



# Developing a List of Approved Equivalent Living Shoreline Products

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# Questions

Which living shoreline product should I select for my project?

**Product A vs. Product B**

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Which living shoreline product should I select for my project?

## **Product A vs. Product B**

What if we could remove the selection process entirely?

What if we could develop a list of approved equivalents?

# Agenda

Background, Motivation, and Goals

Development of the RFI

Preliminary List of Approved Equivalents

Final Design Refinement

Bidding and Construction

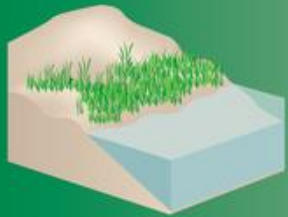


# HOW GREEN OR GRAY SHOULD YOUR SHORELINE SOLUTION BE?

## GREEN - SOFTER TECHNIQUES

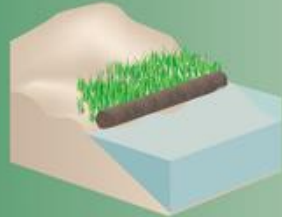
## GRAY - HARDER TECHNIQUES

### *Living Shorelines*



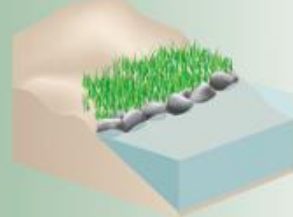
#### **VEGETATION ONLY -**

Provides a buffer to upland areas and breaks small waves. Suitable only for low wave energy environments.



#### **EDGING -**

Added structure holds the toe of existing or vegetated slope in place.



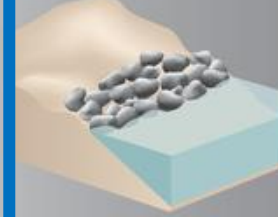
#### **SILLS -**

Parallel to existing or vegetated shoreline, reduces wave energy, and prevents erosion. Suitable for most areas except high wave energy environments.



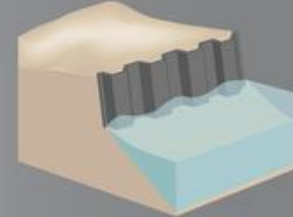
#### **BREAKWATER -**

(vegetation optional) - Offshore structures intended to break waves, reducing the force of wave action, and encourage sediment accretion. Suitable for most areas.



#### **REVETMENT -**

Lays over the slope of the shoreline and protects it from erosion and waves. Suitable for sites with pre-existing hardened shoreline structures.



#### **BULKHEAD -**

Vertical wall parallel to the shoreline intended to hold soil in place. Suitable for areas highly vulnerable to storm surge and wave forces.

[fisheries.noaa.gov](https://www.fisheries.noaa.gov)

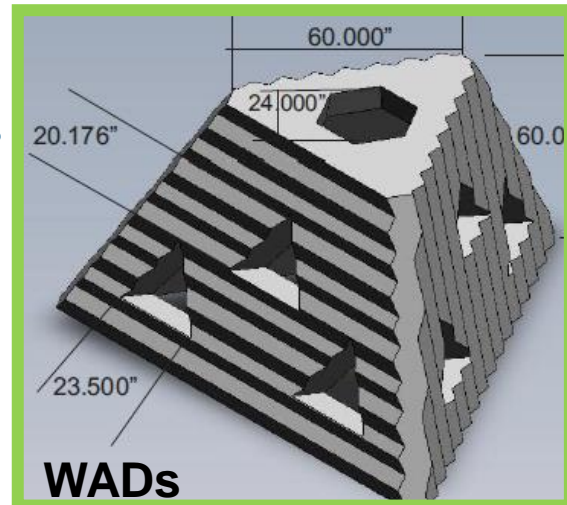


# Background

Demonstration project  
Analyzed performance  
of known living  
shoreline and artificial  
reef products using  
Flow3D

Ranked each product  
for cost-effectiveness

Selected the most  
cost-effective products  
for construction





1/16/2019



3 bottom x 2 top – 4' tall  
58" diameter





1/16/2019



5' tall  
9' 5" base



1/16/2019



Ultra Ball – 4' 4" tall  
5' 6" diameter



# Motivation

Next phase of the project will be 9-12 miles

How do you introduce competition?

How do you get around sole sourcing?

How do you enforce LDs?



# Goal

Make contractors and product manufacturers compete

Contractors able to leverage better pricing and scheduling

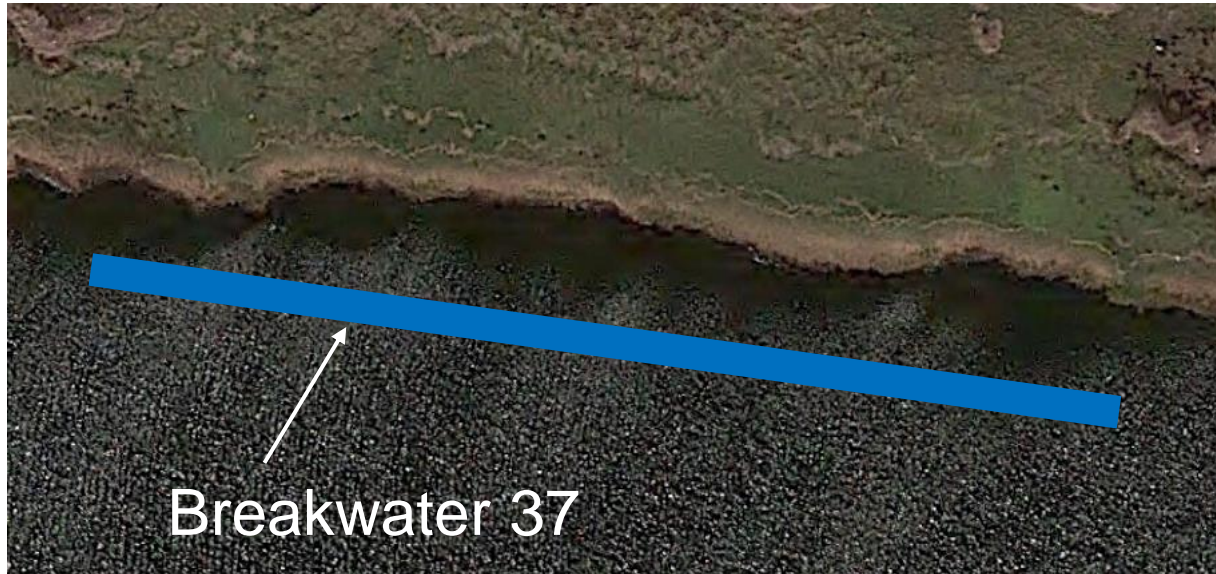
Contractors can select the manufacturer(s) that best fits their installation approach

Flexibility during construction

Incorporate “or approved equivalent” into the design

# End goal

Delineate a group of various product configurations for each breakwater segment



Item	Product Configurations
BW 37	2 rows of Product A, 6 in spacing 3 rows of Product D, 24 in spacing 1 row of Product E, 6 in spacing
BW 55	1 row of Product A, 24 in spacing 2 rows of Product C, 18 in spacing

# Performance-based engineered equivalent – framework

## Literature review

Little to no example for similar process

Products required no performance requirement

Products required to have performance metrics, but no correlation to project site



# Performance-based engineered equivalent – framework

## Planning charette takeaways:

Create a transparent performance-based evaluation

Use new data collected to improve analysis tools

*Flow3D*

*Shoreline change rate*

Develop minimum wave attenuation rate at various water levels

Develop performance-based engineered equivalent product list

No guarantee to be used on the project

Inclusion/exclusion does not impact their ability to be used on other projects

# Performance-based engineered equivalent – framework

## Manufacturer feedback takeaways:

Excited, but hesitant

Need a lot of time to prepare a submittal

Need a way to contest the results and outcomes

Need a way to opt out

# Notice of Intent

**Notice of Intent to issue a  
Request for Information (RFI)  
Artificial Reef Product Information  
2503-19-02**

**Date:** July 23, 2018

**Agency:** Louisiana Coastal Protection and Restoration Authority

**Action:** Notice of Intent

**Summary:** The Louisiana Coastal Protection and Restoration Authority (CPRA) is conducting engineering and design activities for the PO-0174 Biloxi Marsh Living Shoreline Project (Project). The Project, located in St. Bernard Parish, is anticipated to protect 9 to 11 miles of shoreline north of Eloi Bay. The primary goal of the Project is to reduce shoreline recession rates and enhance local oyster production through the implementation of marsh-fringing and artificial reefs to promote the formation of self-sustaining living breakwaters.

This Notice of Intent is to provide early notification to product manufacturers of the upcoming Request for Information (RFI). Through a subsequent Request for Information (RFI), CPRA intends to solicit information from artificial reef products manufacturers to develop a list of approved products to potentially be used in the construction of the Project. The goal of the subsequent RFI will be to obtain information on available artificial reef products for consideration. CPRA will then use the information received through the RFI, along with engineering analyses conducted by the design team, to evaluate the artificial reef products to determine their applicability for use at the Project site.



# Request for Information

Format similar  
to standard  
RFQ

Background  
info

Evaluation  
criteria and  
methodology

Conditions,  
requirements,  
etc

## REQUEST FOR INFORMATION (RFI) ARTIFICIAL REEF PRODUCT INFORMATION

RFI NO. 2503-19-04

FEBRUARY 20, 2019

### 1.0 INTRODUCTION

The Louisiana Coastal Protection and Restoration Authority (CPRA) is conducting engineering and design activities for the PO-0174 Biloxi Marsh Living Shoreline Project (Project). The primary goal of the Project is to reduce shoreline recession rates and enhance local oyster production through the implementation of marsh-fringing artificial reef breakwaters to promote the formation of self-sustaining living breakwaters.

This Request for Information (RFI) intends to solicit information from artificial reef product manufacturers. CPRA intends to develop a list of approved equivalent product configurations for potential use in the construction of the Project. CPRA will use the information received through this RFI, supplemented with engineering analyses conducted by the Project design team, to evaluate the artificial reef product configurations to determine their applicability for use at the Project site. The criteria for evaluation of the potential product configurations is outlined within this RFI. All products submitted must be able to be installed by a third-party construction contractor.

Product configurations that meet the requirements specified herein will be placed on a Preliminary List of Approved Equivalent Product Configurations for the Project. See Section 17.0 POST-RFI COORDINATION for additional information.

This RFI is exclusive to the Project. Only submittals that meet the minimum requirements specified herein will be considered. Failure to be selected as an approved equivalent product configuration for this Project will **not** preclude a manufacturer from participating in other CPRA projects.

# Evaluation

## Bearing pressure

## Wave transmission

Parameter	Value
Wave Height	1 to 2.5 ft
Wave Period	2 to 4 sec
Water Level	Max, MHHW, MSL, MLLW

Water Level	Kt
MHHW + 1.7 ft	Average < 0.95
MHHW	Average < 0.75
MSL	Average < 0.62
MLLW	Average < 0.50

## Hurricane stability

Determined by Flow3d, based on previous project

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Hurricane stability

Manufacturer: How to ensure?

# Preliminary List of Approved Equivalents

7 manufacturers submitted

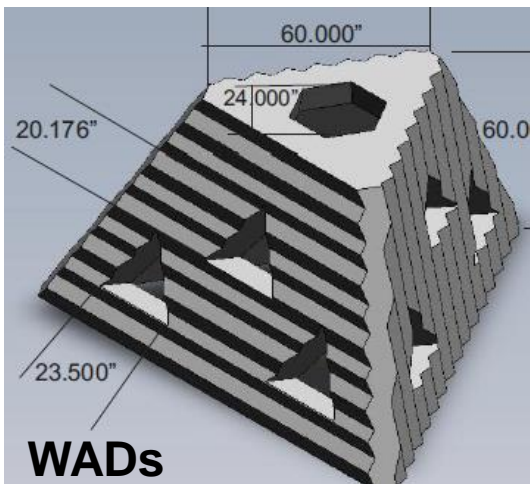
4 manufacturers were selected

Living Shoreline Solutions – WAD

Wayfarer Environmental Technologies – Oysterbreak

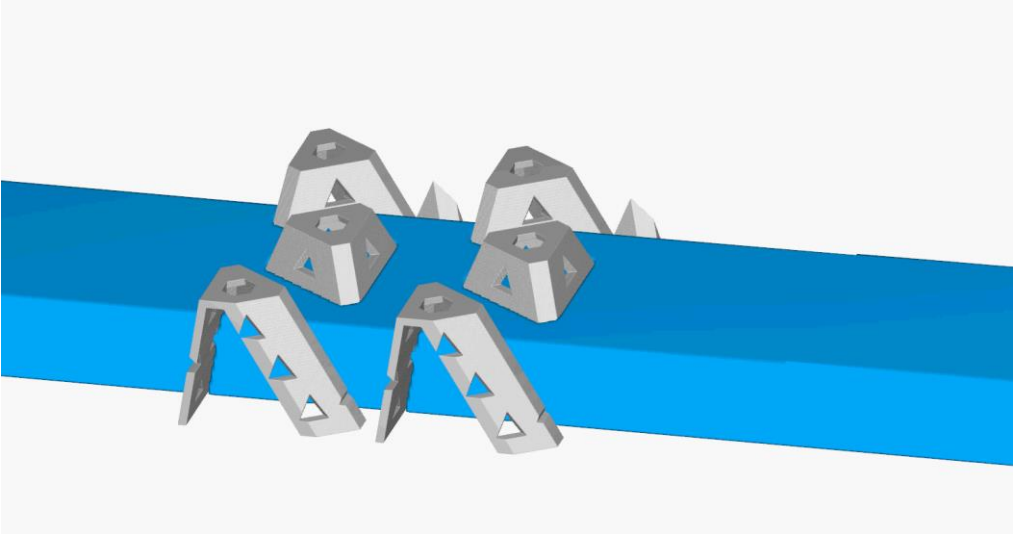
Premier Concrete – ShoreJax

Martin Ecosystems – EcoBale

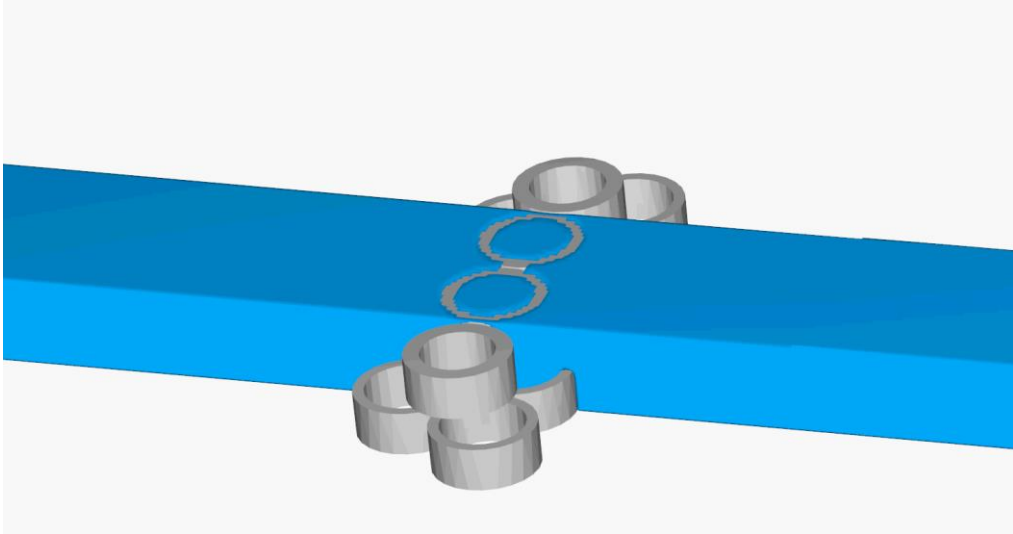




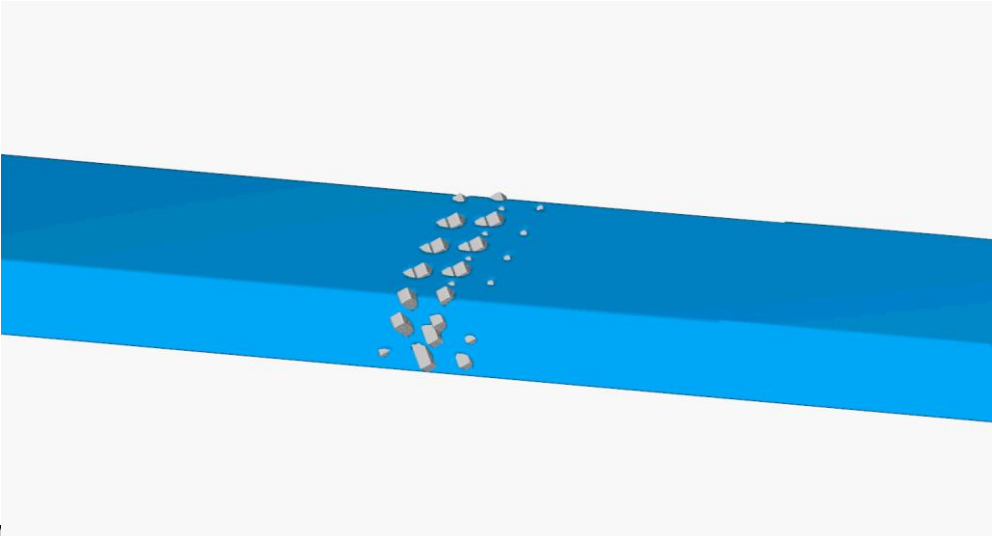
# Preliminary List of Approved Equivalents



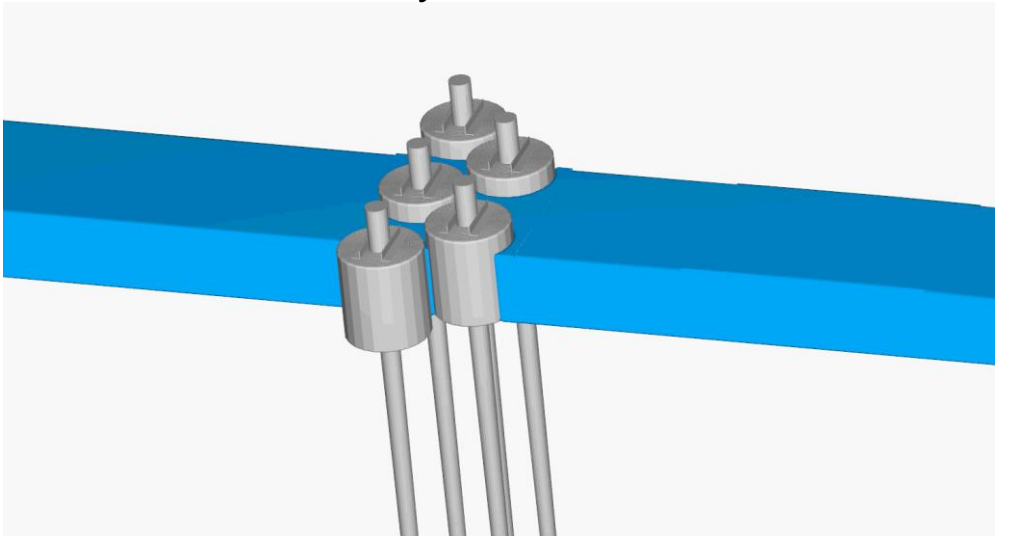
WAD



Oysterbreak



ShoreJax



EcoBale

# Final Design Refinement

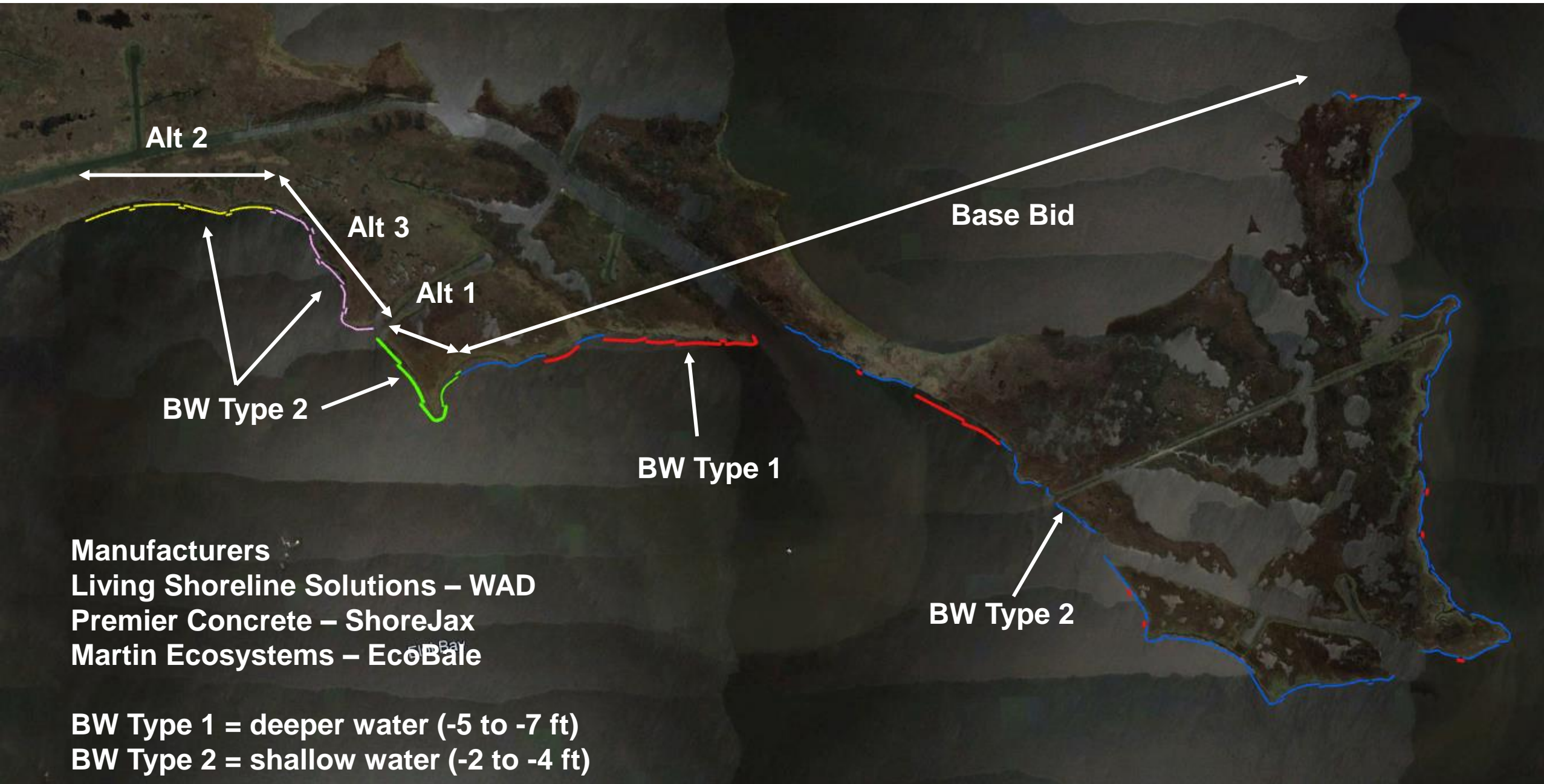
## Analysis

Flow3D -> shoreline change rate change = land saved

Evaluated throughout shoreline to develop regimes for performance

Worked with manufacturers to make modifications to their configuration scheme

OysterBreak product was pulled from project at request of manufacturer/licensee



# Bidding and Construction

Bid date 5/14/2021

Lots of questions = lots of addenda

Bid opening 7/14/2021

4 responsible bidders

Winning bidder was Rigid Constructors who was awarded the full project of Base Bid through Alt 3

Currently in pre-construction submittal phase

Mobilization expected May/June 2022





# Thank you

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