (OSHA) Standards. Title 29, Code of Federal Regulations (CFR), Part 1926.

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

Furnish all materials, equipment, and appurtenances required for safety and spill prevention, including first aid kits, absorbent booms, and storage containers.

PART 3 EXECUTION

3.1 SPILL PREVENTION AND CONTROL

Keep adequate supply of absorbent materials onsite to immediately cleanup any leaks or spills that may occur. Immediately notify ABB-ES of hazardous material spills.

3.2 DUST CONTROL

At a minimum, control dust as necessary to protect worker and public health and safety. The construction of the SHA is an area that may require dust control and respirator wear for the protection against ingestion/inhalation of contaminants containing dust.

--END OF SECTION--

SECTION 01210

PRECONSTRUCTION MEETING

PART 1 GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Summary of Work: Section 01010
- B. Measurement and Payment: Section 01025

1.2 DESCRIPTION

Prior to commencement of construction activities, the CONTRACTOR (Superintendent or Project Manager) shall attend a preconstruction meeting to address any questions concerning the work to be accomplished, discuss task schedules, safety, and general requirements.

--END OF SECTION--

SECTION 01220

PROGRESS MEETINGS

PART 1 GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Summary of Work: Section 01010
- B. Project Coordination: Section 01041

1.2 DESCRIPTION OF MEETING

CONTRACTOR and other pertinent representatives are required to attend a progress meeting held by ABB-ES every other day, beginning with the first day of construction activities, to discuss construction task progress, schedule, and safety issues and address any questions.

--END OF SECTION--

SECTION 01310

CONSTRUCTION SCHEDULES

PART 1 GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Summary of Work: Section 01010
- B. Project Coordination: Section 01041
- C. Project Meetings: Section 01220
- D. Submittals: Section 01340

1.2 DESCRIPTION

- A. Provide projected construction schedules for entire work, revise daily or as needed.
- B. Form of Schedules:
 - 1. Prepare in form of horizontal bar chart or other format, subject to ENGINEER'S review.
 - a. Provide separate horizontal bar column for each major activity.
 - b. Order: Chronological order, beginning of each item of work.
 - c. Horizontal time scale: Identify first work day of each week.
 - d. Scale and spacing: To allow space for updating.
 - 2. Minimum sheet size: 8-1/2" x 11".

1.3 SUBMITTALS

Submit initial schedules within [7 days after date of Notice to Proceed.]

- A. ENGINEER will review schedules and return review copy within 2 days after receipt.
- B. If required, resubmit within 2 days after return of review copy.

--END OF SECTION--

SECTION 01340

SUBMITTALS

PART 1 GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

General Conditions.

1.2 DESCRIPTION

A. Submit to ENGINEER:

1. Manufacturer's Certificates
2. Project Data
3. Samples required by the Contract Documents.

1.3 PROJECT DATA

A. Manufacturer's Standard Schematic Drawings:

1. Modify Drawings to delete information that is not applicable to project.
2. Supplement standard information to provide additional information applicable to project.

B. Manufacturer's catalog sheets, brochures, diagrams, schedules, performance charts, illustrations, and other standard descriptive data.

1. Clearly mark each copy to identify all pertinent materials, products or models, or information.
2. Show dimensions and clearances required.
3. Certify performance characteristics and capacities.

1.4 SAMPLES

A. Physical examples to illustrate materials, equipment, or workmanship, and to establish standards by which completed work is judged.

1. Office Samples: Of sufficient size and quantity to clearly illustrate:
 - a. Functional characteristics of product or material, with integrally related parts and attachment devices.
 - b. Full range of color samples.

- c. After review, samples may be used in construction of project.

1.5 CONTRACTOR RESPONSIBILITIES

- A. Review Project Data and Samples prior to submission.
- B. Samples:
 1. Field measurements.
 2. Field construction criteria.
 3. Catalog numbers and similar data.
- C. Coordinate each submittal with requirements of work and of Contract Documents.
- D. CONTRACTOR's responsibility for errors and omissions in submittals is not relieved by ABB-ES review of submittals.
- E. CONTRACTOR's responsibility for deviations in submittals from requirements of Contract Documents is not relieved by ABB-ES review of submittals, unless ABB-ES gives written acceptance of specific deviations.
- F. Notify ABB-ES, in writing at time of submission, of deviations in submittals from requirements of Contract Documents.
- G. Begin work that requires submittals after return of submittals with ABB-ES approval.

1.6 SUBMITTAL REQUIREMENTS

- A. The CONTRACTOR shall schedule submittals to ABB-ES at least 2 days before the dates that the reviewed submittals will be needed by the CONTRACTOR, except where longer lead time is specified by ABB-ES.
- B. Submit the number of Samples specified in each of the Specification Sections.
- C. Each submittal shall be attached to a transmittal letter, which shall contain the following information:
 1. Submittal number (in sequence, beginning with 1).
 2. Date.
 3. Project title and number.
 4. CONTRACTOR's name and address.
 5. The number of each Project Data and Sample submitted.
 6. Notification of deviations from Contract Documents.
 7. Return date required by CONTRACTOR.
 8. Other pertinent data.
- D. Submittals shall include the following information:
 1. Date and revision dates
 2. Project title and number

3. The names of
 - a. ENGINEER
 - b. CONTRACTOR
 - c. Subcontractor
 - d. Supplier
 - e. Manufacturer
 - f. Separate detailer when pertinent
 4. Identification of product or material
 5. Relation to adjacent structure or materials
 6. Field dimensions, clearly identified as such
 7. Specification section number
 8. Applicable standards, such as ASTM number or Federal Specification.
 9. A labeled approval space for approval
 10. Identification of deviations from Contract Documents
 11. Manufacturer's Certificate of Compliance for manufactured or fabricated materials (See attached form)
- E. Submittals shall be hand delivered to the ABB-ES representative onsite in a sealed envelope addressed to Louis Barrentine and Rick Ryan.

1.7 ABB-ES DUTIES

- A. Review submittals with reasonable promptness.
- B. Review the following information
 1. Design concept of project.
 2. Information given in Contract Documents.
- C. Review of separate item does not constitute review of an assembly in which item functions.
- D. Return submittals to CONTRACTOR for distribution.

(Sample)
MANUFACTURER'S LETTERHEAD
CERTIFICATE OF
COMPLIANCE
(Manufactured or Fabricated Material)

Date _____

WE HEREBY CERTIFY that _____
(Description, Kind of Material, Model No., etc.)

Furnished to _____
(Name of Contractor) (Prime or Sub.)

For Use on _____
(Project Name)

No. _____ Owner _____

In the Amount of _____
(Quantity Represented)

Identified by _____
(Label, Marking, Seal No., Consignment, or Waybill No.)

Shipped on _____ 19____, Delivered on _____ 19____,

Shipped via _____
(Method of Shipment, Car No., Truck No.)

MEETS THE REQUIREMENTS OF THE PERTINENT PROJECT PLANS, SPECIAL CONDITIONS, AND SPECIFICATIONS OF THE SUBJECT PROJECT IN ALL RESPECTS. PROCESSING, PRODUCT TESTING, AND INSPECTION CONTROL OF RAW MATERIALS ARE IN CONFORMANCE WITH ALL APPLICABLE SPECIFICATIONS, DRAWINGS, AND/OR STANDARDS OF ALL ARTICLES FURNISHED.

All records and documents pertinent to this certificate and not submitted herewith will be maintained available by the undersigned for a period of not less than three years from the date of this certificate.

(Manufacturer)

Signed by _____

Title _____

--END OF SECTION--

SECTION 01510
TEMPORARY FACILITIES

PART 1 GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

1.2 DESCRIPTION

A. Work Included

1. Provide such temporary enclosures and facilities as the work may warrant.
2. Facilities include, but are not limited to
 - CONTRACTOR'S storage facilities;
 - Shelter for crews, including sanitary facilities conforming to local codes and OSHA requirements;
 - Fire protection;
 - Safety equipment;
 - Construction warning, protection, and control devices for maintenance and safety of vehicular and pedestrian traffic.
3. Completely remove all temporary equipment and materials upon completion of the work and repair all damage caused by the installation of temporary utilities.

B. Other Requirements:

1. Obtain permits as required by local governmental authorities.
2. Comply with all local, State, and Federal codes, laws, and regulations.

PART 2 PRODUCTS

2.1 MATERIALS

- A. CONTRACTOR'S facilities shall be of size and content for adequate administration of the contract, storage of materials required for installation, and provision for personnel shelter.
- B. Equipment required for personal safety of workers shall be furnished in full compliance with specific safety requirements of local, State, and Federal agencies, including OSHA.

- C. Signs, barricades, warning lights, and all necessary equipment for the protection of the traveling public shall be furnished and maintained as specified in the Manual on Uniform Traffic Control Devices (Part VI).

PART 3 EXECUTION

3.1 PERFORMANCE

- A. Storage Trailers: Sited in approved locations and properly set up for all anticipated weather conditions.
- B. Sanitary Conveniences:
 - 1. Provide and maintain in sufficient numbers, for the use of all persons employed on the work, and properly screen from public observation, at suitable locations, in accordance with State and local ordinances.
 - 2. Rigorously enforce the use of the approved sanitary facilities provided.
 - 3. When no longer required, remove from the site and dispose of the contents in a satisfactory manner.
- C. Provide sufficient drinking water for all employees from approved sources.
- D. Obey and enforce other local sanitary regulations and orders, taking such precautions against infectious diseases as may be deemed necessary.
- E. Conduct operations in a manner which, with the use of proper equipment, provides maximum safety for workers and the traveling public.

--END OF SECTION--

SECTION 01567
POLLUTION CONTROL

PART 1 GENERAL

1.1 RELATED DOCUMENTS

The general provisions of the Contract, including General and Supplementary Conditions and General Requirements (if any), apply to the work specified in this Section.

1.2 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Cleaning: Section 01710
- B. Dewatering: Section 02140
- C. Earthwork, Excavation, Backfill, and Compaction: Section 02200
- D. Erosion Control: Section 02271

1.3 DESCRIPTION

- A. Provide water controls and measures for prevention of water pollution and control of turbidity in the stream (ditch) due to construction required by these Contract Documents.
- B. Control operations so that no turbidity due to operations exists in concentrations that will impair natural or other existing uses upstream and downstream from the construction area in conformance with local, State, and Federal permits, licenses, and regulations.

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

Furnish all materials, equipment, appurtenances, and facilities required for the furnishing, installing, and removing of all water pollution preventive measures and structures and all turbidity control structures and facilities.

PART 3 EXECUTION

3.1 PREVENTION OF WATER POLLUTION

- A. Perform construction activities using methods that will prevent entrance or accidental spillage of solid matter, contaminants, debris, and other objectionable pollutants and wastes into streams, flowing or dry watercourses, and underground water sources. Such pollutants and wastes include, but are not limited to, refuse, garbage, cement, concrete, grout, sewage effluent, industrial waste, mercury, oil and other petroleum products,

aggregate processing tailings, mineral salts, excess earth materials, and thermal pollution.

- B. Dispose of excess earth materials in accordance with the applicable Sections of these Specifications under Division 2.
- C. Dispose of pollutants, sanitary wastes, and other wastes in accordance with State and local regulations.
- D. Do not drain oils, petroleum waste products, or chemicals randomly onto the soil but confine them in sealed containers or sealed sumps and remove them to disposal sites approved by the State.

3.2 CONTROL OF TURBIDITY

- A. Turbidity increases above the natural turbidities in the stream that are caused by required construction work shall be limited in accordance with the provisions of the State of Mississippi and U.S. Army Corps of Engineers permits.
- B. Methods of dewatering, excavating, operating in the excavation areas, stockpiling earth and rock materials, and handling, transporting, and disposing of wet earth materials shall include preventive measures to control silting and erosion and to intercept and settle any runoff of muddy waters.
- C. Prevent waste waters from washing of concrete trucks and equipment or similar construction operations from entering flowing or dry watercourses without the use of special turbidity control methods.

--END OF SECTION--

SECTION 01570

MAINTENANCE OF TRAFFIC

PART 1 GENERAL

1.1 DESCRIPTION

- A. All work will be located onbase in light traffic areas.
- B. Schedule work in such a manner that it shall be carried on to provide safe passage at all times for public traffic and with a minimum of obstruction to traffic.
- C. Maintain at least one-way traffic over the area during the working day, and provide all of the necessary warnings, signs, flags, and flag holders to accomplish this.
- D. Leave the area in a satisfactory state at the end of each day so as to provide two-way traffic during the night and over the weekend.
- E. When it is necessary to remove street directory or regulatory signs during the course of construction, reset and maintain the signs during construction and permanently reset the signs at designated locations prior to completion of the Contract. The cost of such maintenance and relocation of signs shall be incidental to other signs of the Contract.
- F. All traffic controls shall be in accordance with Title 23 CFR 1204.4 U.S. Department of Transportation, Federal Highway Administration, Part 6 "Construction and Maintenance Activities," latest edition available from Superintendent of Documents, U.S. Government Printing Office, Washington D.C. 20402 and coordinated with the proper local authorities.

--END OF SECTION--

SECTION 01600
MATERIAL CONTROL

PART 1 GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

1.2 DESCRIPTION

A. This Section covers packing and shipping, receiving, unloading, examining, and storage of materials and equipment to be installed in this Project. These items shall include, but not be limited to, the following:

1. Geotextiles used for turf reinforcement;
2. Geotextiles used for soil stability;
3. Geotextiles used for soil separation/pollution control;
4. Gabion stone;
5. Gabion baskets;
6. Drainage pipe;
7. Grass seed; and
8. Mulch for grass seed cover.

B. Package, ship, receive, inspect, handle, and store materials and equipment in a manner that will protect such items from damage or deterioration.

1.3 PACKING AND SHIPPING

A. Suppliers' preparation of material shall be suitable for long-term storage in the climate at the site and be such that preventative maintenance is not required during storage.

B. The outermost covering shall be clearly marked with the complete Supplier identification, including weight.

C. Boxes and crates shall be equipped with skids.

D. Indicate the weight, lifting points, and/or center of gravity on the crate, skid, or package and utilize those indications for all handling procedures.

E. Obtain from the Supplier any instructions that clearly describe the methods by which material is properly installed.

1.4 RECEIPT AND UNLOADING

A. Handle material and equipment in accordance with these specifications and any manufacturer's handling precautions that may be applicable to specific materials and equipment.

B. Supply and use all specialized equipment, such as nylon slings or special hoisting equipment, where appropriate or required.

- C. Remove the materials from the carrier and place them at the point of installation or in storage areas for later movement to the point of installation, as applicable. Receive and store materials and equipment as described in Paragraph 1.05, Acceptance at Site and Paragraph 1.06, Storage and Protection of this Section.

1.5 ACCEPTANCE AT SITE

A. General:

1. Examine all materials and equipment upon arrival.
2. Damaged or nonconforming items shall be removed immediately to a separate storage area for expeditious removal from the site.

1.6 STORAGE AND PROTECTION

A. General:

1. Provide open and closed storage areas for materials for protection from vandalism and weather damage.
2. Store materials in accordance with these specifications and any manufacturer's instructions for additional storing precautions that may be applicable to specific materials and equipment.
3. Store materials on blocking or pallets a sufficient distance above the ground or floor to protect from mud, standing or flowing water, or similar hazards. Use waterproof covers on storage outdoors.
4. Provide indoor storage for material that normally requires such protection.

--END OF SECTION--

SECTION 01700

PROJECT CLOSEOUT

PART 1 GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Time of Final Payment: General Conditions.
- B. Completion; Waiver of Claims: General Conditions.
- C. Liquidated Damages: General Conditions.
- D. Project Coordination: Section 01041.
- E. Cleaning: Section 01710.

1.2 FINAL REVIEW

- A. CONTRACTOR shall submit written certification that
 - 1. Work has been completed in accordance with Contract Documents.
 - 2. Project is completed, and ready for final review.
- B. ABB-ES will make final review and recommendation to Owner within 5 days after receipt of certification.
- C. Should ABB-ES consider that work is complete in accordance with requirements of Contract Documents, ABB-ES will request CONTRACTOR to make project closeout submittals.
- D. Should ABB-ES consider that work is not complete
 - 1. ABB-ES will notify CONTRACTOR, in writing, stating reasons.
 - 2. CONTRACTOR shall take immediate steps to remedy the stated deficiencies, and send second written notice to ABB-ES certifying that work is complete.
 - 3. ABB-ES will again review the work.

1.3 FINAL APPLICATION FOR PAYMENT

CONTRACTOR shall submit final application in accordance with requirements of General and Supplementary Conditions.

1.4 FINAL CERTIFICATE FOR PAYMENT

- A. ABB-ES will issue final certificate in accordance with provisions of General Conditions.

- B. Should final completion be materially delayed through no fault of CONTRACTOR, ABB-ES may recommended further payment, in accordance with provisions of General Conditions.

--END OF SECTION--

SECTION 01710

CLEANING

PART 1 GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE:

- A. Summary of Work: Section 01010.
- B. Project Coordination: Section 01041.
- C. Project Closeout: Section 01700.

1.2 DESCRIPTION

- A. Maintain premises and public properties free from accumulations of waste, debris, and rubbish, caused by operations.
- B. At completion of work, remove waste materials, rubbish, tools, equipment, machinery, and surplus materials, and clean all sight-exposed surfaces; leave project clean and ready for occupancy.

1.3 SAFETY REQUIREMENTS

- A. Standards: Maintain project in accordance with following safety and insurance standards:
 - 1. Manual of Accident Prevention in Construction - AGC.
- B. Hazards Control:
 - 1. Store volatile wastes in covered metal containers and remove from premises daily.
 - 2. Prevent accumulation of wastes that create hazardous conditions.
 - 3. Provide adequate ventilation during use of volatile or noxious substances.
- C. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
 - 1. Do not burn or bury rubbish or waste materials on project site unless permits are obtained from agencies having jurisdiction.
 - 2. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains or onto the ground.
 - 3. Do not dispose of wastes into streams or waterways.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Use only cleaning materials recommended by manufacturer of surface to be cleaned.
- B. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

PART 3 EXECUTION

3.1 DURING CONSTRUCTION

- A. Execute cleaning to ensure that grounds and public properties are maintained free from accumulations of waste materials and rubbish.
- B. Daily clean site and dispose of waste materials, debris, and rubbish in a location that is coordinated with the ENGINEER.
- C. Provide onsite containers for collection of waste materials, debris, and rubbish.

3.2 FINAL CLEANING

- A. In preparation for substantial completion, conduct final inspection of sight-exposed areas and of concealed areas.
- B. Repair, patch, and touchup marred surfaces to specified finish, to match adjacent surfaces.
- C. Broom clean paved surfaces; rake clean other surfaces of grounds.
- D. Maintain cleaning until project is substantially complete.

--END OF SECTION--

SECTION 02016

EXISTING UTILITIES AND UNDERGROUND STRUCTURES

PART 1 GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE:

- A. Earthwork, Excavation, Backfill, and Compaction: Section 02200.
- B. Project Coordination: Section 01041

1.2 DESCRIPTION

- A. Coordinate with the ENGINEER prior to excavation in any area whether utilities shown on the Drawings or not.
- B. The CONTRACTOR shall be responsible for any and all damage to any existing utilities, caused by his efforts.
- C. Should any utility damage occur, contact the ENGINEER as soon as any damage is discovered.
- D. The utility shall make the determination as to who makes the necessary repairs.
- E. In areas where existing underground structures are shown or suspected, carefully uncover such structures to such extent as to enable the ENGINEER to determine what adjustments, if any, need to be made to accommodate the presence or removal of such structures.
- F. CONTRACTOR shall make all efforts necessary to immediately repair any and all damage caused by his/her efforts prior to continuing regular contract work.

--END OF SECTION--

SECTION 02140

DEWATERING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

The general provisions of the Contract, including General and Supplementary Conditions and General Requirements (if any), apply to the work specified in this Section.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. Excavation, Backfill, and Compaction: Section 02221
- B. Erosion Control: Section 02271

1.3 DESCRIPTION OF WORK

Work Included: Furnish, operate, and maintain dewatering equipment for the control, collection, and disposal of surface water entering or existing in ditches and excavations.

1.4 SUBMITTALS

Submit the dewatering methods to be utilized to the ENGINEER for review.

PART 2 PRODUCTS

2.1 GENERAL

- A. Provide, operate, and maintain a dewatering system(s) to remove all water from excavations and ditches using pumps, drains, wellpoints, piping, pipe plugs, and any other facilities necessary to keep the excavations and ditches free of water. Have spare units available for immediate use in the event of equipment breakdowns.
- B. The work involved will require the dewatering for the SRTs and ditch modifications in ditches that maintain constant flow and/or ponding. The CONTRACTOR may divert flow around or out of areas of excavation by damming and pumping the water around the area of construction. In order to minimize the disturbance of area soils due to excavation, the CONTRACTOR shall not dig temporary channels but utilize temporary sheetpiling, pipe, and/or hose to reroute flow around the work area.
- C. Rerouted flow shall be managed so as to prevent the migration of silt generated from the dewatering activities by utilizing silt bags or silt fence to contain the sediment. This material shall be removed and taken to the SHA.

PART 3 EXECUTION

3.1 PERFORMANCE

A. General:

1. Keep excavations and ditches dry until the SRTs or soft armor geotextile has been placed to such an extent that they will not be damaged due to the occurrence of a rainfall event.
2. Perform dewatering work when necessary at no additional cost to ABB-ES.

B. Disposal of Water:

1. Dispose of water pumped or drained from the construction site in a suitable manner to avoid public nuisance, injury to public health, damage to public and private property, and damage to the work completed or in progress.
2. Do not allow surface water to enter piped utilities.

C. Damage:

1. All damage resulting from the dewatering operations, or the failure of the CONTRACTOR to maintain the work in a suitable dry condition shall be repaired by the CONTRACTOR, at no additional cost to ABB-ES.
2. Take all necessary precautions to protect new work from flooding during storms or from other causes.
3. Thoroughly brace or otherwise protect all pipelines and structures that are not stable, against floatation, when necessary.

3.2 DEWATERING THE CONSTRUCTION SITE

- A. Dewater the construction site and keep free of standing water or excessively muddy conditions as needed for proper execution of the construction work.
- B. Furnish, install, operate, and maintain all drains, sumps, pumps, and other equipment needed to perform dewatering as specified.
- C. Pipe water pumped from excavations to points discharging into ditches on the downgradient side of the area of construction such that silt shall not damage the existing ditch or so that adjacent properties are not affected by off-base water flow.

3.3 REMOVAL OF TEMPORARY WORKS

After the temporary works have served their purposes, remove them or level and grade them to the extent required to present a sightly appearance and to prevent any obstruction of the flow of water or any

other interference with the operation of or access to the permanent works.

--END OF SECTION--

SECTION 02200

EARTHWORK, EXCAVATION, BACKFILL, AND COMPACTION

PART 1 GENERAL

1.1 RELATED DOCUMENTS

The general provisions of the Contract, including General and Supplementary Conditions and General Requirements (if any) apply to the work specified in this Section.

1.2 DESCRIPTION

This work shall consist of excavation associated with (1) SRT installation, (2) ditch modifications, and (3) SHA installation. Work also includes disposal of all material encountered and necessary for construction of the project, excavation, backfill, and compaction activities.

1.3 JOB CONDITIONS

A. Existing Utilities: Locate existing underground utilities in the areas of work. If utilities are to remain in place, provide adequate means of protection during earthwork operations. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult the Utility Owner immediately for directions. Cooperate with ABB-ES and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.

Do not interrupt existing utilities serving facilities occupied and used by NCBC Gulfport or others, except when permitted in writing by ABB-ES and then only after acceptable temporary utility services have been provided.

B. Protection of Persons and Property: Barricade open excavations occurring as part of this work and post with warning lights. Operate warning lights as recommended by authorities having jurisdiction. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

PART 2 PRODUCTS

2.1 SOIL MATERIALS

- A. Drainage Pipe Bedding Material: Shall be 2-inch-diameter limestone aggregate free of organic matter, silt or clay lumps, and deleterious material.
- B. SRT Foundation Material: Shall be 2-inch-diameter limestone aggregate free of organic matter, silt or clay lumps, and deleterious material.

2.2 ONSITE MATERIAL

- A. Material on the site is the property of the Owner and shall be incorporated in the work, if possible. Any sample testing needed for this classification will be performed by an approved laboratory at ABB-ES expense.
- B. Material not incorporated in the work either because it is unsuitable or the quantity exceeds the project's needs will be hauled away and disposed of at the CONTRACTOR's expense.

PART 3 EXECUTION

3.1 INSPECTION

Examine the areas and conditions under which excavating, filling, and grading are to be performed and notify ABB-ES, in writing, of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in an acceptable manner.

3.2 EXCAVATION

Excavation consists of removal and disposal, as directed by ABB-ES, of material encountered when establishing required grade elevations. All excavation shall be unclassified and shall include any and all material encountered. No extra compensation shall be allowed for excavation work not covered by the Bid proposal.

3.3 STABILITY OF EXCAVATIONS

Slope sides of excavations to comply with local codes and ordinances having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated. Maintain sides and slopes of excavations in a safe condition until completion of backfilling.

3.4 MATERIAL STORAGE

Stockpile satisfactory excavated materials where directed, until required for backfill or fill. Place, grade, and shape stockpiles for proper drainage. Locate and retain soil materials away from edge of excavations. Dispose of excess soil material and waste materials as herein specified.

3.5 COMPACTION

Foundation stone shall be compacted using mechanical equipment, to the satisfaction of the ENGINEER.

3.6 BACKFILL AND FILL

- A. General: Place acceptable soil material in layers to required subgrade elevations, for each area classification shown on the drawings.

- B. Backfill excavations as promptly as work permits, but not until completion of the following:
 - 1. Acceptance by ABB-ES of construction below finish grade.
 - 2. Removal of shoring and bracing, and backfilling of voids with satisfactory materials. Temporary sheet piling driven below bottom of structures shall be removed in a manner to prevent settlement of the structure or utilities, or cut off and left in place, if required.
 - 3. Removal of trash and debris.
- C. Ground Surface Preparation: Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Conduct activities per the Drawings and Specifications.
- D. Placement and Compaction:
 - 1. The placement of stone for the SHA drainage pipe and for the SRT foundations shall occur in two uniform 6-inch lifts so as not to damage the geotextile located underneath. Stone shall not be dropped from a height greater than 1 foot.

3.7 MAINTENANCE

- A. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.

Repair and reestablish grades in settled, eroded, and rutted areas to specified tolerances.
- B. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape, and compact to required density prior to further construction.

3.8 DISPOSAL OF EXCESS AND WASTE MATERIALS

Remove waste materials determined by ABB-ES, including excess and unacceptable excavated material, trash, and debris, and dispose of it properly according to this specification.

--END OF SECTION--

SECTION 02271

EROSION CONTROL

PART 1 GENERAL

1.1 RELATED DOCUMENTS

The general provisions of the Contract, including General and Supplementary Conditions and General Requirements (if any), apply to the work specified in this Section.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. Earthwork, Excavation, Backfill, and Compaction: Section 02200
- B. Dewatering: Section 02140

1.3 DESCRIPTION

- A. Work Included: To provide and install all materials, equipment, and labor necessary for the removal of surface water and, as required, to place silt and erosion control structures as specified herein.
- B. Permanent Control: Furnish and place turf reinforcement geotextile (soft armor) on surfaces prepared and seeded under other items, at locations shown and/or specified in this document.

1.4 SEDIMENT CONTROL GUIDELINES

Mississippi Department of Environmental Quality, Mississippi Soil and Water Conservation Commission, and USDA Soil Conservation Service "Planning and Design Manual for the Control of Erosion, Sediment and Stormwater," first edition, April 1994.

1.5 REVIEW AND INSPECTION OF SEDIMENTATION CONTROL MEASURES

All construction under this project shall be subject to review and inspection by the appropriate State and Federal agencies responsible for ensuring the adequacy of sedimentation control measures.

1.6 SUBMITTALS

The CONTRACTOR shall furnish to the ABB-ES representative, in writing, his/her plan for controlling erosion and siltation before beginning the construction work. Said plan shall also include the methods to be utilized for protecting and stabilizing steep slopes that will be affected by the construction work. Acceptance of this plan will not relieve the CONTRACTOR of responsibility for completing the work as specified.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Mulch:
 - 1. Late cut, matured, and cured hay.
 - 2. When air-dried in the loose state, the contents of a representative bale shall lose not more than 15 percent of the resulting air-dry weight of the bale.
 - 3. Free from primary noxious weed seeds and rough or woody materials.
- B. Matting for Erosion Control/Turf Reinforcement:
 - 1. Synthetic Industries Land Lok TRM 1060 or approved equal.
- C. Staples: No. 11 (or heavier) plain iron wire, made from lengths of at least 12 inches.
- D. Seed for Erosion Control:
 - 1. For Temporary Control: Annual or perennial ryegrass as specified.
- E. Hay Bales:
 - 1. Consist of rectangular-shaped bales of hay or straw weighing at least 40 pounds per bale.
 - 2. Free from primary noxious weed seeds and rough or woody materials.
- F. Siltation Fence: Synthetic Industries 914SC silt fence or approved equal.

PART 3 EXECUTION

3.1 PERFORMANCE

- A. Diverting Surface Water:
 - 1. Build, maintain, and operate all temporary diversion and protection works needed to divert stream flow and other surface water through or around the construction site and away from the construction work while construction is in progress.
 - 2. Unless otherwise specified, ditch diversion must discharge into the same drainageway in which its headworks are located.

B. Erosion Control Provisions:

1. Prior to removal of all sediment control devices, remove all retained silt or other materials and transport to the SHA at no additional cost to the Owner.

C. Mulch:

1. Undertake immediately after each area has been properly prepared.
2. When seed for erosion control is sown prior to placing the mulch, place on the seeded areas within 48 hours after seeding.
3. Apply hay that has been thoroughly fluffed at approximately, but not to exceed, 3 tons per acre unless ordered otherwise.
4. Blowing chopped mulch will be permitted when authorized.
5. Authorization will be given when it can be determined that the mulch fibers will be of such length and applied in such a manner that there will be a minimum amount of matting that would retard the growth of plants.
6. Hay mulch should cover the ground enough to shade it, but the mulch should not be so thick that a person cannot see ground through the mulch.
7. Remove matted mulch or bunches.
8. Dispose of all baling wire or rope outside the limits of the project in approved areas.

D. Turf Reinforcement Geotextile:

1. Preparation:

a. Surfaces of Ditches and Slopes:

- (1) Conform to grades and cross sections shown on the Drawings.
- (2) Finish to a smooth and even condition with all debris, roots, stones, and lumps raked out and removed.
- (3) Loosen soil surface to permit bedding of the matting.
- (4) Unless otherwise directed, apply seed prior to placement.

2. Turf Reinforcement:

- a. Place strictly in accordance with manufacturer's specifications.

- b. Staple spacing shall be five for every square yard so as to create an "X" pattern in a given square yard.

E. Seed for Erosion Control:

- 1. Temporary Seeding: Seed with ryegrass sown at the rate of approximately 1 pound per 1,000 square feet, on the pure live seed basis.

F. Siltation Fence:

- 1. Install per manufacturer's requirements and in locations as dictated from construction and as directed by the ENGINEER.

3.2 MAINTENANCE

- A. If any staples become loosened or raised, or if any matting becomes loose, torn, or undermined, make satisfactory repairs immediately.
- B. Maintain areas mulched or matted, with no extra compensation, until acceptance of the work.

3.3 HAY BALES FOR EROSION CONTROL

- A. Place as ordered to provide for temporary control of erosion or pollution or both.
- B. Stake with the required stakes.
- C. Upon acceptance of the Contract, the bales shall be left in place unless released to the CONTRACTOR.

3.4 REMOVAL OF TEMPORARY WORKS

- A. Remove or level and grade to the extent required to present a neat appearance and to prevent any obstruction of the flow of water or any other interference with the operation of or access to the permanent works.

--END OF SECTION--

SECTION 02272

GABIONS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

The general provisions of the Contract, including General and Supplementary Conditions and General Requirements (if any), apply to the work specified in this Section.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. Gabion stone: Section 02274
- B. Erosion Control: Section 02271

1.3 DESCRIPTION

Work Included: Gabion installation includes the fabrication, rock fill, and installation of the gabions as indicated on the Drawings and as specified herein.

1.4 SUBMITTALS

- A. Manufacturer's Literature:
 - 1. Descriptive data of installation methods and procedures.
 - 2. Standard drawings of gabion installation.
- B. Certificates: Manufacturer's certification that materials meet specification requirements.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials with manufacturer's tags and labels intact.
- B. Handle and store so as to avoid damage.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Gabions

- A. PVC-coated steel wire mesh baskets manufactured by Maccaferri Gabion Inc., Bekaert Steel Wire Corp., or approved equal.
- B. Coat with a minimum of 0.020 inches black PVC suitable to resist destructive effects of immersion in acidic, salt, or pollution water, exposure to ultraviolet light and abrasion, and retain these characteristics after a period of not less than 3,000 hours under test in accordance with ASTM G23 specifications.

2.1.2 Steel Mesh Wire

Diameter 0.1063 inch (U.S. Gauge No. 12) after galvanization and an overall diameter (core wire plus PVC coating) of 0.1463 inch.

2.1.3 Selvedge Wire

Diameter, running through all the edges (perimeter wire), 0.1339 inch (U.S. Gauge No. 10) after galvanization and an overall diameter (core wire plus PVC coating) of 0.1739 inch.

2.1.4 Lacing Wire

Diameter 0.0866 inch (U.S. Gauge No. 13) after galvanization and an overall diameter (core wire plus PVC coating) of 0.1266 inch.

2.2 FABRICATION

- A. Manufacture in such a manner that sides, ends, lid, and diaphragm(s) assembled to form rectangular units of the specified dimensions, as shown on the Drawings.
- B. Single unit construction, with front, base, back, and lid woven into a single unit, and ends and diaphragm(s) factory connected to the base.
- C. Selvedge all perimeter edges of the mesh forming the gabion so that the joints obtained have at least the same strength as the wire mesh itself.

PART 3 EXECUTION

3.1 GABION INSTALLATION

- A. Assemble and erect according to manufacturer's instructions.
- B. Completely fill with hard, durable, clean stone, 3 to 6 inches in size, or as approved by the ENGINEER.
- C. Fill by hand; no machine placement of rock allowed.
- D. Place in accordance with lines, grades, and dimensions shown on the Drawings.

--END OF SECTION--

SECTION 02273

GEOTEXTILES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

The general provisions of the Contract, including General and Supplementary Conditions and General Requirements (if any) apply to the work specified in this Section.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. Earthwork: Section 02200
- B. Polyvinyl Chloride (PVC) Flexible Membrane Liner: Section 02775

1.3 DESCRIPTION

Furnish and install [woven], [nonwoven], and [turf reinforcement] geotextile at the locations and in the manner shown on the figures and/or specified in the appropriate sections.

1.4 SUBMITTALS

- A. If brand name materials other than those suggested in this Section are proposed for use, furnish certified copy of laboratory test results and material sample as evidence that the material is similar and equal in mechanical, hydraulic, and endurance properties relative to soils.
- B. Catalog Data: manufacturer's literature.
- C. Manufacturer's specifications, installation guidelines, and engineering data.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Applicable ASTM Standards:
 - 1. D 570 - Standard Test Methods for Water Absorption of Plastics.
 - 2. D 1907 - Test Method for Yarn Number by Skein Method.
 - 3. D 2256 - Test Method for Breaking Strength and Elongation of Yarn by Single Strand Method.
 - 4. D 3786 - Standard Test Method for Hydraulic Bursting Strength of Knitted Goods and Nonwoven Fabrics.

5. D 4354 - Practice for Sampling of Geosynthetics for Testing.
 6. D 4355 - Test Method for Deterioration of Geotextiles from Exposure to Ultraviolet Light and Water (Xenon-Arc Type Apparatus).
 7. D 4439 - Terminology for Geotextiles.
 8. D 4491 - Test Methods for Water Permeability of Geotextiles by Permittivity.
 9. D 4533 - Test Method for Index Trapezoid Tearing Strength of Geotextiles.
 10. D 4595 - Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method.
 11. D 4632 - Test Method for Grab Breaking Load and Elongation of Geotextiles.
 12. D 4751 - Test Method for Determining Apparent Opening Size of a Geotextile.
 13. D 4759 - Practice for Determining the Specification Conformance of Geosynthetics.
 14. D 4833 - Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products.
 15. D 4873 - Guide for Identification, Storage, and Handling of Geotextiles.
 16. D 5035 - Standard Test Method for Breaking Force and Elongation of Textile Fabrics (Strip Force).
 17. D 5199 - Standard Test Method for Measuring Nominal Thickness of Geotextiles and Geomembranes.
 18. D 5261 - Test Method for Measuring Mass Per Unit Area of Geotextiles.
- B. Woven Geotextile: Silt Fence
1. Synthetic fibers woven to provide a strong, water permeable material.
 2. Fiber may be made from polypropylene, polyethylene, nylon, or polyester.
 3. Edges: Selvedged to prevent raveling.
 4. Geotextile shall be resistant to rot, mildew, insects, rodents, salt water, ultraviolet degradation, and other biological and chemical substances commonly encountered in the ground.

5. Combination woven slit film and monofilament polypropylene geotextile.
6. Individual slit films woven together to provide dimensional stability relative to each other.
7. The woven geotextile shall meet the minimum requirements listed below:
 - a. Synthetic Industries 9145C or approved equal.

Property	Test Method	Units	Results
<u>Mechanical</u>			
Grab Tensile Strength	ASTM D 4632	N (lbs)	665 x 445 (100 x 100)
Grab Elongation	ASTM D 4632	percent	15 x 15
Puncture Strength	ASTM D 4833	N (lbs)	265 (60)
Mullen Burst	ASTM D 3786	kPa (psi)	2410 (350)
Trapezoidal Tear	ASTM D 4533	N (lbs)	265 x 265 (60 x 60)
<u>Hydraulic</u>			
Apparent Opening Size	ASTM D 4751	mm (US Std. Sieve)	0.425 (40)
Permittivity	ASTM D 4491	1.00 sec ^{-1.0}	0.90
Water Flow Rate	ASTM D 4491	ℓ/min/m ² (gpm/ft ²)	3055 (75)
<u>Endurance</u>			
UV Resistance (percent retained at 500 hours)	ASTM D 4355	percent	90

- C. Nonwoven Geotextile: Foundation Stabilization for SRT and Filter Wrap SHA Drain
 1. Produced by heat bonding, needle punching, or by the use of external adhesives.
 2. The network of fibers shall be bonded so the fibers will retain their relative position with respect to each other.
 3. Fibers may be made from polypropylene, polyethylene, nylon, or polyester.
 4. Geotextile shall be resistant to rot, mildew, insects, salt water, rodents, ultraviolet degradation, and any other biological and chemical substances commonly encountered in the ground.
 5. The nonwoven geotextile shall meet the following equivalent requirements:
 - a. Synthetic Industries 1201 or approved equal.

b.	Property	Test Method	Units	Results
	Thickness	ASTM D-5199	mm (in)	12.7 (0.50)
	Resiliency	ASTM D-5199	percent	80
	Mass Per Unit Area	ASTM D-5261	G/sq m (oz/sy)	340 (10.0)
	Tensile Strength	ASTM D-5035	kN/m (lb/ft)	x 1.8 (170 x 125)
	Tensile Elongation	ASTM D-5035	percent	50 (max)
	Tensile Strength @ 10% Elongation (typical value)	ASTM D-5035	kN/m (lb/ft)	1.5 x 1.3 (105 x 90)
	Ground Cover Factor	Light Projection	percent	74
	Moisture Absorption	ASTM D-570	percent	0.01 (max)
	UV Resistance	ASTM D-4355	percent	80 at 1000 hrs

D. Turf Reinforcement Geotextile: Ditch Erosion Protection

1. Reinforcement turf matrix consisting of lofty three-dimensional web of synthetic fibers positioned between two high strength biaxially oriented nets.
2. Geotextile shall be resistant to rot, mildew, insects, rodents, salt water, ultraviolet degradation, and other biological and chemical substances commonly encountered in the ground.
3. The turf reinforcement geotextile shall meet the minimum requirements listed below:
 - a. Synthetic Industries Land Lok TRM 1060 or approved equal.

b.	Property	Test Method	Units
	<u>Mechanical</u>		
	Grab Tensile Strength	ASTM D1632	300 lbs.
	Grab Elongation	ASTM D4632	50 percent
	Puncture Strength	ASTM D4833	175 lbs.
	Mullen Burst	ASTM D3786	580 psi
	Trapezoidal Tear	ASTM D4533	115 lbs.
	<u>Hydraulic</u>		
	Apparent Opening Size (AOS)	ASTM D4751	100 US Std. Sieve
	Permittivity	ASTM D4491	1.00 sec ⁻¹
	Permeability	ASTM D4491	0.29 cm/sec
	Water Flow Rate	ASTM D4491	75 gpm/ft ²
	<u>Endurance</u>		
	UV Resistance (percent retained after 500 hours)	ASTM D4355	70 percent

PART 3 EXECUTION

3.1 INSTALLATION

- A. Geotextile installation shall include the following considerations:
1. Place in the manner and at the locations shown on the figures and/or as specified.
 2. At the time of installation, geotextile shall be rejected if it has defects, rips, holes, flaws, deterioration, or damage incurred during manufacture, transportation, or storage.
 3. All geotextiles shall be installed in strict accordance with the manufacturer's specifications for installation. This shall include, but not be limited to, slope specific guidelines; overlap joints and seams; means of securing to ground; etc.
 4. In the presence of wind, weight the materials with sandbags until final covers are installed.
- B. Protection of Geotextile:
1. Protect and store per manufacturer's specifications.
 2. Exercise necessary care while transporting, storing, and installing the geotextile to prevent damaging it.
 3. Protect from prolonged direct exposure to sunlight during storage.
 4. Repair all damaged areas of the geotextile by placing another piece of geotextile of sufficient size to extend a minimum of 1.0 foot beyond the limits of the damage in all directions over the damaged area.
 5. During incident of prolonged exposure during nonuse, the CONTRACTOR will protect geotextile from excessive exposure to sunlight.
 6. Overlap successive pieces of geotextile a minimum of 1.5 feet.

--END OF SECTION--

SECTION 02274

GABION STONE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

The general provisions of the Contract, including General and Supplementary Conditions and General Requirements (if any), apply to the work specified in this Section.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. Earthwork, Excavation, Backfill, and Compaction: Section 02200
- B. Erosion Control: Section 02271

1.3 DESCRIPTION

- A. Furnish and place gabion stone in gabion baskets and place up- and downgradient of those baskets, as shown on Drawings 3 through 7, Appendix B.
- B. Types of gabion stone included in this Specification:
 - 1. Gabion stone: Gabion stone consists of stone hand-placed in gabion baskets.

PART 2 PRODUCTS

2.1 MATERIALS

Field Stone, Quarry Stone, or Rock Fragments: Sound, of approved quality, free from structural defects, having approximately rectangular shapes for the use of filling gabion baskets. The stone shall be well graded with a maximum 6-inch-diameter stone and a minimum 3-inch-diameter stone. Vulcan, Inc. has a local stock yard of stone material located approximately 5 to 7 miles from the base.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Gabion Stone:
 - 1. Gabion stone shall be placed in baskets such that gradation is not affected nor the gabion basket damaged. Stone shall not be dropped from a height greater than 1 foot.

--END OF SECTION--

SECTION 02711
SUBDRAINAGE SYSTEM

PART 1 GENERAL

1.1 RELATED DOCUMENTS

The general provisions of the contract, including General and Supplementary Conditions and General Requirements (if any), apply to the work specified in this section.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. Excavation, Backfill, and Compaction: Section 02221
- B. Polyvinyl Chloride (PVC) Flexible Membrane Liner: Section 02775
- C. Geotextiles: Section 02273

1.3 DESCRIPTION OF WORK

- A. Extent of subdrainage system work is shown on Drawing 8, Appendix B.

1.4 QUALITY ASSURANCE

Codes and Standards: Perform subdrain work in compliance with Drawings and Specifications and with other applicable codes, as required.

1.5 SUBMITTALS

- A. Catalog Data: manufacturer's literature.
- B. Manufacturer's specifications and engineering data.

PART 2 PRODUCTS

2.1 DRAINAGE PIPE AND FITTINGS

- A. Furnish drainage pipe complete with bends, reducers, adapters, couplings, collars, and joint materials.
 - 1. Perforated, corrugated polyethylene pipe: ASTM 405 (ADS N-12, 8-inch-diameter or approved equal).

2.2 JOINT MATERIALS

- A. N-12 coupler or approved equal.

2.3 SUBDRAIN BACKFILL MATERIAL

- A. Drainage Fill: Uniformly graded mixture of 2-inch crushed stone or approved equal.

2.4 GEOTEXTILE FILTER FABRIC

- A. Synthetic Industries nonwoven 1201 or approved equal.

PART 3 EXECUTION

3.1 INSPECTION

Examine the areas and conditions under which excavation and fill is to be performed and notify the ENGINEER, in writing, of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in an acceptable manner.

3.2 INSTALLATION

- A. Excavate drain trench as shown on Drawing 8, Attachment B.
- B. Place geotextile filter wrap in 40-mil PVC-lined trench.
- C. Place pipe at 1 percent slope on 3-inch bed of backfill material.
- D. Extend riser pipe to an elevation approximately 4 feet above existing ground surface elevation by using a 90 degree elbow.
- E. Backfill to top of trench with backfill and cover with geotextile filter wrap.

--END OF SECTION--

SECTION 02775

POLYVINYL CHLORIDE (PVC) FLEXIBLE MEMBRANE LINER

PART 1 GENERAL

1.1 RELATED DOCUMENTS

The general provisions of the Contract, including General and Supplementary Conditions and General Requirements (if any), apply to the work specified in this Section.

1.2 RELATED WORK SPECIFIED ELSEWHERE

Excavation, Backfill, and Compaction: Section 02221

1.3 DESCRIPTION OF WORK

- A. Furnish all labor, materials, and equipment to install PVC membrane lining in conformity with the Drawings and as specified in this Section.
- B. Liner and cover shall be delivered to the site ready for installation. Dimensions for liner and cover material may be obtained from Drawing 8, Attachment B. No field seams shall be allowed unless approved by the ENGINEER.

1.4 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.

- NSF Standard 54-1991.
- ASTM D1593, Thickness (inches, nominal).
- ASTM D882, Breaking Factor (lbs/in).
- ASTM D882, Elongation at Break (percent).
- ASTM D882, Modulus at 100 Percent Elongation.

1.5 SUBMITTALS

A. Manufacturer's Experience:

- 1. Demonstrate satisfactory previous experience with letter of certification indicating
 - a. Production and in-service use of similar geomembrane materials for not less than 1 year.

B. Certified Material Test Results:

- 1. Submit test results showing
 - a. Liner meets these specifications.

C. Shop Drawings:

1. Show extent, sizes, and details of lining. Include recommendations for terminating, methods of seaming, sealing around penetrations, and seam testing.

D. Manufacturer's Warranty.

- E. Approval from ENGINEER that verifies acceptability of site preparation prior to installation.

1.6 QUALITY ASSURANCE

- A. Establish and maintain a quality control system to assure compliance with contract requirements.

- B. Maintain records of quality control for all phases of liner installation. Phases include, but are not limited to, the following:

1. Materials.
2. Testing.
3. Repairs.

- C. Furnish copies of these records as well as records of corrective action to the ENGINEER as directed.

1.7 DELIVERY, STORAGE, AND HANDLING OF GEOMEMBRANE

- A. Ensure that shipping cartons are strong enough to prevent damage to the contents and banded to heavy duty wood pallets.

- B. All pallets are identified by panel size, type, and number.

- C. Geomembrane panels shall be delivered to the job site, unloaded, and stored in their original, unopened containers in a secure, dry area, and protected from weathering.

- D. Whenever possible, a 6-inch minimum air space between the cartons should be maintained, especially when the geomembrane panels are to be stored over an extended period of time.

- E. Pallets must not be stacked.

1.8 PROJECT CONDITIONS

- A. Temperature Constraints:

1. The PVC geomembrane panels shall be stored in their original packaging until ready for use.
2. The geomembrane panels shall not be positioned when material temperatures are below 32 °F.

3. Panel deployment when material temperatures are below 32 °F may require special handling and storage of the panels at a controlled temperature of at least 50 °F.
4. During low temperature installations, care must be taken to avoid "cold shock" impacting of the geomembrane.

1.9 MANUFACTURER'S WARRANTY

- A. Liner is warranted as follows:
 1. Will not develop cracks or holes from normal service for 20 years from delivery date.
 2. Is immune to chemical attack and degradation by chemicals, specified in the manufacturer's literature.
- B. Should defects or service degradation of the above warranty occur, the manufacturer shall either
 1. Refund the pro-rata part of the unexpired term of the warranty of the original cost of such product, or
 2. Repair or replace materials at the then-current price.
 3. Credit the lesser of the following:
 - a. The pro-rata part of the original sales price of the material repaired or replaced for the unelapsed period of the warranty.
 - b. The pro-rata part of the then-current price of the material repaired or replaced to the unelapsed period of the warranty.
- C. Warranty shall continue in effect on the repaired or replaced material for the unelapsed term of the original warranty.
- D. Owner will present in writing to manufacturer and installer claim for alleged breach of warranty within 30 days after alleged defect is noticed.

PART 2 PRODUCTS

2.1 POLYVINYL CHLORIDE (PVC) GEOMEMBRANE

- A. Description:
 1. Black PVC.
 2. 40 mils thickness.
 3. No additives, fillers, or extenders unless otherwise specified.

B. Physical Characteristics:

Property	Test Method	Specified Values
Specific Gravity	ASTM D792	1.24 - 1.30
Thickness (gauge)	ASTM D1593	40 ±5 percent
Min Tensile Properties (each direction)	ASTM D882	
1. Breaking factor (psi width)	Method A or B	92 (2300 psi)
2. Elongation at break (percent)	Method A or B	300 percent
3. Modulus (force at 100 percent elongation, psi width)	Method A or B	36 (900 psi)
Tear Resistance (lbs/min)	ASTM D1004 Die C	10
Low Temperature Impact (50 percent pass)	ASTM D1790	-20 °F
Water Extraction (percent maximum)	ASTM D3083 (as modified by NSF)	0.35 percent
Dimensional Stability	ASTM D1204 212 °F 15 min	±5 percent
Volatility Loss (percent maximum)	ASTM D1203 Method A	0.5 percent
Resistance to Soil Burial (percent change maximum)	ASTM D3083 (as modified by NSF)	
1. Breaking factor		5 percent
2. Elongation at break		20 percent
3. Modulus at 100 percent elongation		20 percent
Hydrostatic Resistant (psi)	ASTM D751 Method A	89

C. Factory Bonded Seam:

1. Individual calendared widths of PVC are factory fabricated into large panels to minimize seaming during installation.
2. Factory fabricated seams are a minimum 1 1/4-inch in width and extend to the edge of the sheet.
3. Factory seams are produced using the wedge welding method.
4. Factory fabrication production records identify each panel by panel number, size, date of fabrication, material lot number, and seam station identification.

D. Other Materials:

1. Patches:
 - a. Same material as the membrane or a compatible approved equal.

PART 3 EXECUTION

3.1 SURFACE PREPARATION

A. Requirements:

1. Remove all sharp rocks or other sharp objects, vegetation, and stubble, creating a smooth surface.
2. When directed, apply suitable soil sterilant.
3. Illustrate to ENGINEER that surface is acceptable and should not cause damage to the liner.
4. Maintain surface requirements during liner installation.

3.2 FIELD SEAMS

A. Generally shall not be allowed for this project.

B. Seam Preparation:

1. The overlapped geomembrane panels must be clean at the surfaces to be joined. Any foreign material (e.g., dirt, moisture) must be removed with clean, dry rags before seaming commences.
2. If seaming must be conducted over rough substrate, seaming boards are recommended. A 1-foot by 6-foot pine shelf board will work well as a seaming platform.

C. Chemical Fusion Field Seaming:

1. Chemical fusion agent shall be applied between the two surfaces to be joined. These surfaces shall be mated together, and pressure applied to the upper surface by means of a roller (high durometer rubber, nylon, or steel).
2. A sufficient amount of chemical fusion agent shall be applied between the two geomembrane surfaces to be joined such that when rolled, a thin excess of chemical fusion agent will be forced out of the seam.
3. Any excess chemical fusion agent shall be wiped from the geomembrane. The lower of the two surfaces to be joined shall be completely wetted by the chemical fusion agent.
4. Field seams shall be a minimum of 1 inch in width.
5. Fish mouths shall be slit, laid flat, bounded, then patched with a round or oval patch of the same geomembrane material.
6. The patch shall extend a minimum of 6 inches beyond the repair area in all directions and shall be seamed a minimum of 1 inch along its perimeter.

7. If any discontinuities are noted, allow the seaming agent to dissipate (approximately 1/2 hour) before reapplying agent. This process can be expedited by using artificial heat.

3.3 FIELD QUALITY CONTROL

A. Quality of Workmanship:

1. Tightly bond all joints after work is complete.
2. If directed by the ENGINEER, replace or cover and seal with an additional layer of proper-sized PVC any surfaces showing the following conditions:
 - a. Injury due to scuffing.
 - b. Penetration by foreign objects.
 - c. Distress from rough subgrade.
3. Manufacturer's technical representative shall make final installation inspection.
4. Repair defects and test until satisfactory.

B. Manufacturer's Technical Service [at CONTRACTOR's option]:

1. Provide liner manufacturer technical representative at job site to ensure compliance with installation directions as follows:
 - a. When the membrane installation begins.
 - b. During all testing.
 - c. At substantial completion of the installation.
 - d. After written notification from the [Owner's Representative/Engineer] that installation is not in conformance with manufacturer's recommended procedures.
2. Technical representative shall
 - a. Observe work.
 - b. Report in writing to Contractor and [Owner's Representative/ Engineer] unsatisfactory conditions or recommendations for improvement in procedures.

3.4 CLEANUP

- A. Dispose of all trash and waste.
- B. Remove all excess material and equipment.

C. Leave the premises in a neat and acceptable condition.

--END OF SECTION--

SECTION 02930

LAWNS AND GRASSES

PART 1 GENERAL

1.1 RELATED DOCUMENTS

The general provisions of the Contract, including General and Supplementary Conditions and General Requirements, apply to the work specified in this Section.

1.2 RELATED WORK SPECIFIED ELSEWHERE

Excavation, Backfill, and Compaction: Section 02221

1.3 DESCRIPTION

- A. Provide topsoil and seed as specified herein. Furnish, place, grade, lime, fertilize, and seed in the areas disturbed from construction activities. The approximate area required for topsoil seed is 12,481 square feet.
- B. In existing lawn areas disturbed by construction, but where the existing topsoil remains, provide seeding, liming, and fertilizing to reestablish the lawn area.
- C. In areas to be seeded where new grades have been established, furnish, place, and grade topsoil and provide seeding, liming, and fertilizing to establish new lawn areas. This work shall be in conjunction with the placement of the soft armor geotextile.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Topsoil:
 - 1. Furnish all topsoil necessary to complete the work from approved sources off the site.
 - 2. Natural, clear, friable material, possessing the characteristics of representative soils in the vicinity and obtained from naturally well-drained areas.
 - 3. Reasonably free from subsoil, clay lumps, stones, brush, objectionable stumps, roots, litter, toxic substances, and other material or substances that may be harmful to plant growth or be a hindrance to grading, planting, and maintenance operations.
 - 4. Submit a sample of the proposed loam to the ENGINEER for approval.

B. Fertilizer:

1. Type: 13-13-13 commercial grade that meets the standard for grade and quality specified by State law in conformance with the Standards of the Association of Official Agricultural Chemists.
2. Supply in unopened bags with the weight, contents, and guaranteed analysis shown thereon or on a securely attached tag.

C. Lime: Lime shall consist of Standard Ground Agricultural Limestone or approved equivalent (standard limestone meeting current requirements of the State Department of Agriculture).

D. Seed:

1. The grass seed mixture shall include no "primary noxious weed seeds."
2. Furnish in fully labeled, standard, sealed containers.
3. Percentage and germination of each seed type in the mixture, purity, and weed seed content of the mixture shall be clearly stated on the label.
4. The weight of pure live seed (PLS) is computed by the labeled purity percent times the labeled germination percent times the weight.

To illustrate the method of computing to PLS from the tag basis, the following example is given: Required: 20 pounds PLS of a particular variety--stock available is 99.41 percent pure and 92 percent germination--20 divided by the product of .9941 and .92 equals 21.8 pounds on the tag basis to furnish 20 pounds of PLS.

5. Subject to the testing provisions of the Association of Official Seed Analysis, with the month and year of test clearly stated on the label.
6. Seed that has become wet, moldy, or otherwise damaged will not be acceptable.
7. Seed for this project, at the following composition (PLS per acre, pound):
 - a. Common Bermuda: 10
 - b. Pensacola Bahia: 30
 - c. Rye (for erosion control outside of planting season: 10 (or as directed by the local agriculture extension)

PART 3 EXECUTION

3.1 PREPARATION

A. All Areas to Be Seeded:

1. Smooth and level, as required, ditch side slope and bed and work by hand, if required, to ensure a reasonably firm but friable seedbed.

B. Depth of Tillage:

1. Depth of disturbance from excavation activity shall be accepted or as directed by the ENGINEER not to exceed a depth of 2 inches.
2. On slopes steeper than 3:1, reduce depth of tillage as directed.

3.2 APPLICATION

A. Topsoil:

1. Deposit on prepared areas to a reasonable uniform depth of not more than 4 inches (if required), spread, till, (raking out all pieces of sod, roots, and grass). Soil fill the soft armor per the manufacturer's specifications.
2. Compact into an even and uniform layer by rolling, ready for liming, fertilizing, and seeding.

B. Fertilizer and Lime:

1. Apply to the topsoil by means of a mechanical spreader or other acceptable method that is capable of maintaining a uniform rate of application. Hand spreading is acceptable.
2. Conduct when the soil is in a moist condition and at least 24 hours before sowing the seed.
3. Apply fertilizer at a rate of 18 pounds per 1,000 square feet.
4. Apply lime at a rate of 92 pounds per 1,000 square feet.

C. Seeding:

1. Perform erosion control items of work such as seeding and mulching upon completion of a unit or portion of the project, such as a structure.
2. When immediate protection of newly graded areas is necessary at a time outside the normal seeding season, apply hay mulch with the seeding done at the same time or done later, or both, as ordered.

3. The ENGINEER reserves the right to prohibit the use of any equipment that is unsuitable or inadequate for the proper performance of the work; immediately remove all rejected equipment from the project.

3.3 SEEDING SEASONS:

- A. Conduct between March 1 and September 14, or as directed by ABBES.
- B. Do not seed during windy weather or when the ground is frozen, excessively wet, or otherwise untillable.

3.4 SEEDING METHODS

Fertilizer, limestone, and mulch material, if required, and seed of the type specified may be placed at the locations shown or ordered by one of the following methods, provided an even distribution is obtained.

A. Dry Method:

1. Power Equipment: Use mechanical seeders, seed drills, landscape seeders, cultipacker seeders, fertilizer spreaders, or other approved mechanical seeding equipment or attachments when seed, limestone, and fertilizer are to be applied in dry form.
2. Manual Equipment: On areas that are inaccessible to power equipment, permission may be given to use hand-operated mechanical equipment when the materials are to be applied in dry form. The use of hand shovels to spread the materials will not be allowed.
3. Do not mix limestone and fertilizer together prior to their application, but work into the soil together to the depth of at least 1 inch.
4. Allow at least 24 hours between fertilizing and seeding.
5. Rake topsoiled areas or areas covered with park seed, and, unless rolling is ordered omitted, roll with a roller weighing not more than 100 pounds per foot of roller width to firm the soil but not to pack it. Rolling is to be done the same day as the seeding unless otherwise permitted.

B. Hand Seeding:

1. May be permitted, if it is done by an experienced worker and if the seeding is done in several directions to ensure uniform coverage.
2. Otherwise use a mechanical seeder.
3. After the seed has been sown, cover to an average depth of 1/2 inch by means of a brush, harrow, spike tooth harrow, chain harrow, cultipacker or approved device.

4. Immediately after seeding, compact the entire area by a suitable roller, weighing 60 to 90 pounds per lineal foot.

3.5 CARE AFTER SEEDING:

- A. Protect and care for seeded areas until final acceptance of the work, and repair any damage to seeded areas caused by pedestrian or vehicular traffic or other causes, at no additional cost to ABB-ES.
- B. If necessary, place barricades of brush or other materials and suitable signs to protect the seeded areas.
- C. Water as necessary to produce a satisfactory growth.
- D. Where hay mulch is necessary to prevent erosional loss of seed, apply fluffed mulch at a rate not to exceed 2 to 3 tons per acre, based on dry weight.
- E. Maintenance Period:
 1. The maintenance period shall be terminated upon acceptance by the ENGINEER.

--END OF SECTION--

ATTACHMENT D

GLOSSARY

GLOSSARY

ABB-ES	ABB Environmental Services, Inc.
AFCEE	Air Force Center for Environmental Excellence
CFR	Code of Federal Regulations
CLEAN	Comprehensive Long-Term Environmental Action, Navy
HDPE	high density polyethylene
HO	herbicide orange
ICM	interim corrective measures
MSDEQ	Mississippi Department of Environmental Quality
NCBC	Naval Construction Battalion Center
OSHA	Occupational Safety and Health Administration
PLS	pure live seed
PVC	polyvinyl chloride
RAB	Remediation Advisory Board
SHA	sediment handling area
SOUTHNAV- FACENCOM	Southern Division, Naval Facilities Engineering Command
SRT	sediment recovery trap
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency

ATTACHMENT E
REFERENCES/BIBLIOGRAPHY

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- ABB Environmental Services, Inc. (ABB-ES). 1996. *Interim Corrective Measures Workplan, Site 8, Former Herbicide Orange Storage Areas, Naval Construction Battalion Center, Gulfport, Mississippi.*
- ABB-ES. 1997. Meeting Minutes, Engineers Update, Interim Corrective Measures, Naval Construction Battalion Center, Gulfport, Mississippi (May 2).
- ABB-ES. 1997. Remediation Strategy White Paper, Naval Construction Battalion Center, Gulfport, Mississippi (June 30).
- ABB-ES. [n.d.]. Letter Report: Sediment Recovery Trap Evaluation Report, Naval Construction Battalion Center, Gulfport, Mississippi, in preparation.
- Applied Microcomputer Systems. HydroCAD™ Stormwater Modeling System, Version 4.52.
- Fifield, Jerald S. 1996. *Field Manual for Effective Sediment and Erosion Control Methods*, p. 25, (January).
- Mississippi Department of Environmental Quality, and Mississippi Soil and Water Conservation Commission. 1994. *Planning & Design Manual for the Control of Erosion, Sediment & Stormwater*, p. 3-3, 4-2 (April).
- Ogden Environmental and Energy Services. 1994. Stormwater Pollution Prevention Plan, Naval Construction Battalion Center, Gulfport, Mississippi (April 29).
- Synthetic Industries. [n.d.]. Engineered Geosynthetics Reference Guide.
- Trow Consulting Engineers Ltd. 1996. Instream Sediment Control Techniques Field Implementation Manual, p. 75 (January).
- U.S. Environmental Protection Agency (USEPA). 1992. Stormwater Management for Industrial Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92-006, p. 4-86 (September).
- USEPA. 1992. Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices Summary Guidance, EPA 833-R-92-001, p. 8 (October).
- USEPA. 1994. Assessment and Remediation of Contaminated Sediments (ARCS) Program Remediation Guidance Document, EPA 905-R94-003, p. 16. 77. 262. (October).