

EDITH READ WILDLIFE SANCTUARY LIVING SHORELINE FEASIBILITY STUDY

Long Island Sound
Rye, New York

Westchester
gov.com

LONG ISLAND SOUND STUDY
HABITAT RESTORATION AND STEWARDSHIP WORK GROUP
WEDNESDAY MAY 4, 2021

SLR 
SLR CONSULTING,
LANDSCAPE ARCHITECTURE,
AND LAND SURVEYING, P.C.

FORMERLY
 MILONE & MACBROOM

PROJECT DESIGN TEAM



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Principal Scientist, Wetlands and Waterways Lead,
SLR International Corporation



JIM MURAC, PE, CFM
Senior Water Resources Engineer,
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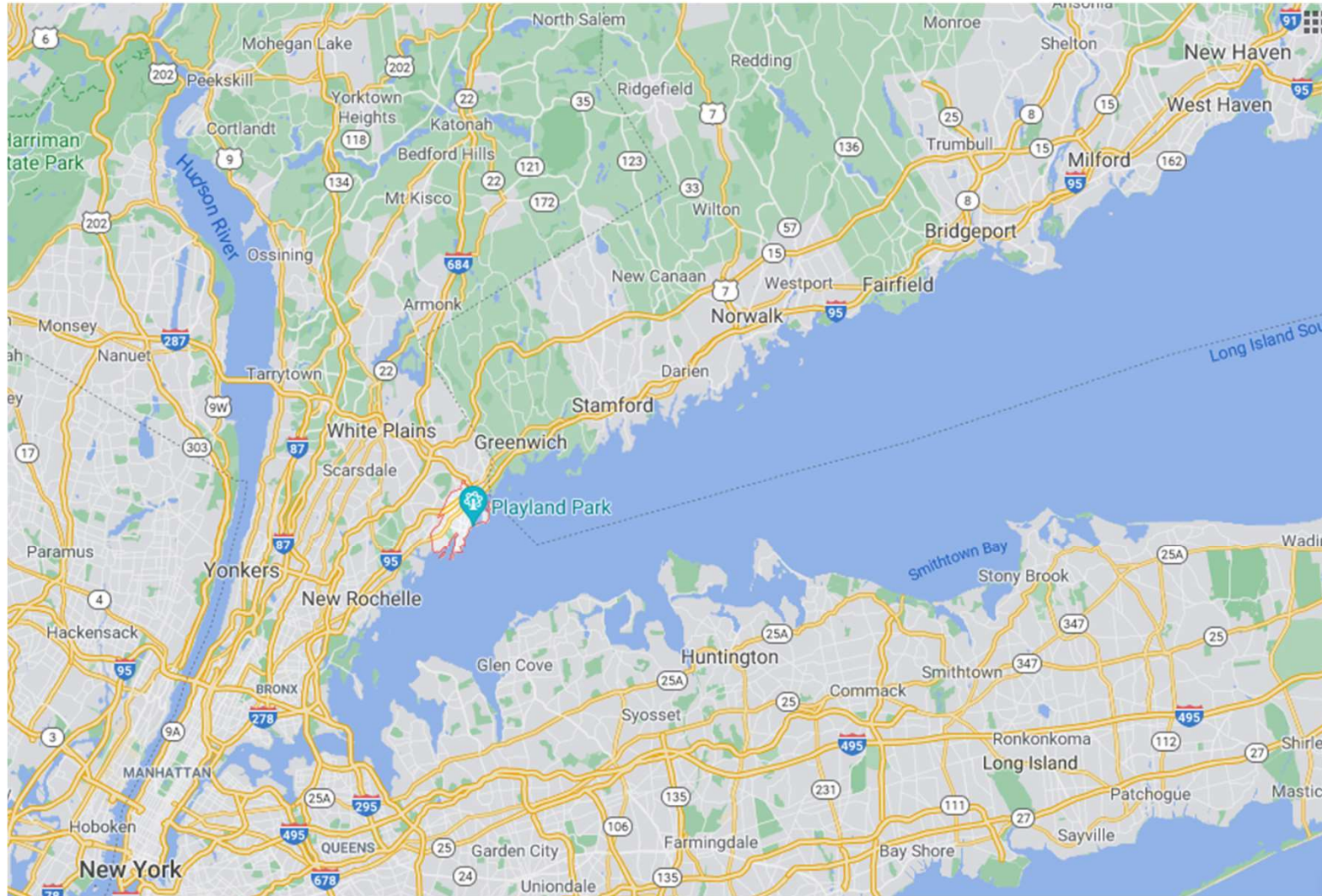


ELLEN HART, AICP
Environmental Scientist / Planner,
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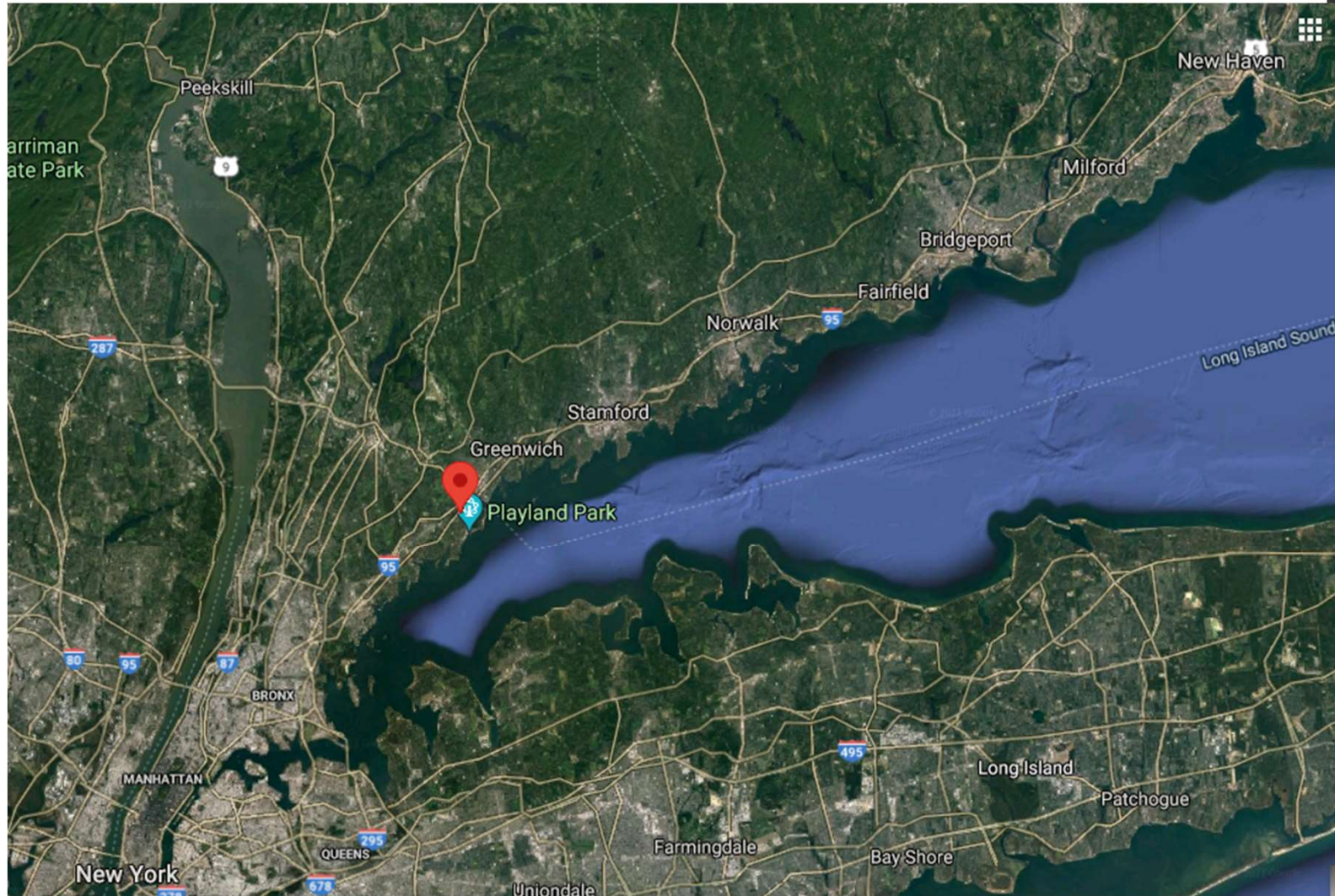
PROJECT SPONSOR

ROBERT DOSCHER, PWS, CPESC
Principal Environmental Planner
Department of Planning
District Manager
Soil and Water Conservation District
County of Westchester

LOCATION MAP



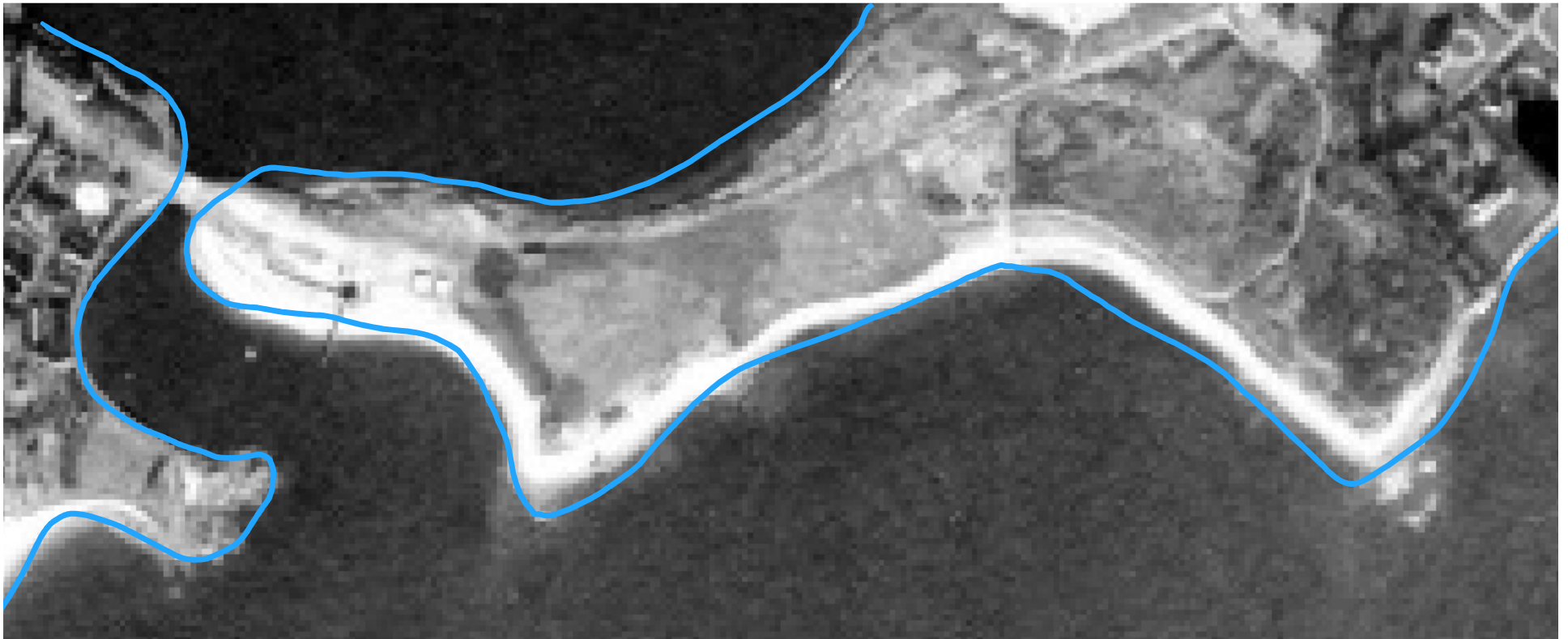
LOCATION MAP



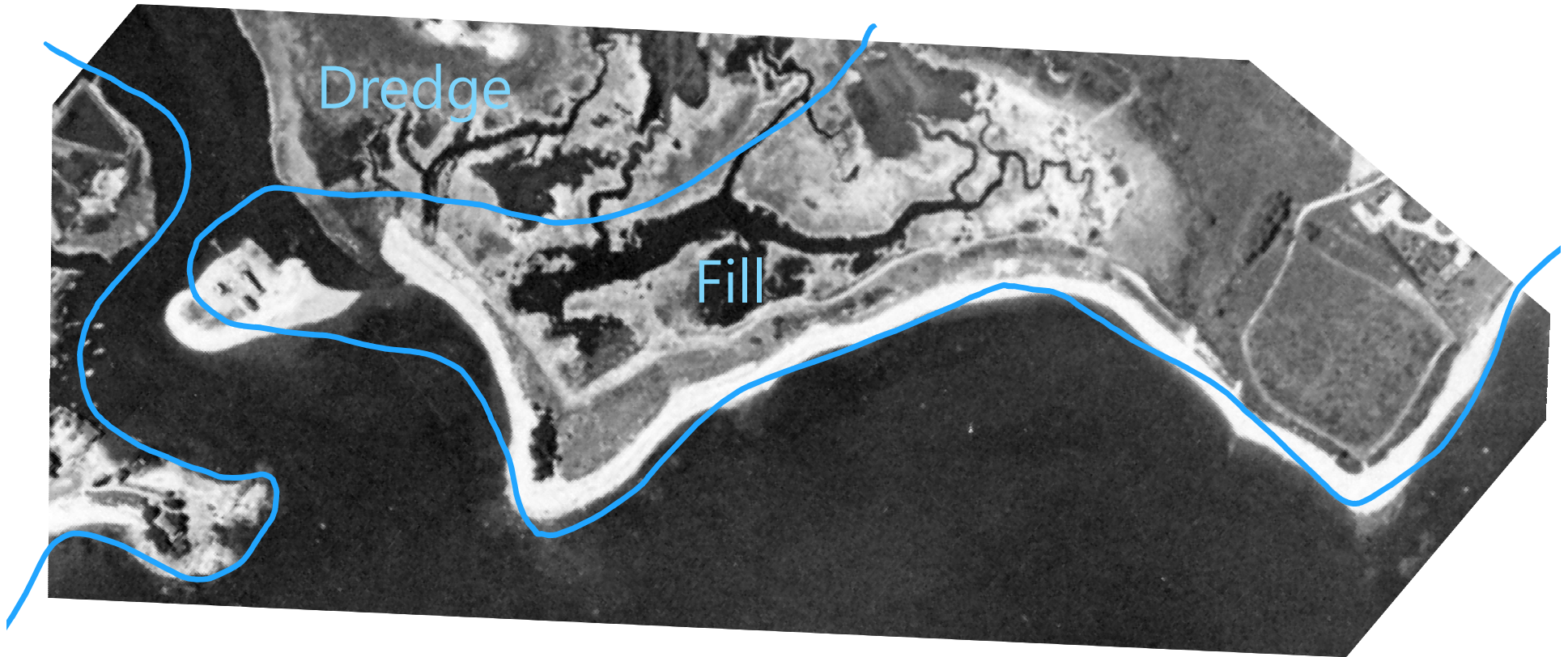
LOCATION MAP



HISTORIC AERIAL IMAGERY 1940



HISTORIC AERIAL IMAGERY 1925



HISTORY & TIMELINE

- Playland built in 1928
- Manursing Pond created between 1925 and 1940.
- Nor'easter in December 1992: Shoreline and sanctuary access road severely eroded by strong wave action.
- Further damage to the Sanctuary and Playland Park during subsequent tropical cyclones and other storms.
- County installed hard armoring and dune system along the shoreline to improve its resilience to coastal erosion.
- Dunes substantially destroyed and eventually eliminated during Hurricane Sandy in 2012.

HISTORIC AERIAL IMAGERY 2010 (PRE SANDY)



HISTORIC AERIAL IMAGERY NOV 2012 (POST SANDY)



PROJECT SITE



PROJECT SITE



PROJECT SITE



PROJECT SITE



PROJECT SITE



PROJECT GOALS AND OBJECTIVES



- Protection of shoreline, infrastructure, and roadway
- Improve water quality and enhance ecological habitat diversity for birds, fish, and mollusks
- Improve resilience to sea level rise (SLR)
- Create a demonstration project

ECOLOGICAL RESOURCES



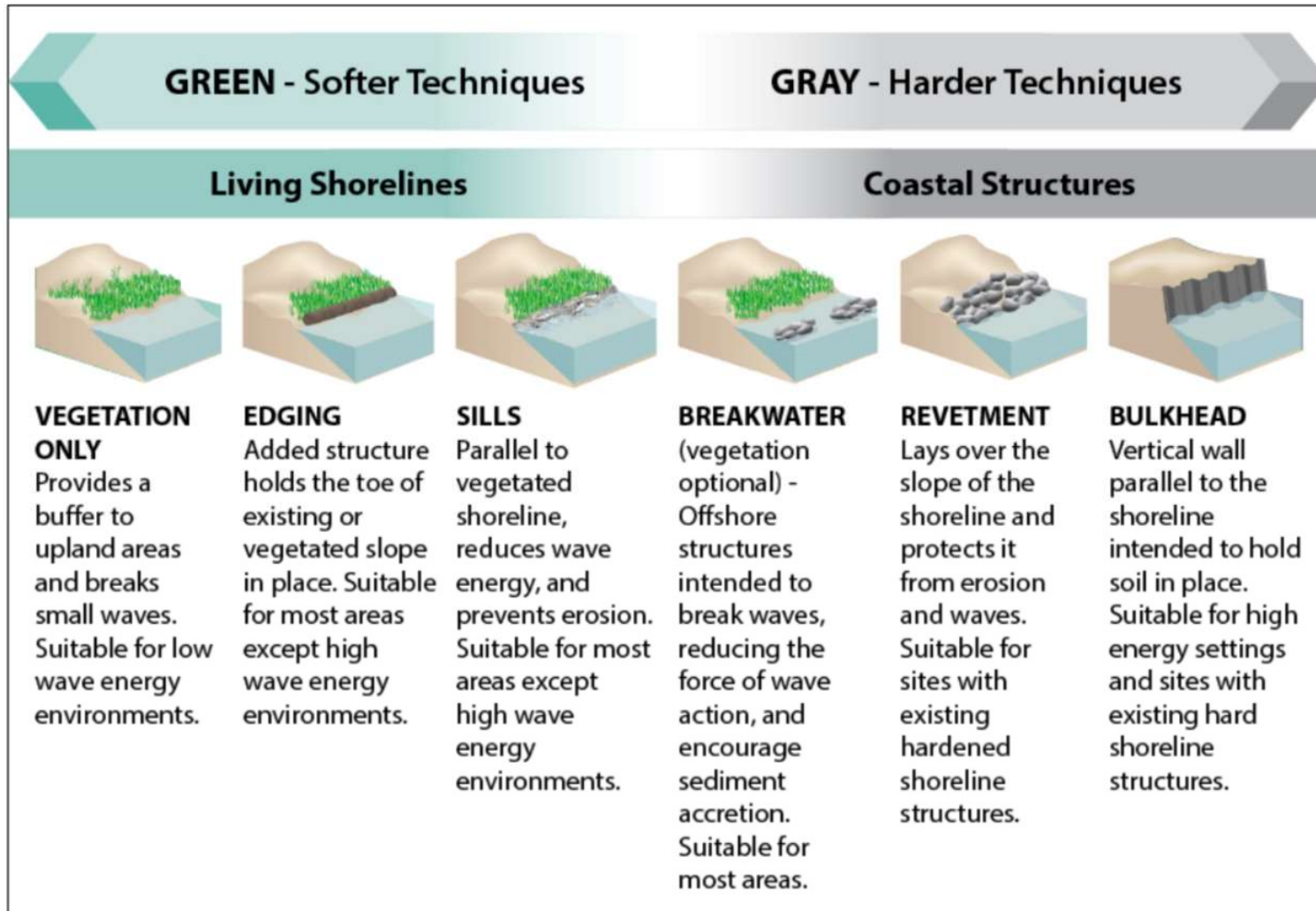
- Transition from marine to terrestrial comprised of a shallow scarp created through deposition of dredge spoils from Manursing Lake
- Shallow scarp transitions to a flat manicured lawn area, leading north to the roadway and then transitioning to the restored tidal wetlands that border the south bank of Manursing Lake
- Limited vegetation along this transition and dominated by common reed (*Phragmites australis*)
- Intertidal area dominated by rocky, cobbly beach face
- Scattered bedrock outcrops exist in the nearshore
- Pockets of vegetated tidal wetlands punctuate the beach face

LIVING SHORELINE (LS) DEFINITION



- The National Oceanic and Atmospheric Association (NOAA) defines a living shoreline as follows:
 - **"A living shoreline is made up mostly of native material.** It incorporates natural vegetation or other living, natural soft elements alone or in **combination** with some type of harder shoreline structure, like **oyster reefs, rock sills, or anchored large wood for added stability.** Living shorelines connect the land and water to stabilize the shoreline, reduce erosion, and provide ecosystem services, like **valuable habitat**, that enhances **coastal resilience.**"
- Examples can include beach nourishment, dune creation or restoration, tidal marsh (wetland) restoration with or without rocky structures, artificial reefs, and bioengineered bank stabilization

SHORELINE DESIGN METHODOLOGIES



Source: CRS, adapted from NOAA, *Guidance for Considering the Use of Living Shorelines*, 2015, p. 8, at https://www.habitatblueprint.noaa.gov/wp-content/uploads/2018/01/NOAA-Guidance-for-Considering-the-Use-of-Living-Shorelines_2015.pdf.

PROJECT SITE



PROJECT SITE



LS DESIGN CONSIDERATIONS



- Tidal Range
 - Salinity
 - Wave exposure
- Environmental / ecological resources present or possible
- Intertidal shore slope
- Wave energy and fetch
- Land use on and adjacent to the site
- Topology between coastal and terrestrial areas
- Shoreline erosion rates
- Sea Level Rise (SLR)

LS DESIGN CONSIDERATIONS



TABLE 8
TNC Living Shoreline Applicability Index Tool¹

Living Shoreline Type	Living Shoreline Type is Applicable to Site?
Dune – Natural	Likely
Dune – Engineered Core	Possible
Beach Nourishment	Likely
Coastal Bank – Natural	Likely
Coastal Bank – Engineered Core	Likely
Natural Marsh Creation/Enhancement	Possible
Marsh Creation/Enhancement w/Toe Protection	Likely
Living Breakwater	Possible

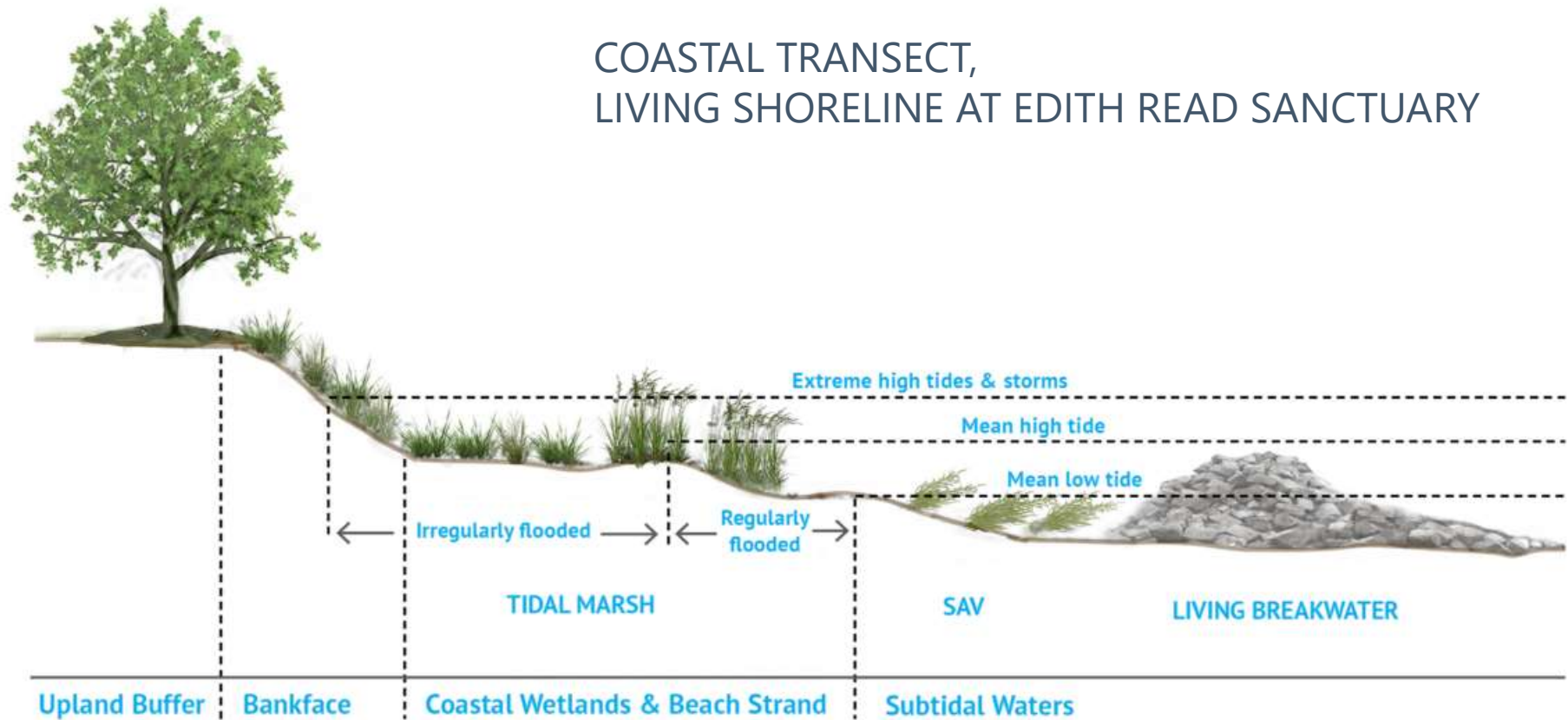
According to the results of the index tool, many options are possible or likely to succeed at the project site.

¹ Woods Hole Group, Inc., July 2017 "Living Shorelines in New England: State of the Practice"

LS DESIGN CONSIDERATIONS



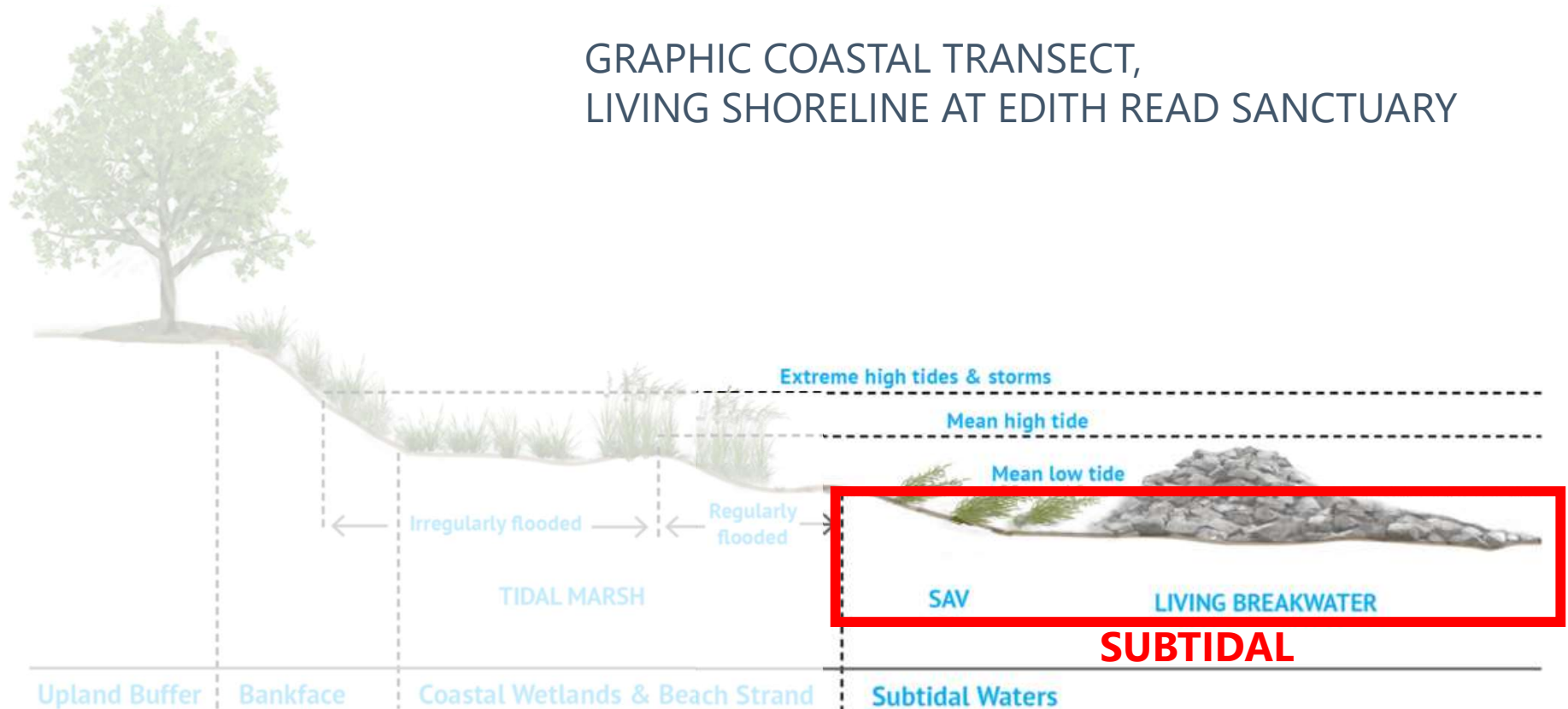
COASTAL TRANSECT,
LIVING SHORELINE AT EDITH READ SANCTUARY



LS DESIGN CONSIDERATIONS



GRAPHIC COASTAL TRANSECT,
LIVING SHORELINE AT EDITH READ SANCTUARY

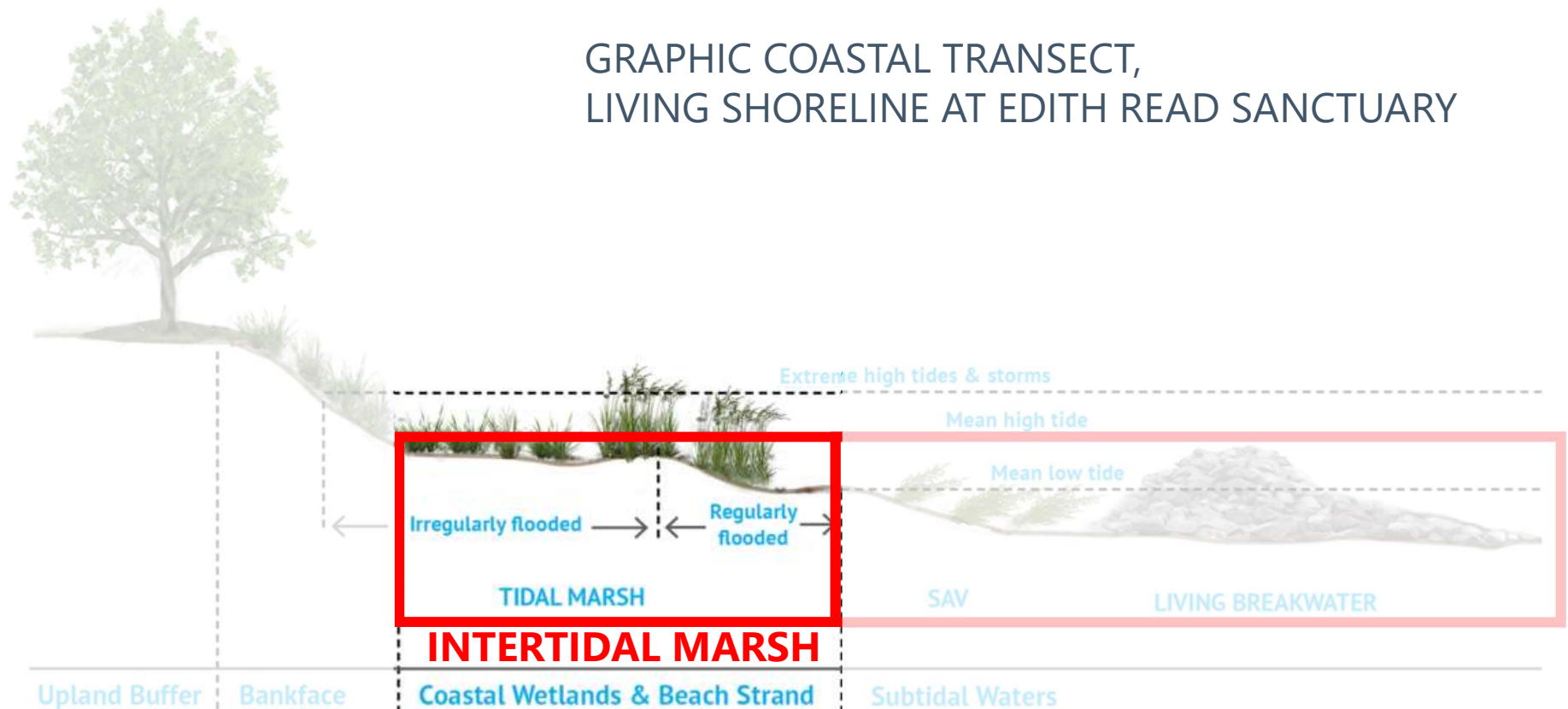


THREE PRIMARY ZONES

LS DESIGN CONSIDERATIONS



GRAPHIC COASTAL TRANSECT,
LIVING SHORELINE AT EDITH READ SANCTUARY

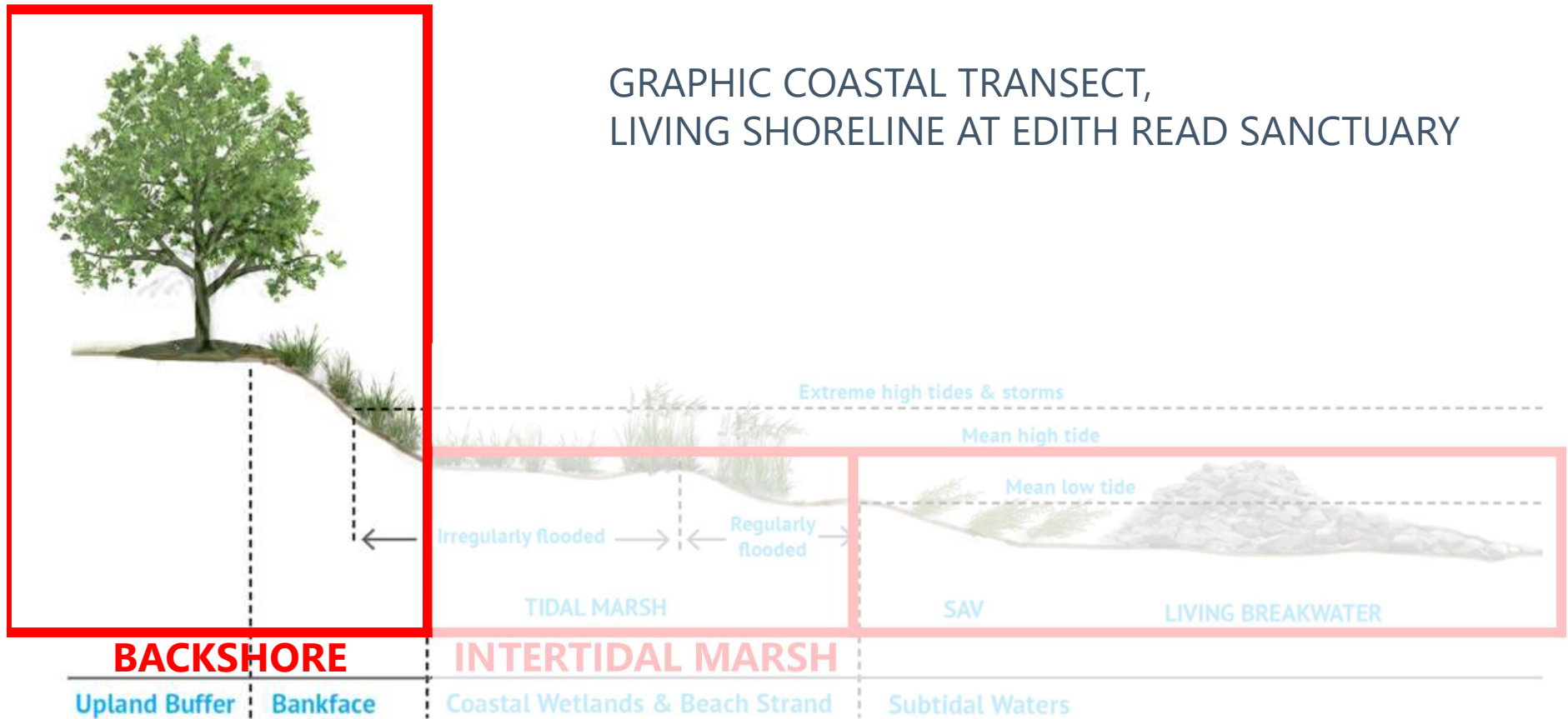


THREE PRIMARY ZONES

LS DESIGN CONSIDERATIONS



GRAPHIC COASTAL TRANSECT,
LIVING SHORELINE AT EDITH READ SANCTUARY



THREE PRIMARY ZONES

SUBTIDAL/INTERTIDAL WAVE ATTENUATION



- Oyster Reef & Boulder Sills (Elevation -4'–1' NAVD)



“SMART Rock”



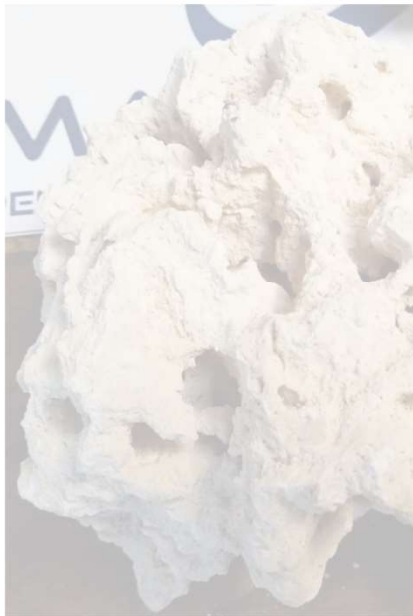
Boulder Sill



■ Oyster Reefs

As Storms Get Bigger, Oyster Reefs Can Help Protect Shorelines

Municipalities and military bases are using the bivalve to defend against flooding and damage from climate change-driven storms



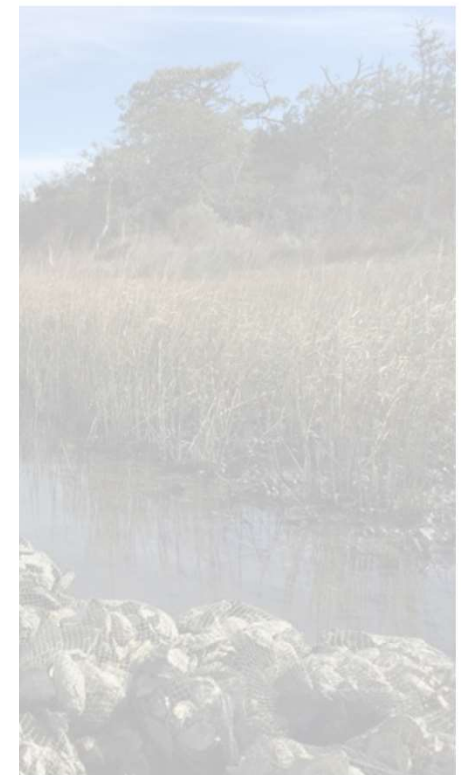
“SMART Rock”



An oyster-dominated anti-erosion structure in Texas (The Nature Conservancy)

By [Emily Matchar](#)
SMITHSONIANMAG.COM
JANUARY 10, 2018

1' NAVD)



Two hundred years ago, the streets of lower Manhattan were lined with “oyster cellars,” rough-and-ready establishments hawking all-your-can-eat oysters for six cents. In those days, the floor of New York Harbor was covered in oyster reefs, making the bivalve a cheap and plentiful snack for the underclass of the rapidly growing city.

REEF BALLS



Stratford Point, CT



“Reef ball”

Creating a 'living shoreline' with Reef Balls

By **Linda Conner Lambeck** Updated 12:36 pm EST, Monday, December 12, 2016



Photo: Brian A. Pounds / Hearst Connecticut Media



IMAGE 1 OF 11

[Buy Photo](#)

Sacred Heart University professor Jennifer Mattei gives a tour of the 325 newly installed reef balls along a section of the shoreline in Stratford on Tuesday. The balls break up the force of wave action to ... [more](#)

STRATFORD — **Jennifer Mattei** crouched along the low-tide mark at Stratford Point to scoop up a mound of inky gray sediment in the palm of her hand.

It is proof, the **Sacred Heart University** biology professor said, that her Reef Balls are working to restore the beach.



INTERTIDAL MARSH



- (Elevation 1' – 5' NAVD)



Intertidal Marsh: peat recruitment and spartina in reduced wave energy zone

BACKSHORE COASTAL BERM

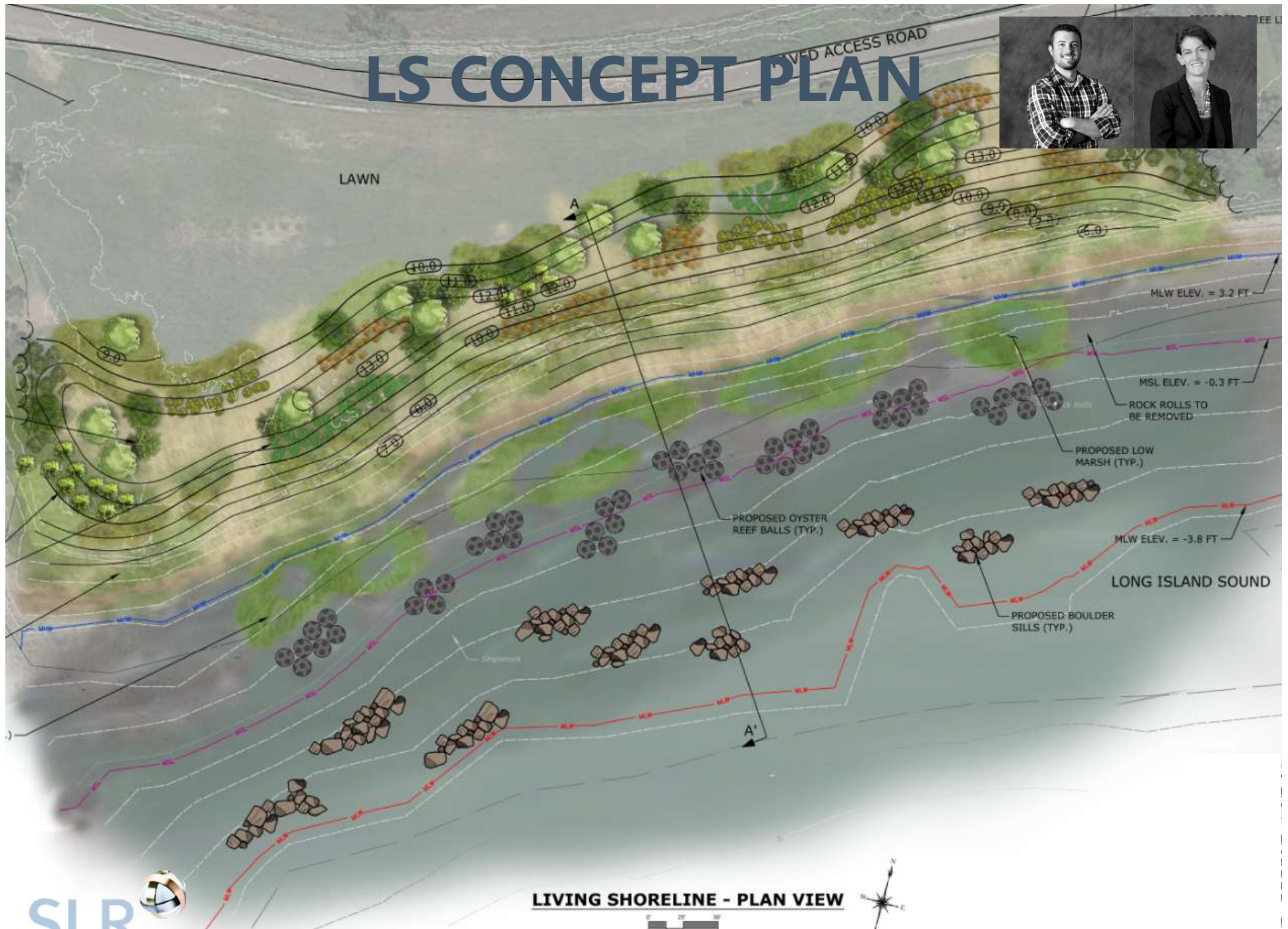


- (> Elevation 5' NAVD)



Salt-tolerant native shrubs and trees planted on berm

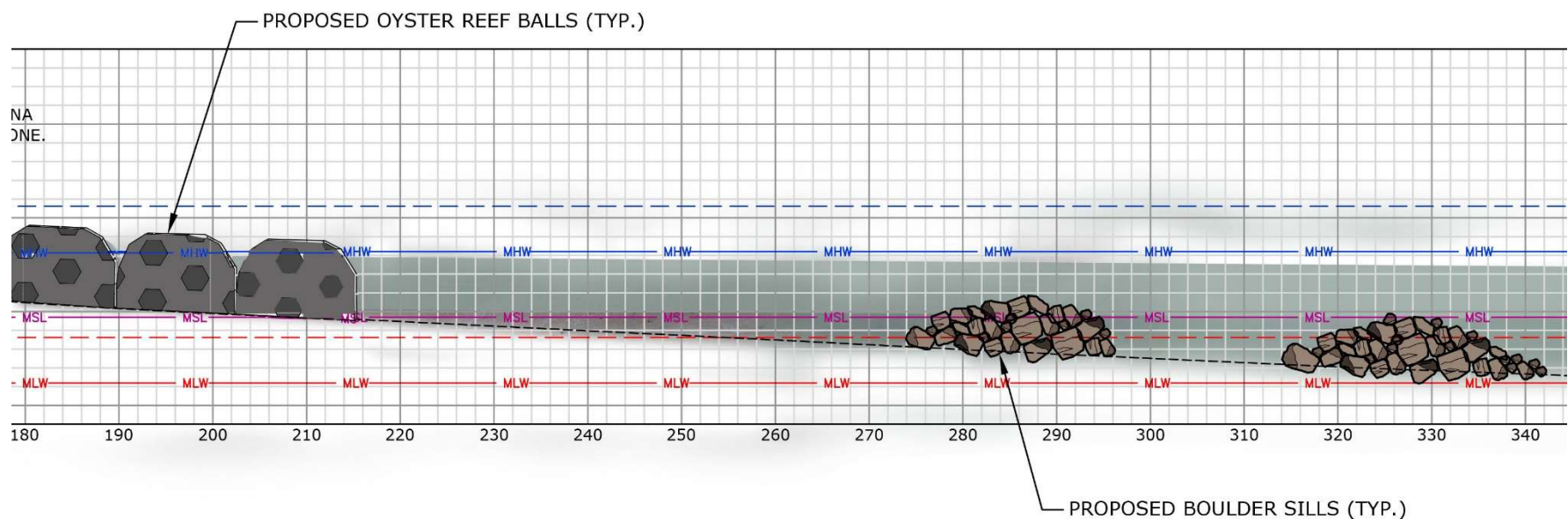
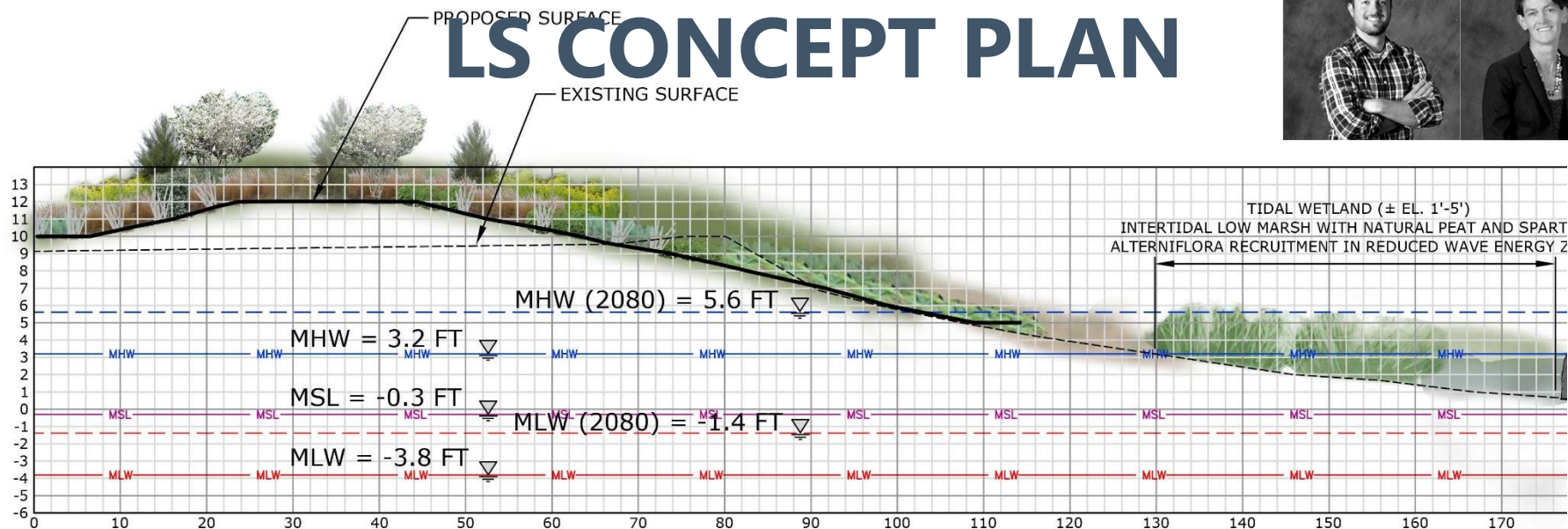
LS CONCEPT PLAN



LIVING SHORELINE - PLAN VIEW



LS CONCEPT PLAN



CONSTRUCTABILITY



- Playland Park parking area for construction access routes and staging areas.
- Adjacent lawn and parking areas for laydown, stockpiling and staging.
- Construction of the reef balls and boulder sills within the intertidal area would take approximately 1-2 weeks.
- Work areas on the backshore and at higher elevations can be performed during any tide, and may take up to a month to complete.

ESTABLISHMENT



- During recruitment and establishment of vegetation, vulnerable to erosion.
- Up to 3 years for vegetation to become established.



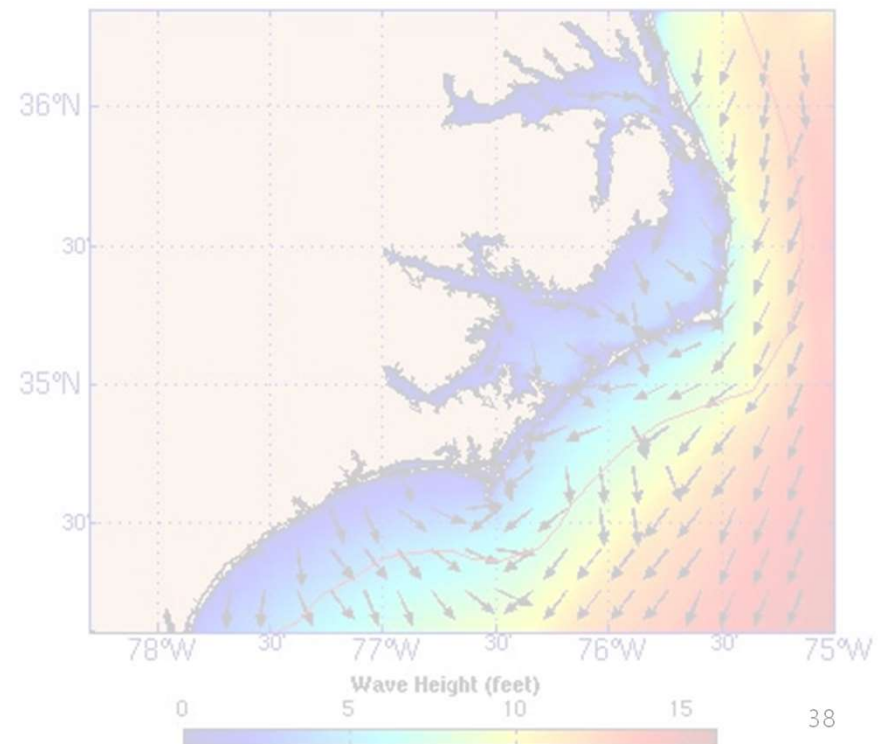
After construction (left) and 1 year later (right)

NEXT STEPS



- Project fundraising
- Advance design drawings and wave modeling
- Regulatory Permitting
- Final design
- Construction

SWAN Total Significant Wave Height and Direction :
Run Time: 19-Nov-2008 01:00:00 (EST)
Valid Time: 19-Nov-2008 01:00:00 (EST)



REGULATORY PERMITTING



State of New York Permitting

- NYS Department of Environmental Conservation (NYSDEC)
- NYS Department of State (NYSDOS)

Federal Permitting

- US Army Corps of Engineers (USACE)
- US Fish & Wildlife Service (USFWS)
- National Oceanic and Atmospheric Administration (NOAA)

Municipal and Local Permitting

- City of Rye

[Click this link to download the June 2020 Feasibility Study and Concept Plan \(67mb\)](#)

QUESTIONS



Stratford Point Living Shoreline
Connecticut