Occohannock on the Bay

Living Shoreline Design

Living Shoreline Workshop for Landowners
March 13, 2014

C. Scott Hardaway, Jr.
Donna Milligan

Shoreline Studies Program
VIMS

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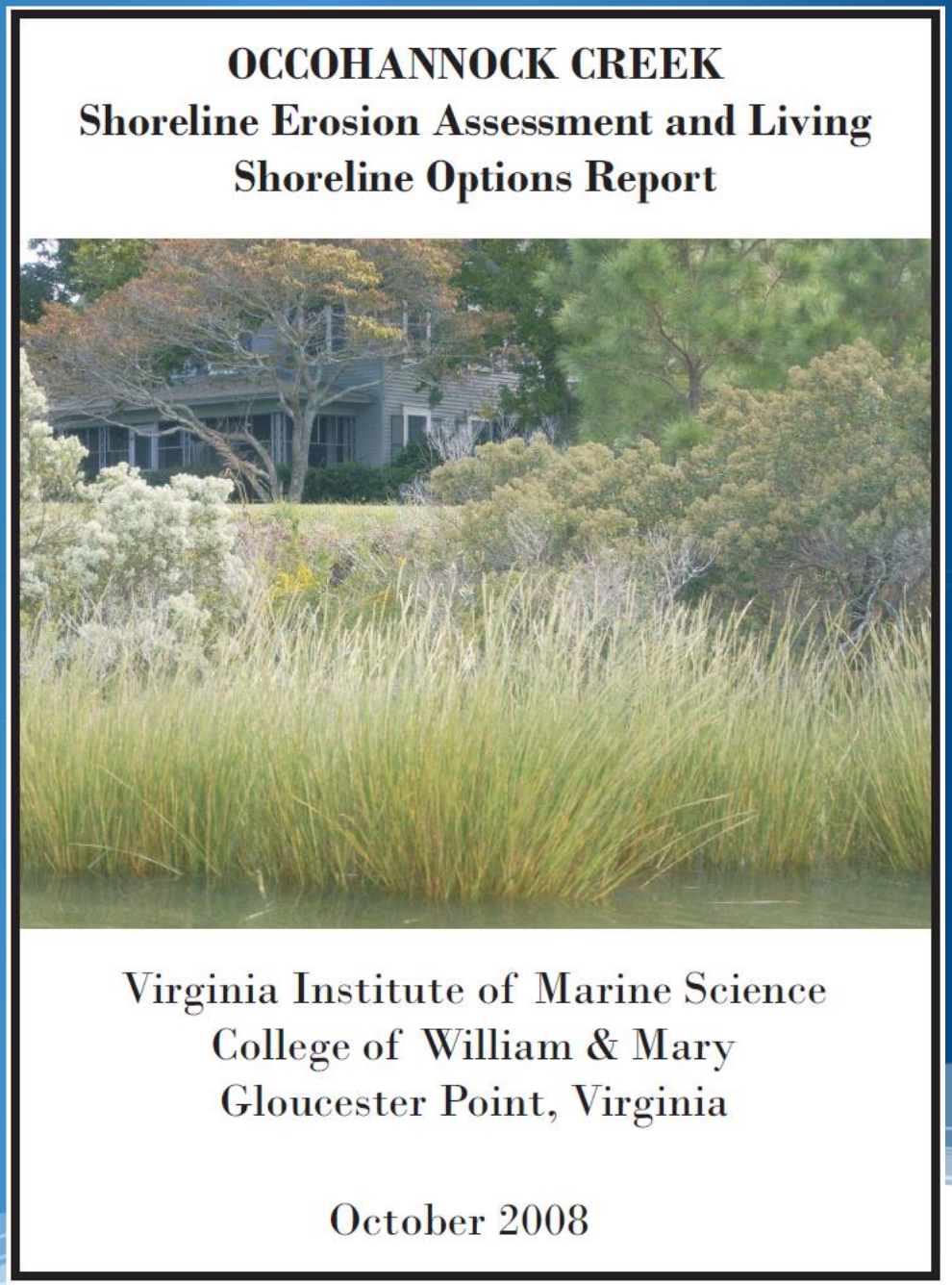
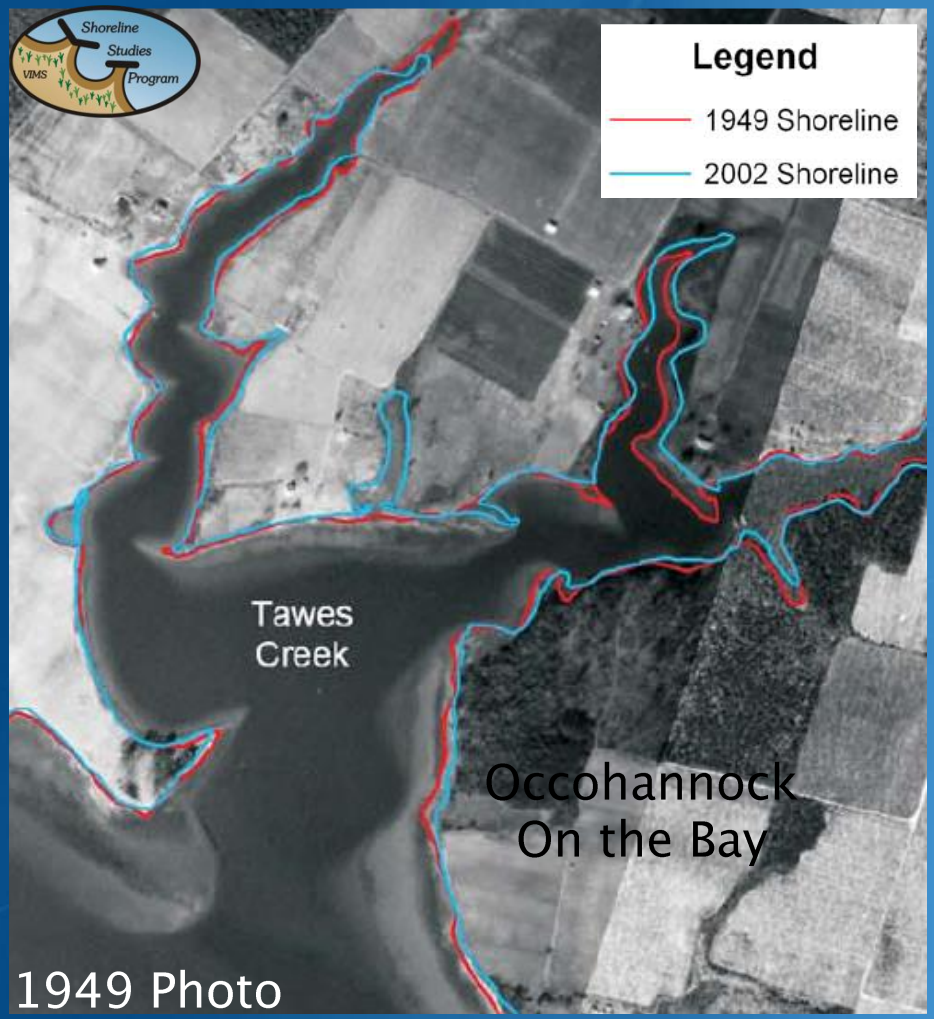
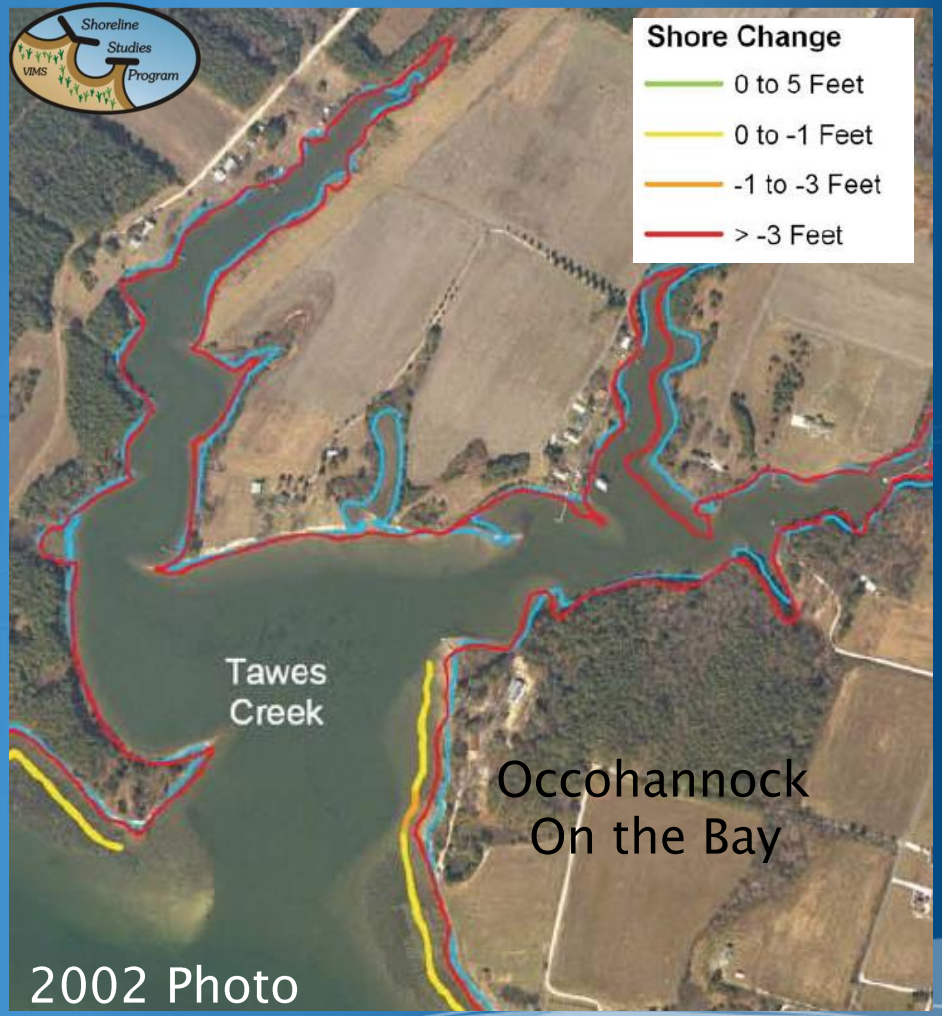
Shoreline Management Planning

Hardaway *et al.*, 2008



Shoreline Change





From Hardaway *et al.*, 2008

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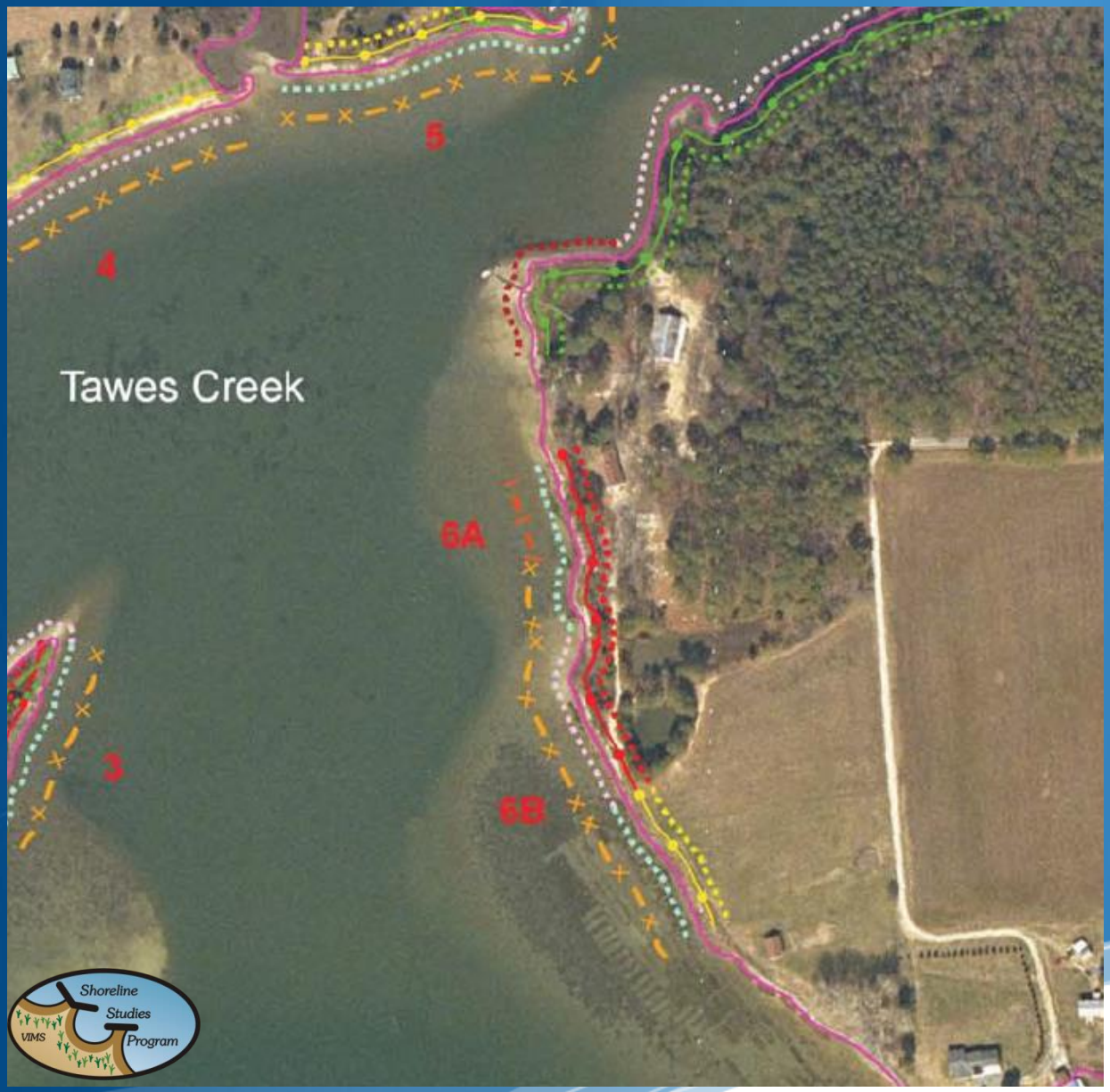
Shoreline Recommendations



From Hardaway *et al.*, 2008

Legend

2002 Shoreline

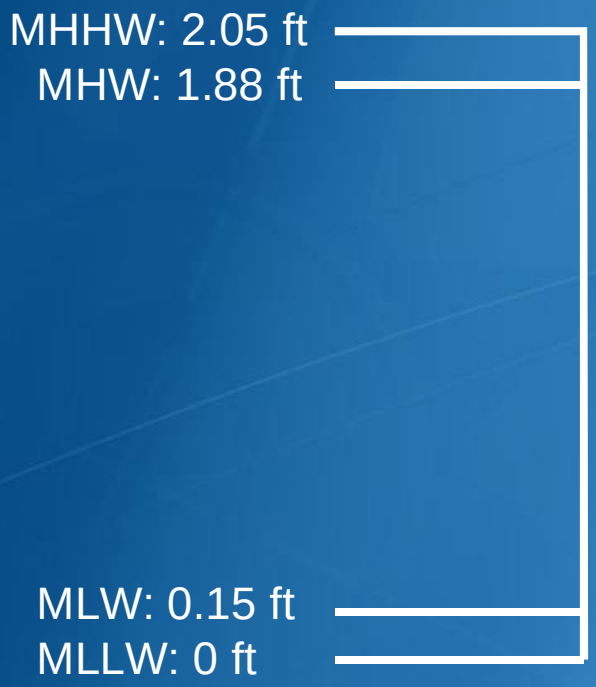
Bank Face	BankBase
Erosional	Erosional
Stable	Stable
Transitional	Transitional

Marsh Width	Structures Recommended
10-15	Breakwaters
5-10	High Sill
<5	Medium Sill
>15	Low Sill.
Grading	Sand and Groins
Yes	

Recommended structures numbered in red

Water Levels

Tide Range
Gaskins Point
Occohannock Creek, Virginia



25 year Storm Surge
(Sandy Point)

7 ft MLW

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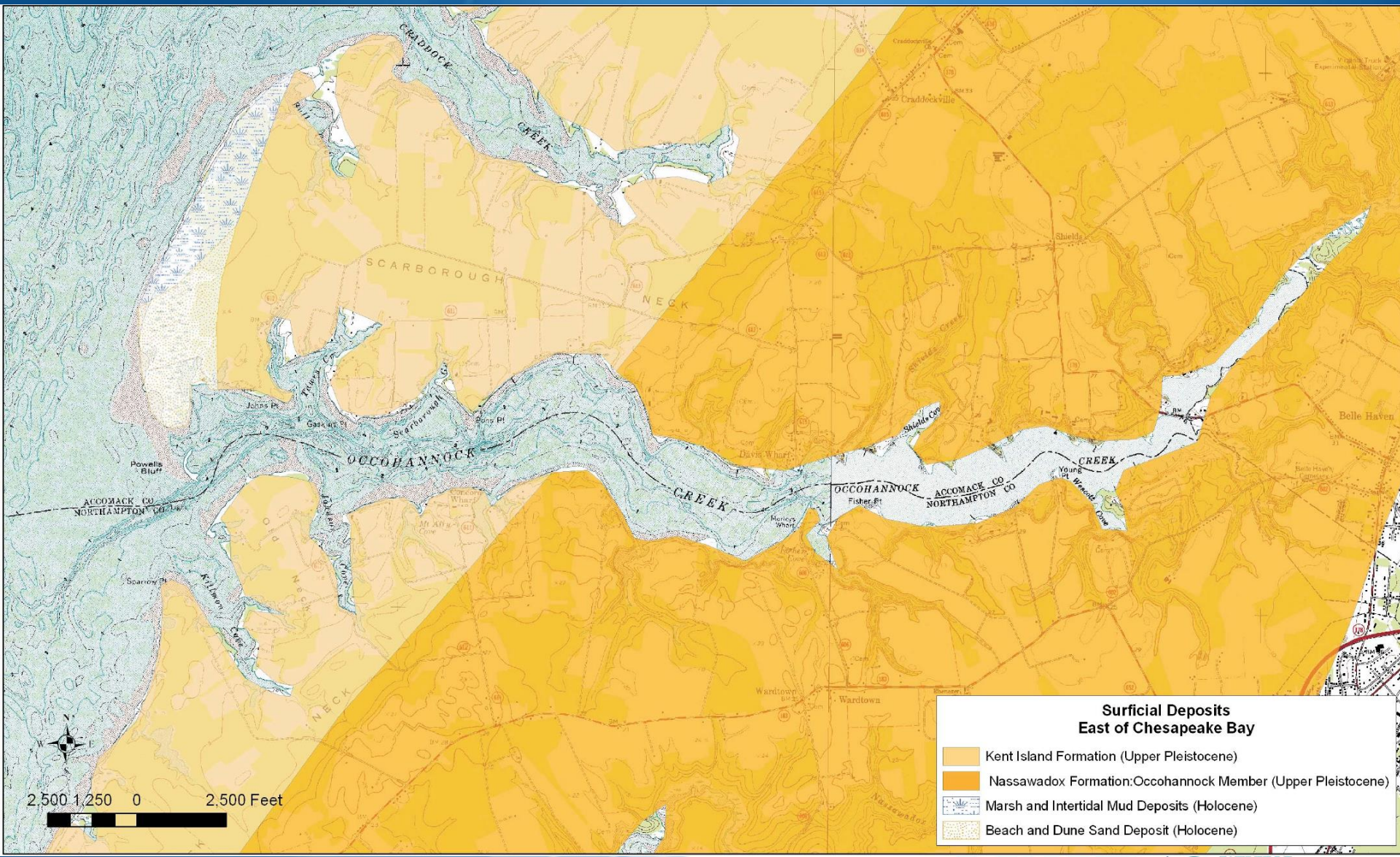
Geology of Occohannock Creek



From Hardaway *et al.*, 2008

Shore Types

Stable

Transitional

From Hardaway *et al.*, 2008

Erosional

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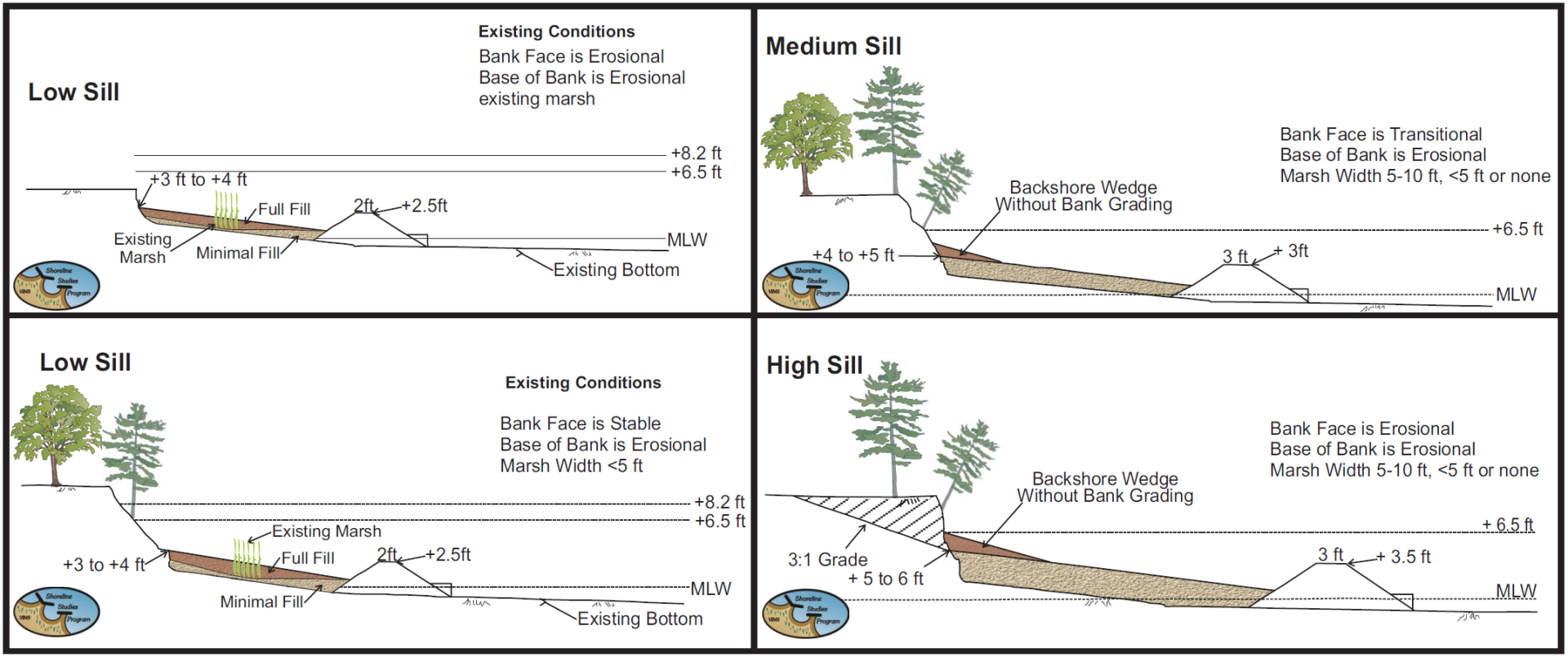
Management Plan Typical Cross-Sections



+6.5 ft MLW 10 yr event
+8.2 ft MLW 50 yr event

From Hardaway *et al.*, 2008

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Developing a Site Specific Design

- Survey existing conditions including elevations, existing structures and natural resources (SAV)
- Determine goals of landowner

Shore Survey

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Permit Application

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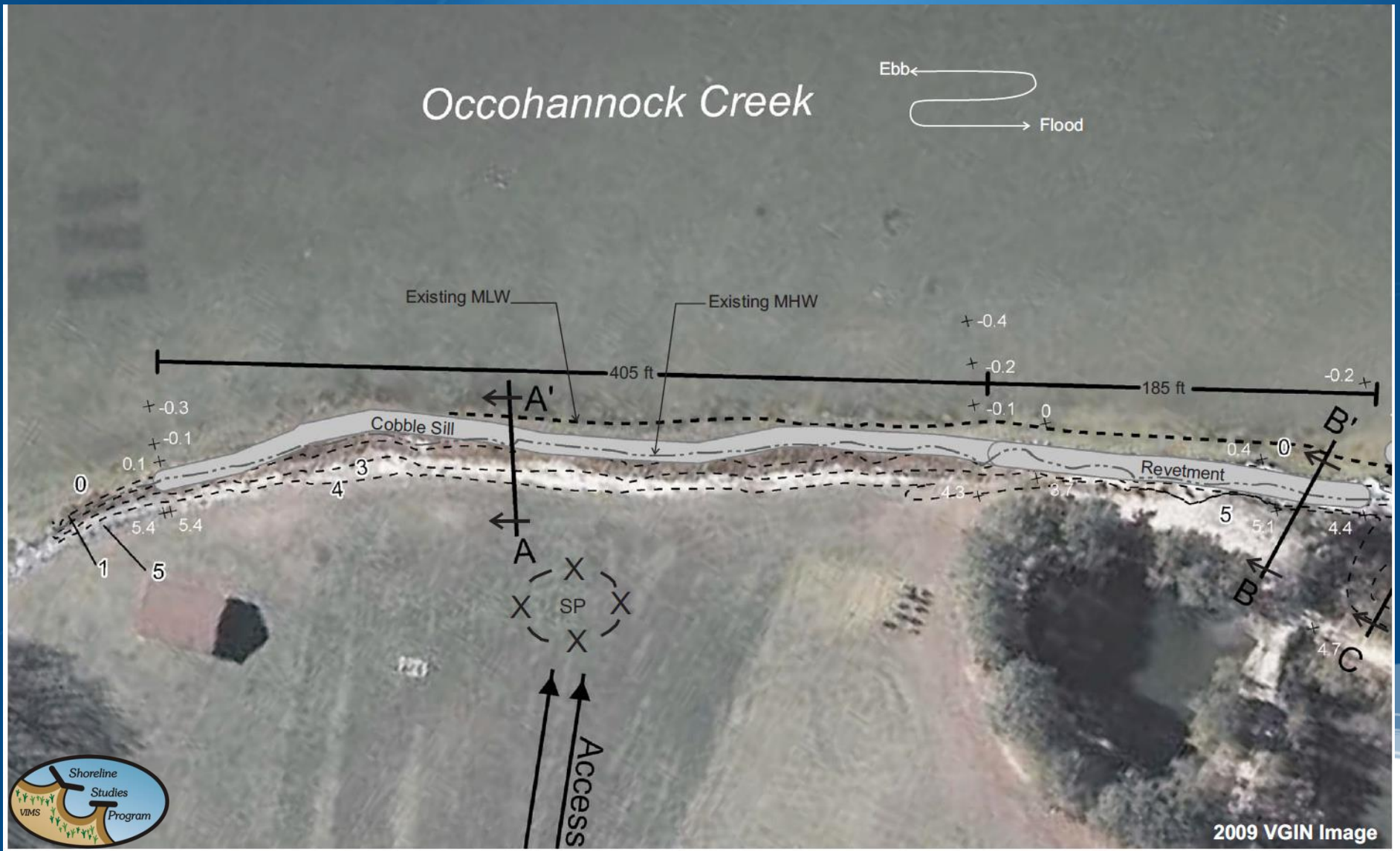
Permit Application



Permit Application

Final Plans

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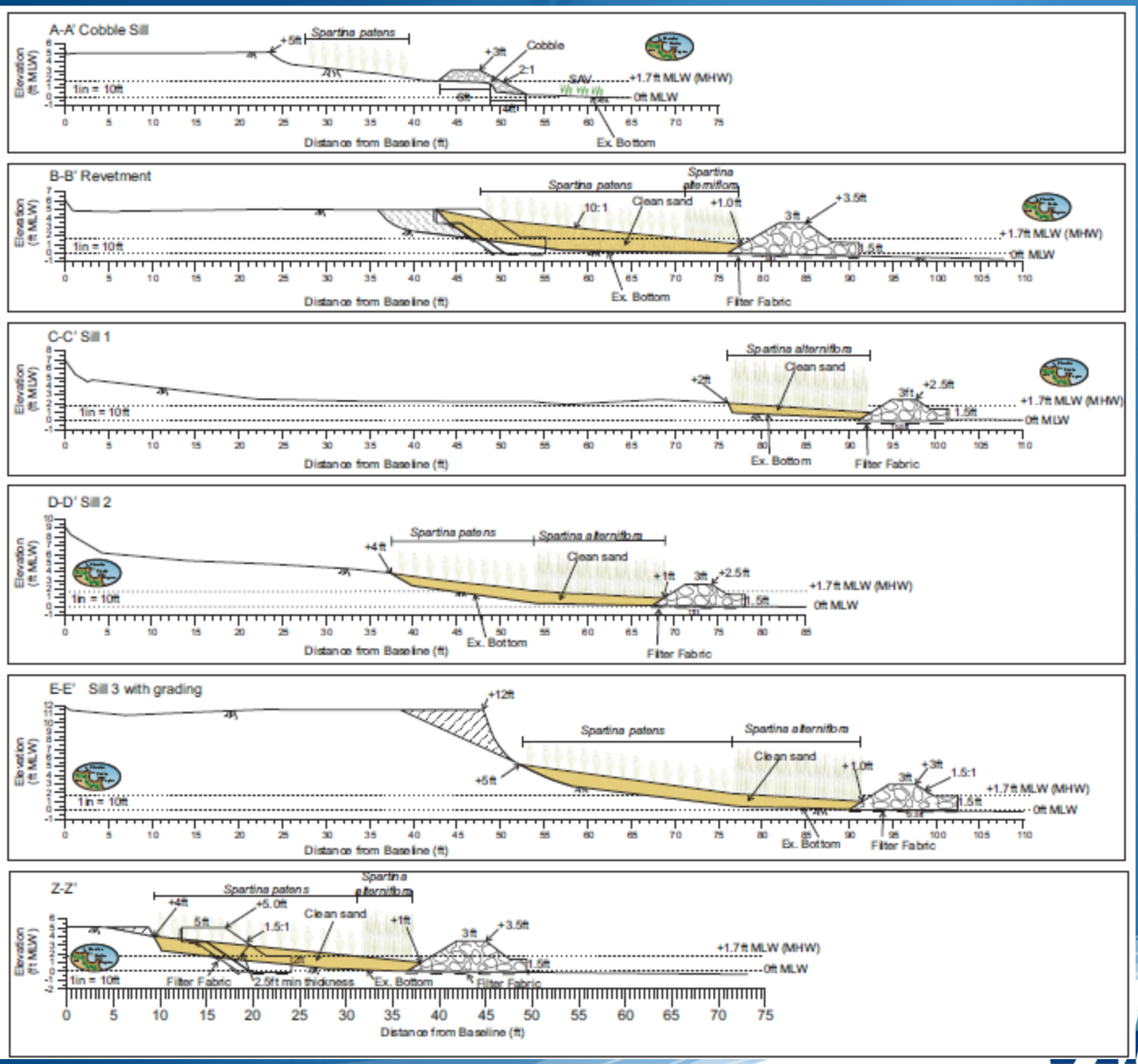

Final Cross-Sections

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Originial Cost Estimate

Camp Occohannock Preliminary Cost Estimate				
	Amount	Unit	Cost ($/unit)	Total Cost ($)
Rock	1080	Tons	80	$86,400
Sand	1068	cy	45	$48,060
Cobble	111	cy	65	$7,215
Plants	7953	plants	1.5	$11,930
			SubTotal:	$153,605
			^25%	$30,721
			TOTAL:	$184,325
^site work, bank grading, tree removal, mob, and demob				

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Habitat Created and Impacts

			Habitat Created		Impacts: Rock					Impacts: Sand					
		Length	Sa (ft^2)	Sp(ft^2)	Max	Max	Vegetated	Nonveg	Subaqueous	Fill	Veg.	Volume		Area	
Typical	Structure				MHW	MLW	Wetlands	Wetlands	Bottom		Wetlands	<MLW	>MLW	<MLW	>MLW
X-Section	Type	(ft)			(ft)	(ft)	(ft^2)	(ft^2)	(ft^2)	(cy)	(ft^2)	(cy)	(cy)	(ft^2)	(ft^2)
A-A'	Cobble Sill	405			12	3	1,920	1,620	50						
B-B'	new sill	185	1,260	4,140	45	18			2,520	360	290	360			5,400
C-C'	Sill	100	1,500		30	12		100	1,200	60		0	5	0	1,500
Bay A	Bay														
D-D'	Sill	120	1,800	1,800	50	25		660	660	192	100	1	70	20	3,600
Bay B	Bay									68	0	1	65	200	1,800
E-E'	Sill	220	3,300	5,500	45	20		5,280	2,640	484	612	1	242	20	8,360
Total		1,030	7,860	11,440	**182**	**78**	**1,920**	**7,660**	**7,070**	**1,164**	**1,002**	**363**	**382**	**240**	**20,660**

Sa=*Spartina alterniflora*

Sp=*spartina patens*

SAV Impact= 180 ft2 of intermittent widgeon grass

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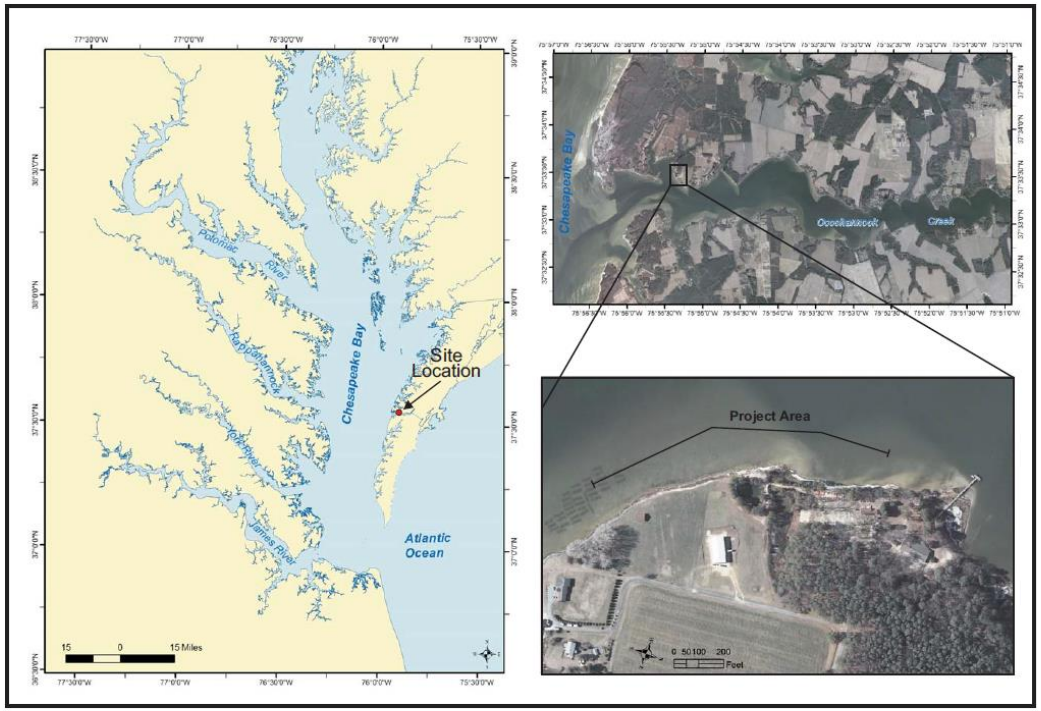
Occohannock on the Bay Camp and Retreat Center Living Shoreline Project



GENERAL NOTES

1. Mean tide range is 1.7 ft (1983-2001)
2. Horizontal control was established by Real Time Kinematic Global Positioning System (RTK-GPS) and is shown in UTM, zone 18, NAD83, ift.
3. Vertical control is MLW. MLW (1983-2001) was determined to be 1.2 ft below NAVD88 at Occohannock on the Bay.
4. Topographic data obtained on 17 and 18 January 2012 using RTK-GPS and a robotic total station.
5. All dimensions and coordinates are given in feet.
6. Plans were created in Esri ArcGIS.

CONSTRUCTION SCHEDULE FOR SEDIMENT AND EROSION CONTROL

1. Contractor/Developer is to notify Eastern Shore NRCS of the date construction is to begin at least seven (7) days prior to the date (Time Frame = 1 day).
2. Clear for and install stabilized construction entrances and access (1 days).
3. Install silt fence and other erosion and sediment control practices (1).
4. Remove all debris interfering with shoreline construction as construction proceeds (continuous). Clear trees and underbrush within designated areas as construction proceeds.
5. Structure installation (90 days).
    1. Install stone and cobble sills and revetment.
    2. Place sand as a vegetative terrace.
    3. Plant vegetative planting terrace as per specifications.
6. Stabilize and seed all upland disturbed areas as specified (continuous).
7. Remove turbidity curtain (1 day).
8. After establishment of vegetative cover on site, remove silt fence and other erosion and sediment control devices.

Index

Engineers Certification

Professional certification. I hereby certify that these documents were prepared or approved by me, and that I am duly licensed professional engineer under the laws of the Commonwealth of Virginia.

VA P.E. License #_____
Expiration Date_____
Name_____
Firm Name_____
Street Address_____
_____
Phone_____

March 2013
(revised 7 August 2013)

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Benchmark	Northing	Easting	Elev (ft MLW)
A	13638553.8	1373267.4	5.8
B	13638974.8	1372975.5	5.0
C	13639459.5	1372949.7	12.3

UTM, Zone 18N, NAD83, IFT
MLW (1983-2001), Geoid09, IFT

Occohannock on the Bay
Camp and Retreat Center

Legend

- Cross Sections
- Sand
- Bulkhead
- Grading
- Contours
- Rock

SCE = Stone Construction Entrance
SP = StockPile

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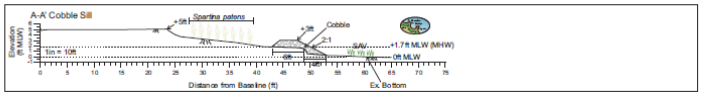
Project Title
Occohannock on the Bay
Living Shoreline Project

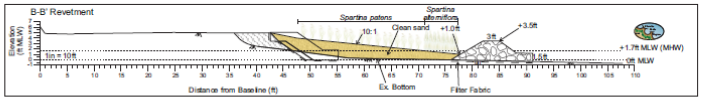
Issued for

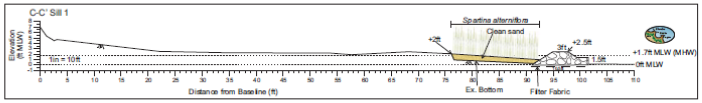
Drawing Title
Plan and Baseline

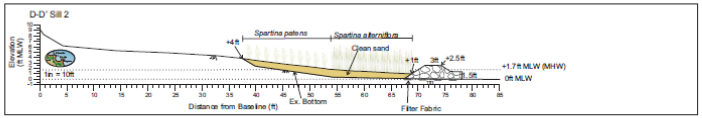
Date 18 March 2013 (revised 23 April 2013)
Scale 1"=50'

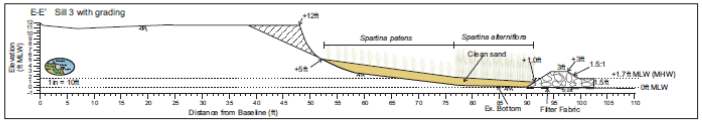
Sheet 1 of 2

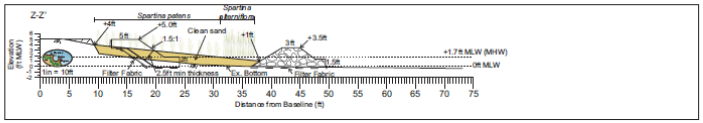












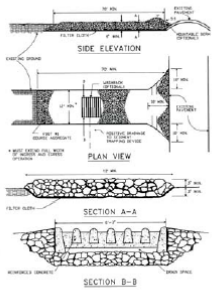
Legend
- Fill
- Grading
- Rock
- Cobble
- Sand

10ft

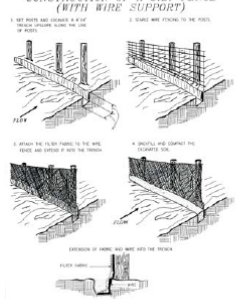
Erosion & Sediment Control Standard Notes

1. The owner/developer must notify the Accomack County Department of Planning at 757-787-5726 at least 24 hours prior to the start of construction in accordance with applicable county ordinances and policies.
2. The owner/developer grants the right-of-entry on to this property to the designated Accomack County personnel for the purpose of inspecting and monitoring for compliance with title 10.1, Chapter 5, Article 4 of the Code of Virginia, Erosion and Sediment Control Law and the Design and Construction Standards Manual Section 750.04 (c).
3. All erosion control measures shown on the approved plan must be in place and inspected and approved by the Department of Public Works prior to clearing, stripping of topsoil or grading.
4. A copy of the approved erosion and sediment control plan and permit shall be kept on the site at all times.
5. The developer/developer's representative is responsible for the installation of any additional erosion control measures necessary to prevent erosion and sedimentation as determined by Accomack County.
6. All disturbed areas are to drain to approved sediment control measures at all times during land disturbing activities and during site development until complete and adequate stabilization is achieved.
7. Water must be pumped into an approved filtering device during dewatering operations.
8. All erosion and sediment control practices must be constructed and maintained according to the minimum standards and specifications of the Virginia Erosion and Sediment Control Handbook and the Virginia Regulations VR 625-02-00 Erosion and Sediment Control Regulations and to the Accomack County Design and Construction Standards Manual. The developer/developer's representative will be responsible for the installation and maintenance of all erosion and sediment control practices at all times.
9. The developer/developer's representative shall inspect all erosion and sediment control measures daily and after each significant rainfall. The following items will be checked in particular:
   A. Sediment basins will be cleaned out when the level of sediment buildup reaches the cleanout elevation indicated on the riser pipe. Sediment shall be disposed in suitable areas and in such a manner that will not erode or cause sedimentation problems. The basin embankment should be checked regularly to ensure that it is structurally sound and has not been damaged by erosion or construction equipment. Emergency spillways should be checked regularly to ensure that its lining is well established and erosion resistant.
   B. Sediment traps will be checked regularly for sediment cleanout. Sediment shall be removed and the trap restored to its original dimensions when the sediment has accumulated to one half the design volume of the wet storage. Sediment removed from the trap shall be deposited in a suitable area and in such a manner that it will not erode and cause sedimentation problems.
   C. Gravel outlets will be checked regularly for sediment buildup which will prevent drainage. If the gravel is clogged by sediment, it shall be removed and cleaned or replaced.
   D. Silt fence barriers will be checked regularly for undermining or deterioration of the fabric. Sediment shall be removed when the level of sediment deposition reaches half way to the top of the barrier.
   E. Seeded areas will be checked regularly to ensure that a good stand is maintained. Areas should be fertilized and reseeded as needed.
   F. Stream diversion and storm conveyance channels shall be inspected daily and after each rain to ensure they're functioning properly and that the integrity of the linings are not impaired. Any necessary repairs or cleanup to maintain the effectiveness of the erosion control devises must be made immediately after the inspection.
10. Sediment trapping measures will be installed as a first step in grading and will be seeded and mulched immediately following installation.
11. Permanent soil stabilization shall be applied to denuded areas within seven (7) days after final grade is reached on any portion of the site. Temporary soil stabilization shall be applied within seven (7) days to denuded areas that may not be at final grade but will remain undisturbed for longer than fourteen (14) days. Seeding and selection of the seed mixture shall be in accordance with the Virginia Erosion and Sediment Control Handbook Standard and Specifications 3.32. Roads and parking areas shall be stabilized within seven (7) days after final grade is reached.
12. All temporary erosion and sediment control measures will be removed within 30 days after adequate site stabilization and after the temporary measures are no longer needed, as authorized by the Prince William County inspectors. Trapped sediment and the disturbed soil areas resulting from the disposition of temporary measures will be permanently stabilized to prevent further erosion and sedimentation.
13. When sediment is transported onto a paved road surface, the road will be cleaned thoroughly at the end of each day. Sediment will be removed from the roads by shoveling or sweeping and transported to a sediment control disposal area. Street washing will be allowed only after sediment is removed in the manner.
14. Areas which are not to be disturbed will be clearly marked by flags, signs, etc.
15. RPA and flood plain limits shall be clearly marked in the field by flags, signs, etc.
16. Tree save areas shall be clearly marked in the field by orange safety fence.
17. Orange safety fence must be installed around all silt traps and sediment basins.

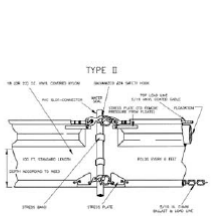
Stabilized Construction Entrance



Silt Fence



Turbidity Curtain
(if required)



Occohannock on the Bay
Camp and Retreat Center

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Project Title
Occohannock on the Bay
Living Shoreline Project

Issued for

Drawing Title
Cross-sections and Erosion and Sediment Control

Date
18 March 2013 (revised 23 April 2013)

Scale

Sheet
2 of 2

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THE END