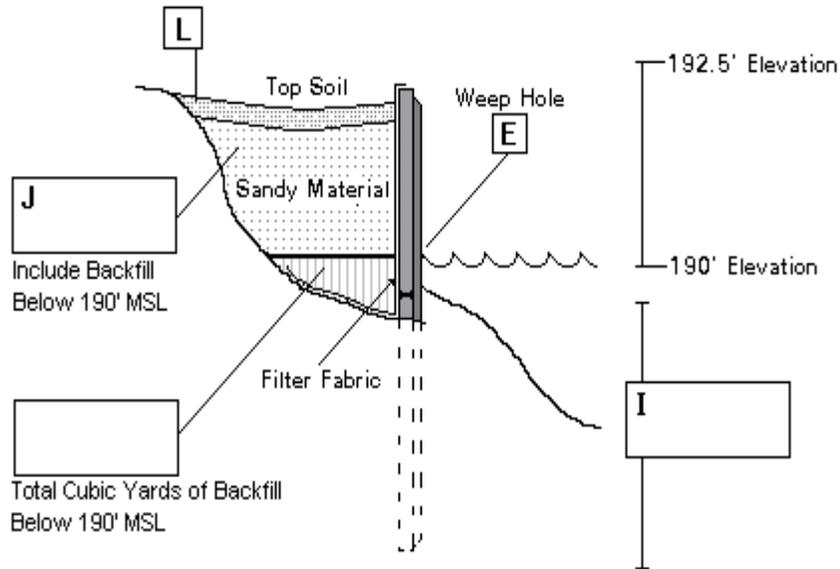
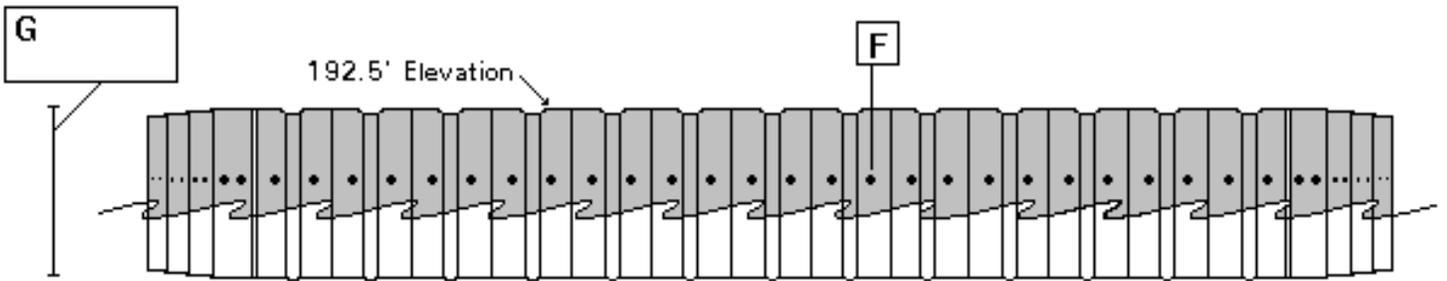
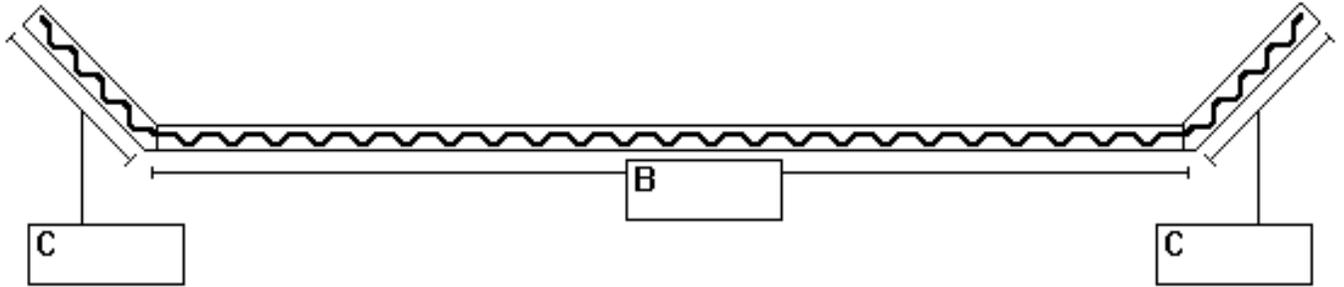


STEEL Z-PILING RETAINING WALL

(No Tie Backs Required)

EXHIBIT "A-11"



CONCEPTUALLY APPROVED
for
U.S. Army Corps of Engineers, Mobile District

BY: _____
DATE: _____

NOTICE: This approval stamp DOES NOT certify an engineering review. The builder should rely on professional engineering services to certify that the design is suitable for intended purposes and meets minimum standards including those related to the safety of the users.

I will construct this facility according to this plan.

Name: _____

Subdivision: _____

Lot No.: _____

STEEL Z- PILING RETAINING WALL OR OTHER FREE STANDING STEEL PILING WALL
--NO TIE BACKS REQUIRED.--

NOTICE: PLEASE ATTACH A DETAILED SITE PLAN AND DIAGRAM OF YOUR WALL TO THIS FORM.

- a. Give dimensions in all boxes. Any deviations must be shown on drawing and prior approved.
- b. Write in the length of the wall in box (b).
- c. Write in the length of the wing walls in boxes (c). Any deviations must be noted and approved.
- d. Normal upper pool elevation is 190.0.
- e. Indicates two inch (2") diameter weep holes six feet (6') on center located one (1') foot above the base of the wall with filter cloth installed behind the holes.
- f. Indicates ball and socket type steel z-piling wall.
- g. Top of wall must be a minimum of 192.5. Indicate elevation of top of wall.
- h. Non-woven polyester needle punched filter fabric. Minimum acceptable weight is eight (8) ounces per square yard.
- i. Required depth of piling:
 - 1. Two and one half foot (2 1/2') tall wall.....Four feet (4') required in ground.
 - 2. Three foot (3') tall wall.....Five feet (5') required in ground.
 - 3. Four foot (4') tall wall.....Six feet (6') required in ground.
 - 4. Five foot (5') tall wall.....Seven feet (7') required in ground.
 - 5. Six foot (6') tall wall.....Eight feet (8') required in ground.
 - 6. Seven foot (7') tall wall.....Nine feet (9') required in ground.

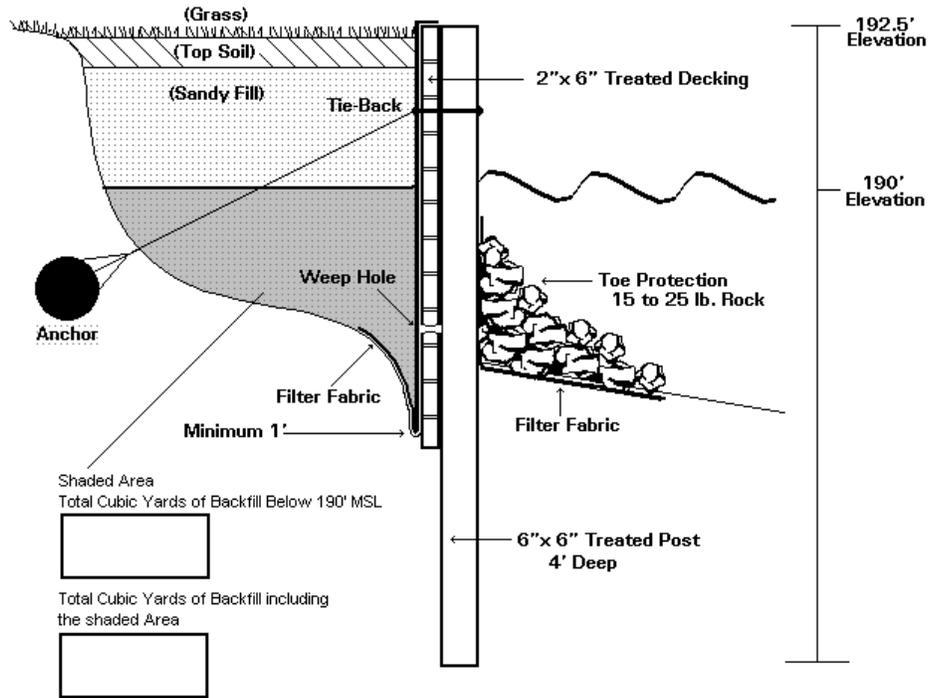
ANY WALLS FIVE FEET (5') AND OVER REQUIRE SPECIAL APPROVAL.

- j. Indicate total cubic yards of sand backfill material. (Water displacement). Indicate the total cubic yards of sandy material that will be placed below the 190' elevation, if this applies.
- k. Deadman posts or tie-backs are not required for this type of wall.
- l. Indicates four inches (4") of top soil with grass to be installed upon completion of wall.

NOTE: ALL STEEL Z- PILING MUST BE LOCATED ON THE SCENE AND INSPECTED PRIOR TO INITIATION OF ANY WORK.

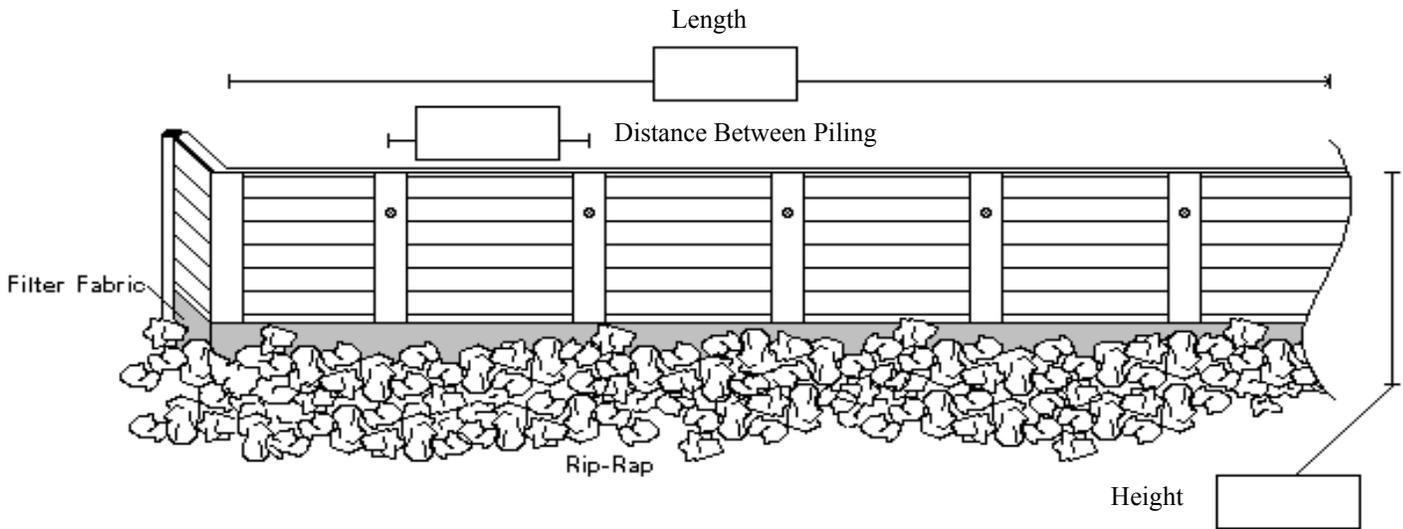
WOOD RETAINING WALL

EXHIBIT "A-11"



Shaded Area
Total Cubic Yards of Backfill Below 190' MSL

Total Cubic Yards of Backfill including
the shaded Area



CONCEPTUALLY APPROVED
for
U.S. Army Corps of Engineers, Mobile District

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DATE: _____

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Name: _____
Subdivision: _____
Lot No.: _____

WOOD RETAINING WALL SPECIFICATIONS
MINIMUM REQUIREMENTS

NOTICE: PLEASE ATTACH A DETAILED SITE PLAN AND DIAGRAM OF YOUR WALL TO THIS FORM.

1. Construction should begin within six (6) months of issuance date of permit. Once construction begins the wall should be completed within sixty (60) days.
2. Only walls using sound engineering design and construction will be considered.
3. Only treated material will be allowed in wood wall construction.
4. Base of wall should be installed as close to the existing shore as possible.
5. Minimum height 192.5 feet MSL; actual height to be determined by site inspection, location, and terrain conditions.
6. Timber bulkhead cross-members must be square cut type lumber, so that they fit flush without gaps.
7. Non-woven polyester needle punched filter fabric must be installed as shown on the attached drawing or the entire inside surface of the wall. Minimum acceptable filter fabric will weigh eight (8) ounces per square yard.
8. Wall must have toe protection a minimum of 1/3 wall height. Toe protection will be stone, rip-rap, no broken concrete or other rubble will be permitted. Filter fabric (as specified in "6") must be installed as shown on the attached drawing under toe protection.
9. Weepholes - Minimum one between each post, approximately two (2) inches in diameter. To be located within one foot from bottom elevation. Weepholes must be covered by filter fabric.
10. MAXIMUM DISTANCE BETWEEN POSTS

<u>WALL HEIGHT</u>	<u>4X4 FACING</u>	<u>2X6 FACING</u>	<u>MINIMUM POST SIZE</u>
4 FT. HIGH	8' MAX. SPACE	6' MAX. SPACE	6 X 6"
5 FT. HIGH	6' MAX. SPACE		6 X 6"
6 FT. HIGH	4' MAX. SPACE	4' MAX. SPACE	8 X 8"

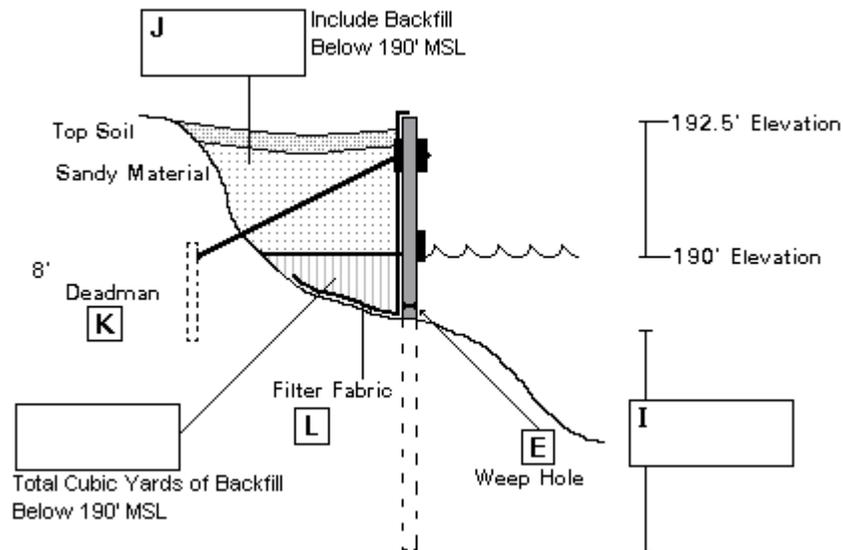
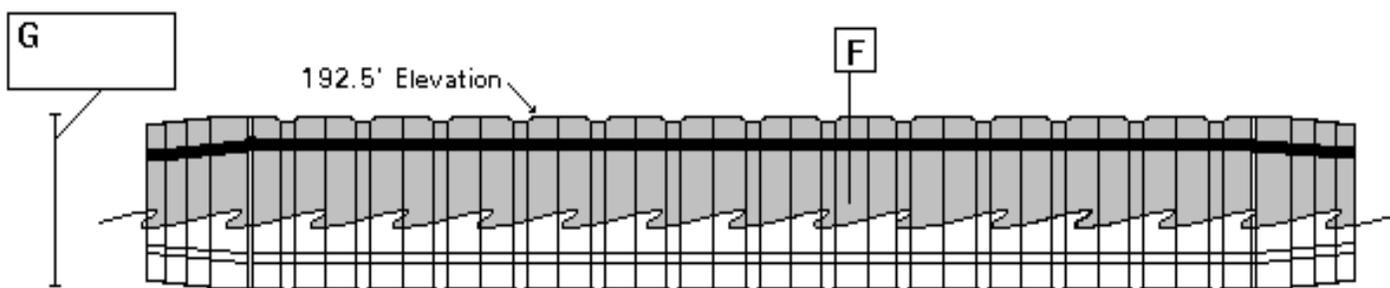
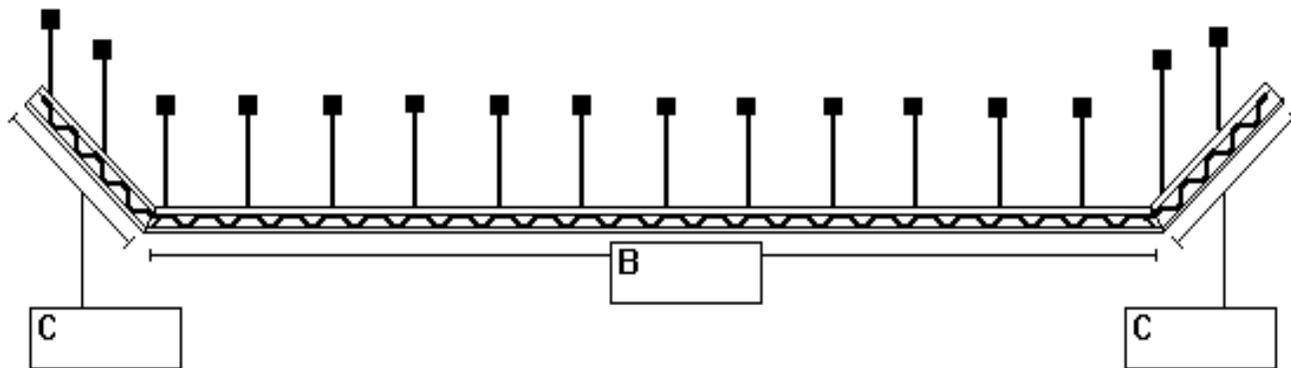
*NOTE: MINIMUM POST DEPTH IS FOUR FEET BELOW BOTTOM ELEVATION.

11. Tiebacks - Should be of sound engineering design and construction compatible with the type wall proposed. Tieback cables must be a minimum of 1/2" diameter and be connected to posts. Minimum is one tieback for each post used in wall construction.
12. Anchor should be a concrete or treated wood minimum 6" diameter post.
13. Fill Material - Must be clean sandy fill dirt, and free of rocks broken concrete, bricks, and other debris. Upper layer should be topsoil and be grassed immediately upon completion of wall.

VINYL SHEET PILING RETAINING WALL

(Tie-Backs Required)

EXHIBIT "A-11"



CONCEPTUALLY APPROVED
for
U.S. Army Corps of Engineers, Mobile District

BY: _____
DATE: _____

NOTICE: This approval stamp DOES NOT certify an engineering review. The builder should rely on professional engineering services to certify that the design is suitable for intended purposes and meets minimum standards including those related to the safety of the users.

I will construct this facility according to this plan.

Name: _____

Subdivision: _____

Lot No.: _____

VINYL SHEET PILING RETAINING WALL (TIE BACKS REQUIRED)

NOTICE: PLEASE ATTACH A DETAILED SITE PLAN AND DIAGRAM OF YOUR WALL TO THIS FORM.

- a. Give dimensions in all boxes. Any deviations must be shown on drawing and prior approved.
- b. Write in the length of the wall in box (b).
- c. Write in the length of the wing walls in boxes (c). Any deviations must be noted and approved.
- d. Minimum of one inch (1") solid steel tieback connected to sheet piling dead-man or treated piling driven , or concrete anchors poured a minimum of five (5) feet into solid ground required. Indicate number of tiebacks.
- e. Indicates two inch (2") diameter weep holes six feet (6') on center located one (1') foot above the base of the wall with filter cloth installed behind the holes.
- f. Indicates a minimum wall thickness of 0.25 inch vinyl sheet piling.
- g. Top of wall must be a minimum of 192.5. Indicate elevation of top of wall.
- h. Normal upper pool elevation is 190.0.
- i. Required depth of piling:
 - 1. Two and one half foot (2 1/2') tall wall.....Four feet (4') required in ground.
 - 2. Three foot (3') tall wall.....Five feet (5') required in ground.
 - 3. Four foot (4') tall wall.....Six feet (6') required in ground.
 - 4. Five foot (5') tall wall.....Seven feet (7') required in ground.
 - 5. Six foot (6') tall wall.....Eight feet (8') required in ground.
 - 6. Seven foot (7') tall wall.....Nine feet (9') required in ground.

ANY WALLS FIVE FEET (5') AND OVER REQUIRE SPECIAL APPROVAL.

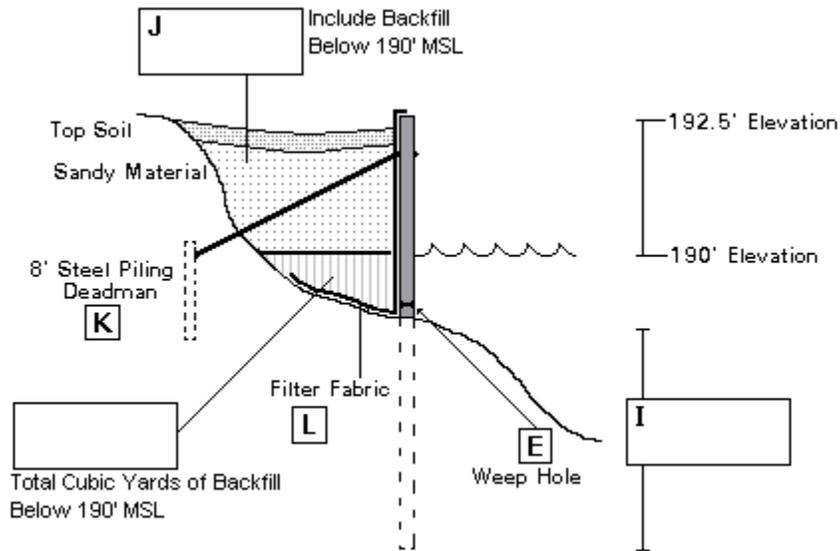
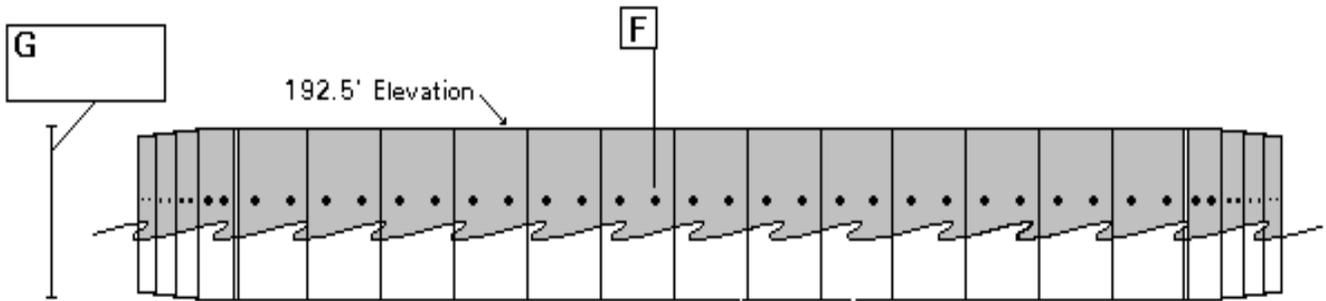
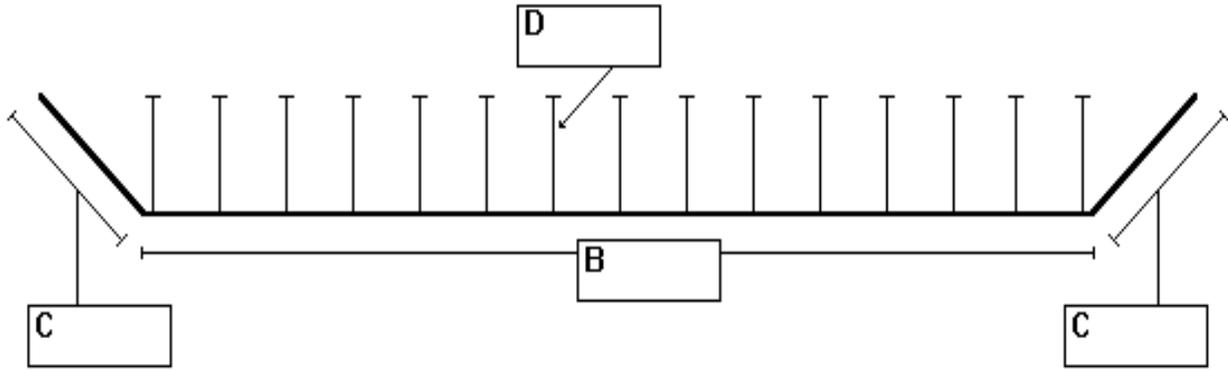
- j. Indicate total cubic yards of sandy material backfill. (Water displacement). Indicate the total cubic yards of sandy material that will be placed below the 190' elevation, if this applies.
- k. Indicates dead-man set back a minimum of eight foot (8').
- l. Non-woven polyester needle punched filter fabric. Minimum acceptable weight is eight (8) ounces per square yard.
- m. Indicates four inches (4") of top soil with grass to be installed upon completion of wall.

NOTE: ALL VINYL SHEET PILING MUST BE LOCATED ON THE SCENE AND INSPECTED PRIOR TO INITIATION OF ANY WORK.

STEEL SHEET PILING RETAINING WALL

(Tie-Backs Required)

EXHIBIT "A-11"



CONCEPTUALLY APPROVED
for
U.S. Army Corps of Engineers, Mobile District

BY: _____
DATE: _____

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Name: _____

Subdivision: _____

Lot No.: _____

STEEL SHEET PILING RETAINING WALL
(TIE BACKS REQUIRED)

NOTICE: PLEASE ATTACH A DETAILED SITE PLAN AND DIAGRAM OF YOUR WALL TO THIS FORM.

- a. Give dimensions in all boxes. Any deviations must be shown on drawing and prior approved.
- b. Write in the length of the wall in box (b).
- c. Write in the length of the wing walls in boxes (c). Any deviations must be noted and approved.
- d. Minimum of one inch (1") solid steel tieback welded to sheet piling dead-man driven a minimum of five (5) feet into solid ground required. Indicate number of tiebacks.
- e. Indicates two inch (2") diameter weep holes six feet (6') on center located one (1') foot above the base of the wall with filter cloth installed behind the holes.
- f. Indicates ball and socket type steel sheet piling wall.
- g. Top of wall must be a minimum of 192.5. Indicate elevation of top of wall.
- h. Normal upper pool elevation is 190.0.
- i. Required depth of piling:
 - 1. Two and one half foot (2 1/2') tall wall.....Four feet (4') required in ground.
 - 2. Three foot (3') tall wall.....Five feet (5') required in ground.
 - 3. Four foot (4') tall wall.....Six feet (6') required in ground.
 - 4. Five foot (5') tall wall.....Seven feet (7') required in ground.

ANY WALL FIVE FEET (5') AND OVER REQUIRE SPECIAL APPROVAL.

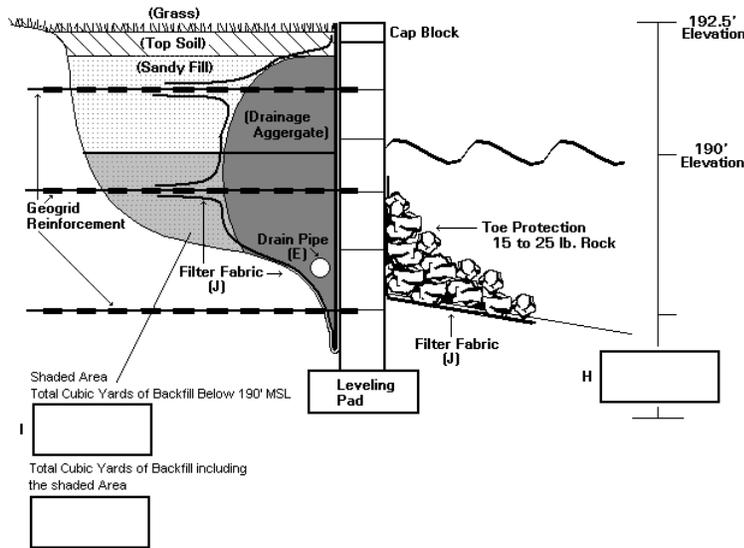
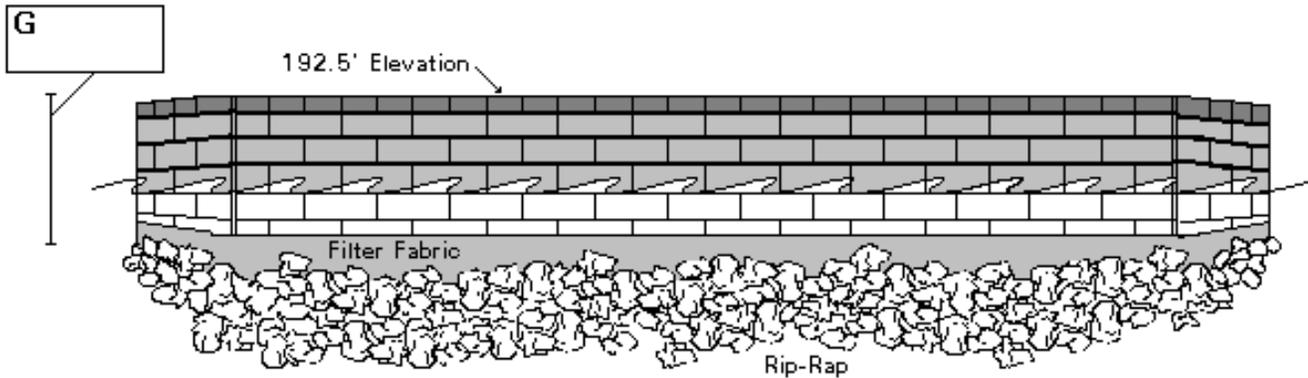
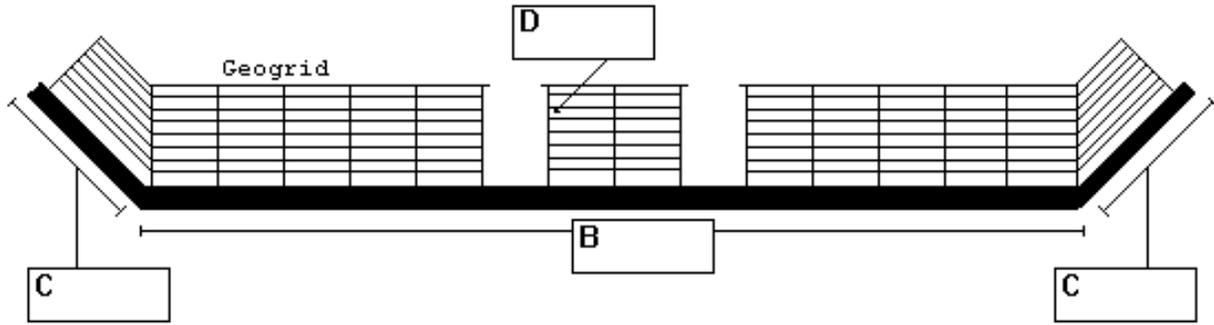
- j. Indicate total cubic yards of sandy material backfill. (Water displacement). Indicate the total cubic yards of sandy material that will be placed below the 190' elevation, if this applies.
- k. Indicates eight foot (8') steel piling dead-man.
- l. Non-woven polyester needle punched filter fabric. Minimum acceptable weight is eight (8) ounces per square yard.
- m. Indicates four inches (4") of top soil with grass to be installed upon completion of wall.

NOTE: ALL STEEL SHEET PILING MUST BE LOCATED ON THE SCENE AND INSPECTED PRIOR TO INITIATION OF ANY WORK.

BLOCK RETAINING WALL

(Tie-Backs Required)

EXHIBIT "A-11"



CONCEPTUALLY APPROVED
for
U.S. Army Corps of Engineers, Mobile District

BY: _____
DATE: _____

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I will construct this facility according to this plan.

Name: _____

Subdivision: _____

Lot No.: _____

BLOCK RETAINING WALL
(TIE BACKS REQUIRED)

A Certified Structure Engineer Must Certify That This Wall is Suited to the Particular Site Conditions that Exist. Engineer Drawing and Plan Must be Submitted for Corps Approval.

NOTICE: PLEASE ATTACH A DETAILED SITE PLAN AND DIAGRAM OF YOUR WALL TO THIS FORM.

- a. Give dimensions in all boxes. Any deviations must be shown on drawing and prior approved.
- b. Write in the length of the wall in box (b).
- c. Write in the length of the wing walls in boxes (c). Any deviations must be noted and approved.
- d. Geosynthetic Reinforcement Grid must be used. Number of Grid layers is determined by height of Wall.
- e. Drain pipe place with drainage aggregate to direct water out from behind wall.
- f. Top of wall must be a minimum of 192.5. Indicate elevation of top of wall.
- g. Normal upper pool elevation is 190.0. Show height of Wall.
- h. Depth of Wall
- i. Indicate total cubic yards of sandy material backfill. (Water displacement). Indicate the total cubic yards of sandy material that will be placed below the 190' elevation, if this applies.
- j. Non-woven polyester needle punched filter fabric. Minimum acceptable weight is eight (8) ounces per square yard.
- k. Indicates four inches (4") of top soil with grass to be installed upon completion of wall.

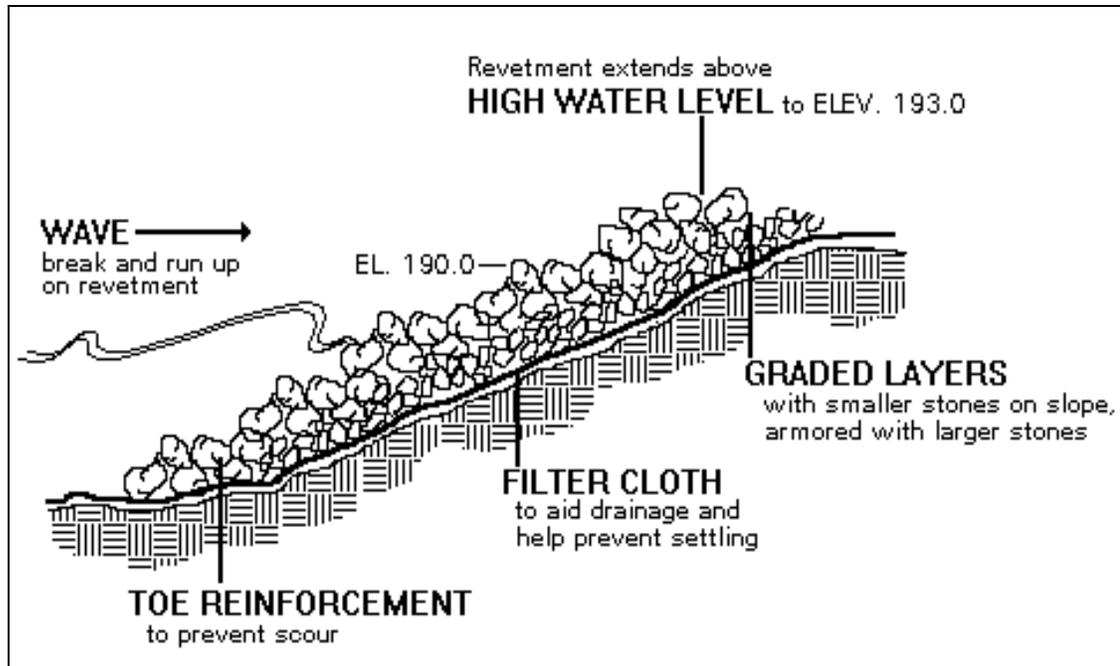
NOTE: ALL BLOCKS AND INSTALLATION MATERIAL MUST BE LOCATED ON THE SCENE AND INSPECTED PRIOR TO INITIATION OF ANY WORK.

REVETMENTS

EXHIBIT "A-11"

Revetments are structures placed on banks or bluffs in such a way as to absorb the energy of incoming waves. They are usually built to preserve the existing uses of the shoreline and to protect the slope. Like seawalls, revetments armor and protect the land behind them. They may be either watertight, covering the slope completely, or porous, to allow water to filter through after the wave energy has been dissipated.

Most revetments do not significantly interfere with transport of littoral drift. They do not redirect wave energy to vulnerable unprotected areas, although beaches in front of steep revetments are prone to erosion. Materials eroded from the slope before construction of a revetment may have nourished a neighboring area, however. Accelerated erosion there after the revetment is built can be controlled with a beach-building or beach-protecting structure such as a groin or a breakwater.



Design Considerations

Waves break on revetments as they would on an unprotected bank or bluff, and water runs up the slope. The extent of run-off can be reduced by using stone or other irregular or rough-surfaced construction materials. A rough surface offers more resistance to the water's flow than the original shoreline surface, decreasing the energy of the wave more quickly and preventing the water from traveling as far.

Important design considerations include providing appropriate height, width, and toe protection. Revetments should be high enough to prevent overtopping by high waves. To prevent flank erosion, the sides should be protected by tiebacks or returns. Scour at the toe can be prevented by a rock apron. Where there is a beach between the revetment and the water, access over the structure should be provided for beach users.

Construction Materials

Where they are readily available, rubble or quarry-stone make the most reliable and economical revetments. Adequate filters and armor stone size are important. The cost of labor or machinery necessary for slope preparation or placement of the largest sizes of stone may be high even where material is available at reasonable cost.

Revetment design should also allow for relief of groundwater pressure in the protected bank. Filters of cloth or small stones relieve water pressure in porous revetments, keeping drainage paths open and preventing settling. Solid revetments can be drained by evenly spaced "weep holes" along the bottom. This drainage channels the groundwater along non-eroding paths and prevents it from seeking its own way along the softer material of the slope.

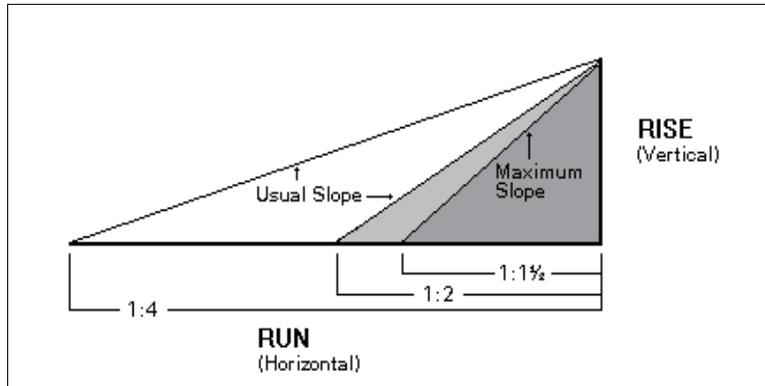
Revetments that are adequate under normal conditions may be damaged in severe storms, when the speed of water and carrying power of waves increase to several times their normal rates. Revetments must be thus strong enough to resist the battering action of waves and wave-carried debris. Heavy stones can help prevent the construction material from being washed away.

Revetments can be adopted to a variety of local conditions and available materials. Some materials are more suitable to gentle slopes and light wave action, others are more sturdy. Armoring the revetment with a heavy face layer and providing drainage are key elements of success.

Site Characteristics

Revetments are stable if they are built on relatively gentle slopes, with two to four feet of run for every foot of rise. Revetments should not be built on slopes with less than a foot and a half of run per foot of rise. The slope on which a revetment is to be built may require grading or smoothing to prepare an adequate foundation for construction.

Erosion at the toe, common in steep revetments, further decreases the stability of the structure. In areas where unstable slope materials may displace the structure, other shoreline erosion devices should be considered. Where vandalism is likely to be a problem, especially heavy or durable construction elements are needed.



NOTICE: PLEASE ATTACH A DETAILED SITE PLAN AND DIAGRAM OF YOUR WALL TO THIS FORM.

CONCEPTUALLY APPROVED
for
U.S. Army Corps of Engineers, Mobile District

BY: _____
DATE: _____

NOTICE: This approval stamp DOES NOT certify an engineering review. The builder should rely on professional engineering services to certify that the design is suitable for intended purposes and meets minimum standards including those related to the safety of the users.

I will construct this facility according to this plan .

Name: _____

Subdivision: _____

Lot No.: _____