Scituate Harbor **Resiliency Master Plan**

Board of Selectmen

December 15, 2020

Photo: Town of Scituate Harbormaster

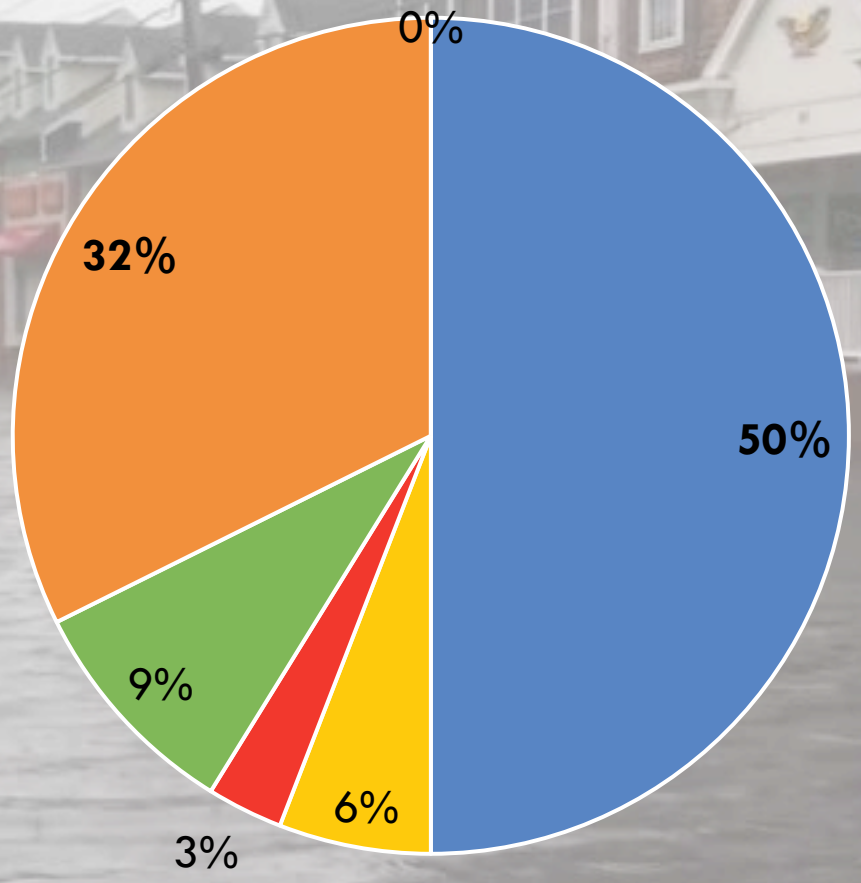
Task Force Members

- **Charlotte Britton** *Scituate Harbor Condominium Resident*
- **John Murphy** *Fire Chief*
- **Karen Connolly** *Board of Selectmen*
- **Kevin Cafferty** *DPW Director*
- **Kyle Boyd** *Coastal Management Director*
- **Louise Pfund** *Chairperson Coastal Advisory Commission*
- **Lynda Ferguson** *Scituate Chamber of Commerce Board Member*
- **Margaret Loughlin** *Scituate Harbor Condominium Resident*
- **Michele Wood** *President of Scituate Harbor Business Association*
- **Penny Scott-Pipes** *Conservation Commission*
- **Rick Murray** *Waterways Commission*
- **Sue DiPesa** *Chairperson Economic Development Commission*
- **Tom Clark** *Scituate Harbor Cultural District Committee Member*


The
Weather
Channel

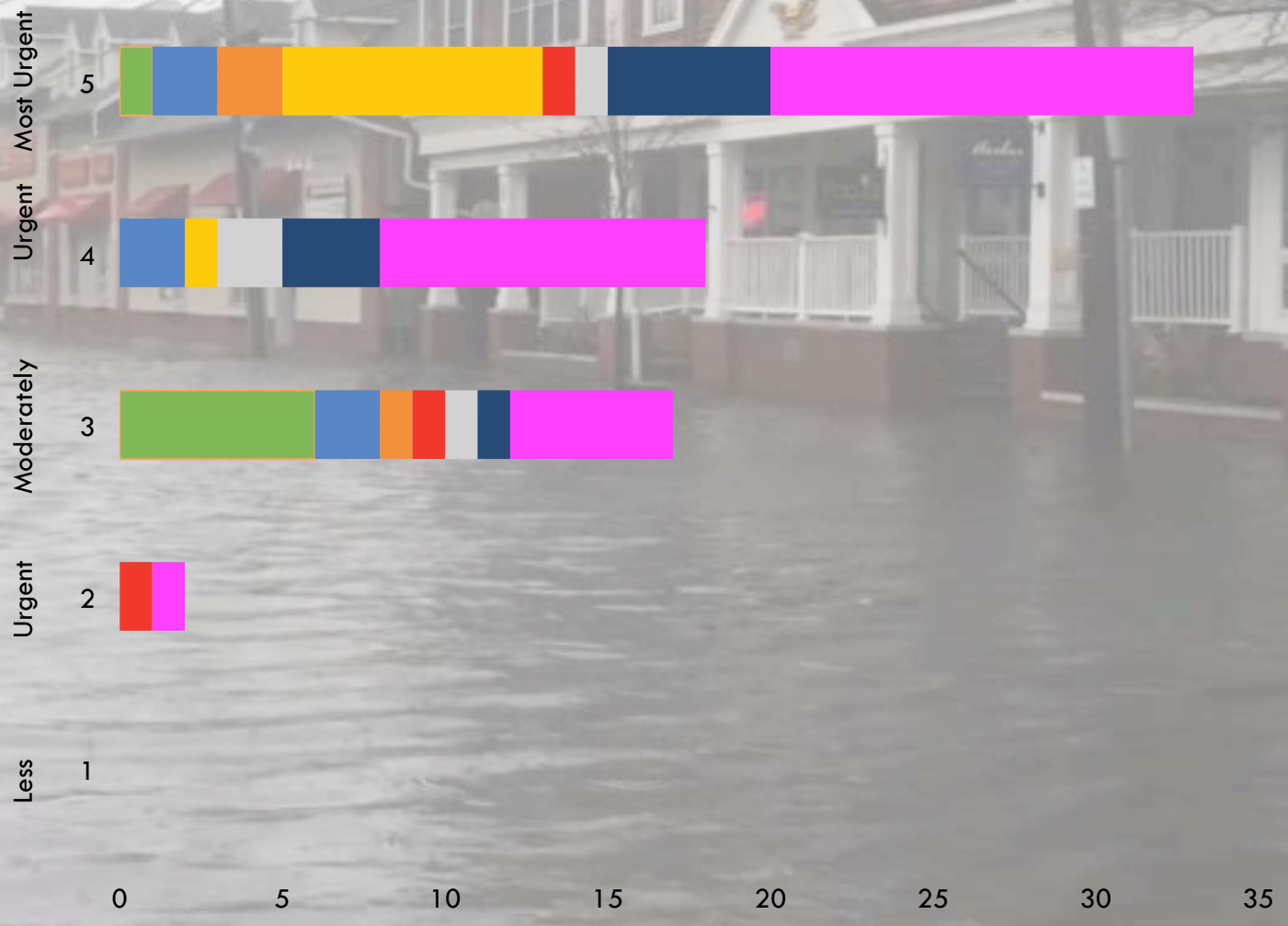

The
Weather
Channel

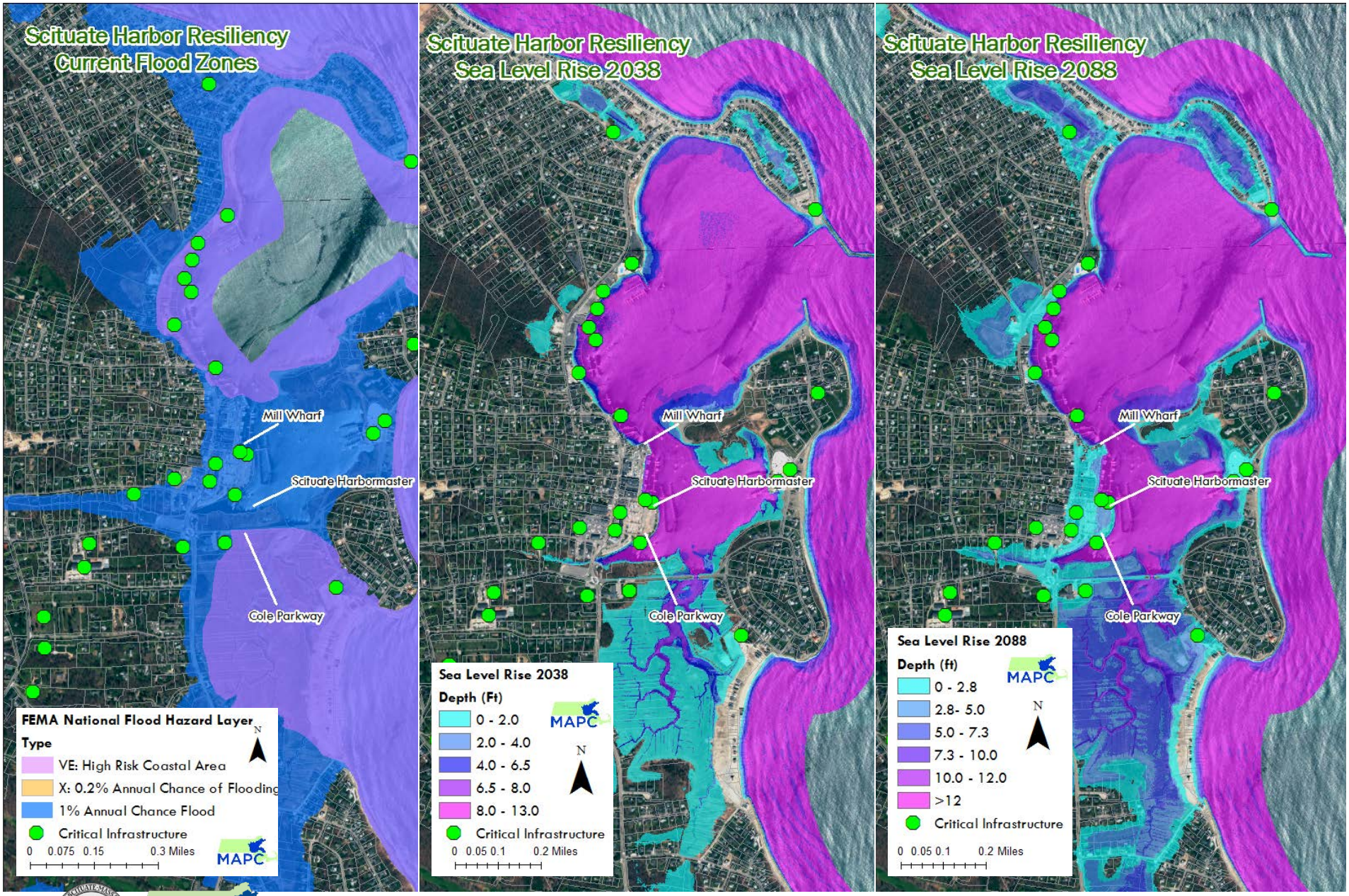
What is your main concern for Scituate Harbor?



- Businesses, shops, restaurants
- Things to do, events, community gathering
- Access to the water
- Convenient parking
- Flood risks
- Other

How urgent do you feel coastal flooding issues are?




Scituate Harbor Resiliency
Current Flood Zones
Mill Wharf
Scituate Harbormaster
Cole Parkway
FEMA National Flood Hazard Layer
Type
VE: High Risk Coastal Area
X: 0.2% Annual Chance of Flooding
1% Annual Chance Flood
Critical Infrastructure
0 0.075 0.15 0.3 Miles
MAPC
N
Scituate Harbor Resiliency
Sea Level Rise 2038
Mill Wharf
Scituate Harbormaster
Cole Parkway
Sea Level Rise 2038
Depth (Ft)
0 - 2.0
2.0 - 4.0
4.0 - 6.5
6.5 - 8.0
8.0 - 13.0
Critical Infrastructure
0 0.05 0.1 0.2 Miles
MAPC
N
Scituate Harbor Resiliency
Sea Level Rise 2088
Mill Wharf
Scituate Harbormaster
Cole Parkway
Sea Level Rise 2088
Depth (ft)
0 - 2.8
2.8- 5.0
5.0 - 7.3
7.3 - 10.0
10.0 - 12.0
>12
Critical Infrastructure
0 0.05 0.1 0.2 Miles
MAPC
N

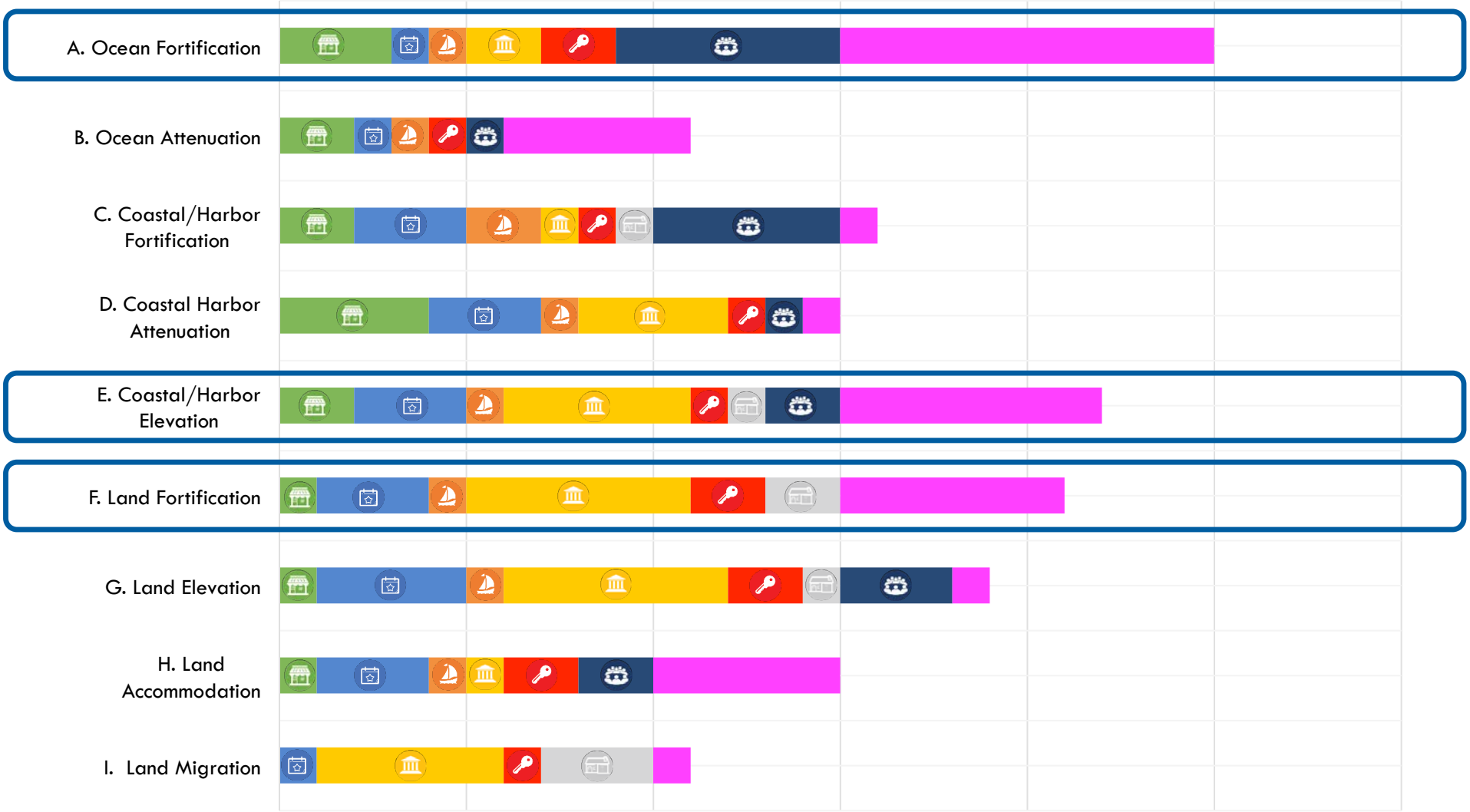
Problem Statement

Create a cohesive vision for Scituate Harbor that will build resilience incrementally, through coordinated and layered measures, to meet flood challenges projected for mid-century (2050) and beyond. Near term and long-term actions should create more flood resilience while creating additional benefits to the district that will:

- Enhance economic vitality
- Improve the public realm
- Strengthen community and civic gathering
- Improve district parking
- Maintain cost effectiveness
- Retain the ability to implement
- Reduce the negative impacts

Feedback from 1st Community Forum

Which types of solutions do you think are most appropriate?



Most Preferred Approaches

Ocean fortification

Conceptual Alternative A

"Close the mouth" –
Harbor barrier infrastructure

*About **10,000 linear feet** of adaptations, including harbor gate*

Coastal elevation

Conceptual Alternative B

"Lift the edge" –
Incremental elevation of coast

*About **5,000 linear feet** of adaptations*

Land fortification

Conceptual Alternative C

"Floodproofing with infrastructure" –
Adapt coast and land configuration

*About **5,000 linear feet** of adaptations*

Most Preferred Approaches Evaluation

Create a cohesive vision that will build resilience incrementally, through coordinated and layered measures, while creating additional benefits to the district that will:

	Enhance economic vitality	Improve the public realm	Strengthen community and civic gathering	Improve district parking	Maintain cost effectiveness	Retain the ability to implement	Reduce negative impacts	Overall Performance
Alt. A	-1	0	0	0	-1	-1	-1	-4
Alt. B	0	0	-1	+1	+1	+1	+1	+3
Alt. C	+1	+1	+1	-1	0	0	0	+2

Scituate Harbor Sustainability and Resilience Master Plan

DRAFT FOR REVIEW

Final Report

May 2020

Scituate Harbor and vicinity showing current and projected flood extents

These recent storm events illustrate that while planning for future sea level rise is necessary for coastal districts such as Scituate Harbor, the coastal flood risk is not hypothetical or confined to a far-off future. The current Flood Emergency Management Agency (FEMA) Flood Insurance Risk Maps (FIRM) show that in some locations the current flood risks expand beyond future sea level rise projections. The diagram above maps the extent of floods projected for current FEMA flood zones (yellow), future sea level rise to 2050 (red), and future sea level rise to 2070 (purple).

Critical Facilities

Critical facilities are infrastructure that are defined as being critically important to the functionality of the Town. These include utility and transportation infrastructure, municipally-owned buildings, buildings used for community gathering or sheltering during extreme weather events, or resources that are critically important for resident health and survival such as grocery stores and pharmacies. The risk of critical facilities to coastal flooding was evaluated for current and future flood zones within and adjacent to the Scituate Harbor Business District. Future sea level rise projections were isolated to 0.5-foot intervals to spatially analyze the risk to critical facilities, and the ranges of depths that are projected to affect the critical facility are indicated at the building level.

Since most of Scituate Harbor has already and will continue to experience coastal flooding, the analysis further assesses the coastal flood risk by severity (depth), probability (current or future flood zone), and function (level of importance for servicing municipal and community needs).

These qualitative categories were used to create a risk matrix to define which buildings are most important to address to minimize damage and loss to Scituate Harbor, not only for the building itself but also for the overall protection of the business district. A risk matrix provides a visualization of risk and asset decision making. Facilities that are very likely to flood, have a high severity or depth of flood risk, and have a critical function to serving the community are the facilities most important to address for resilience strategies for Scituate Harbor.

The critical facilities at greatest risk include Edward Foster Bridge, Peggotty Beach Pump Station, Harbormaster/ Coast Guard building, Jericho Boat Launch, and Kent Street marshes. The Edward Foster Bridge overtops during a 1% Annual Chance Flood and has significant flood depths at SLR 2038. Its flooding effectively disconnects an emergency response road from the First Cliff neighborhood to the rest of the Town. The Jericho Boat Launch, though less important in function during an extreme weather event, has significant flood depths and is a water entry point for this portion of Scituate Harbor. The Harbormaster and Coast Guard buildings have less flood depths but are of greater importance serving the community, particularly during extreme weather events and coastal storms. The Kent Street Marshes provide a protective natural system to Scituate Harbor and surrounding neighborhoods. Located in a FEMA VE High Risk zone, the flooding of these marshes dissipate intense wave energy that might otherwise impair residences, businesses, and other important infrastructure. The marshes flood during storms events today. Future projections indicate that the marshes become submerged by 2038; if this occurs, the marshes transform into open water and no longer provide the critical shoreline protection and could increase the extent of flooding in the future. Finally, though outside of the Scituate Harbor business district, the Peggotty Beach Pump Station is a high-risk facility because its impairment from flooding could cause extensive pollution into Scituate Harbor and surrounding waters.

Risk Matrix of Scituate Harbor critical facilities based on vulnerability, probability, and function

Vulnerability	Less Likely	Probability	Very Likely	Function
Severe	First Cliff Pump Station	CM Senior Center	Peggotty Beach Pump Station	Edward Foster Bridge
	Village Market	CVB	Harbormaster/ Coast Guard	Jericho Boat Launch
	Pier 44 (Town)	Cole Parkway Launching Ramp	Cole Parkway Parking Area	Kent Street Marshes
	St. Mary's Church	Joseph's Hardware	Scituate Marine Park	Satuit Boat Club
Lower	Environmental Police	Scituate Lighthouse	Satuit Waterfront Club	Scituate Harbor Marina

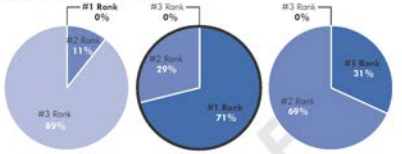
Critical ... Necessary

	Ocean fortification Conceptual Alternative A "Close the mouth" Harbor barrier infrastructure	Coastal elevation Conceptual Alternative B "Lift the edge" Incremental elevation of coast	Land fortification Conceptual Alternative C "Floodproofing infrastructure" Adapt coast/land configuration
Enhance economic vitality	-1	0	+1
Improve the public realm	0	0	+1
Strengthen community and civic gathering	0	-1	+1
Improve district parking	0	+1	-1
Maintain cost effectiveness	-1	+1	0
Retain the ability to implement	-1	+1	0
Reduce negative impacts	-1	+1	0
Overall Performance	-4	+3	+2

Final Community Preferences

The following pie charts show the results of asking the community for ranking of their preferences upon review of the information presented in this comparative analysis. Participants were asked to rank the (3) alternatives, 1 as the most preferred, 2 as the second most preferred, and 3 as the least preferred. The pie charts so that Conceptual Alternative B was the most preferred.

Rank your preferences for the alternatives:



Ocean fortification
Conceptual Alternative A
"Close the mouth"
Harbor barrier infrastructure

Coastal elevation
Conceptual Alternative B
"Lift the edge"
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Land fortification
Conceptual Alternative C
"Floodproofing infrastructure"
Adapt coast/land configuration

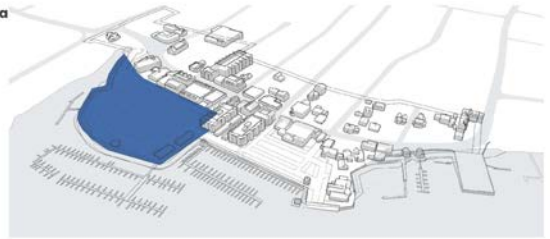
All of this information, including this comparative analysis and its results were presented to the Task Force in February and to the community at a Community Forum in March. On both occasions the participants responded with preferences for Conceptual Alternatives B and C. While Conceptual Alternative A was expressed as a preference by the community at the beginning of the process, the comparative evaluation of the three most preferred approaches left the other two as the leading preferences.

The Scituate Harbor Resiliency Master Plan is focused on these two approaches to resilience solutions, the elevating of the coastal edge and the creation of land-based amenities that would also serve to increase the height of a barrier to flooding. This community-based process and discussion has determined the final preferred approach that the Scituate Harbor Resilience Master Plan is based upon.

Cole Parkway

The **Cole Parkway sub-area** is town-owned and provides much of the parking supply for the district. It should be the pilot area for resilience investments that add district amenities.

Cole Parkway sub-area
location map



PRIORITY

A. Rebuild side walls of boat ramp to add height and integrate a deployable flood gate near the top of the ramp. This could be a gate lifted or rotated into a watertight closed position.

PRIORITY

B. Replace open guardrails with reinforced concrete barriers at the edge of the parking lot and outer edge of the harborwalk sidewalk. Design to integrate with existing sidewalk.

PRIORITY

C. Heighten and extend the existing reinforced concrete wall at the outer edge of the harborwalk. Design to integrate with the existing wall and sidewalk.

D. Explore replacement of stone revetment with vertical bulkhead structure to allow more efficient use of waterside edge for additional revenue generating dock and slip space.

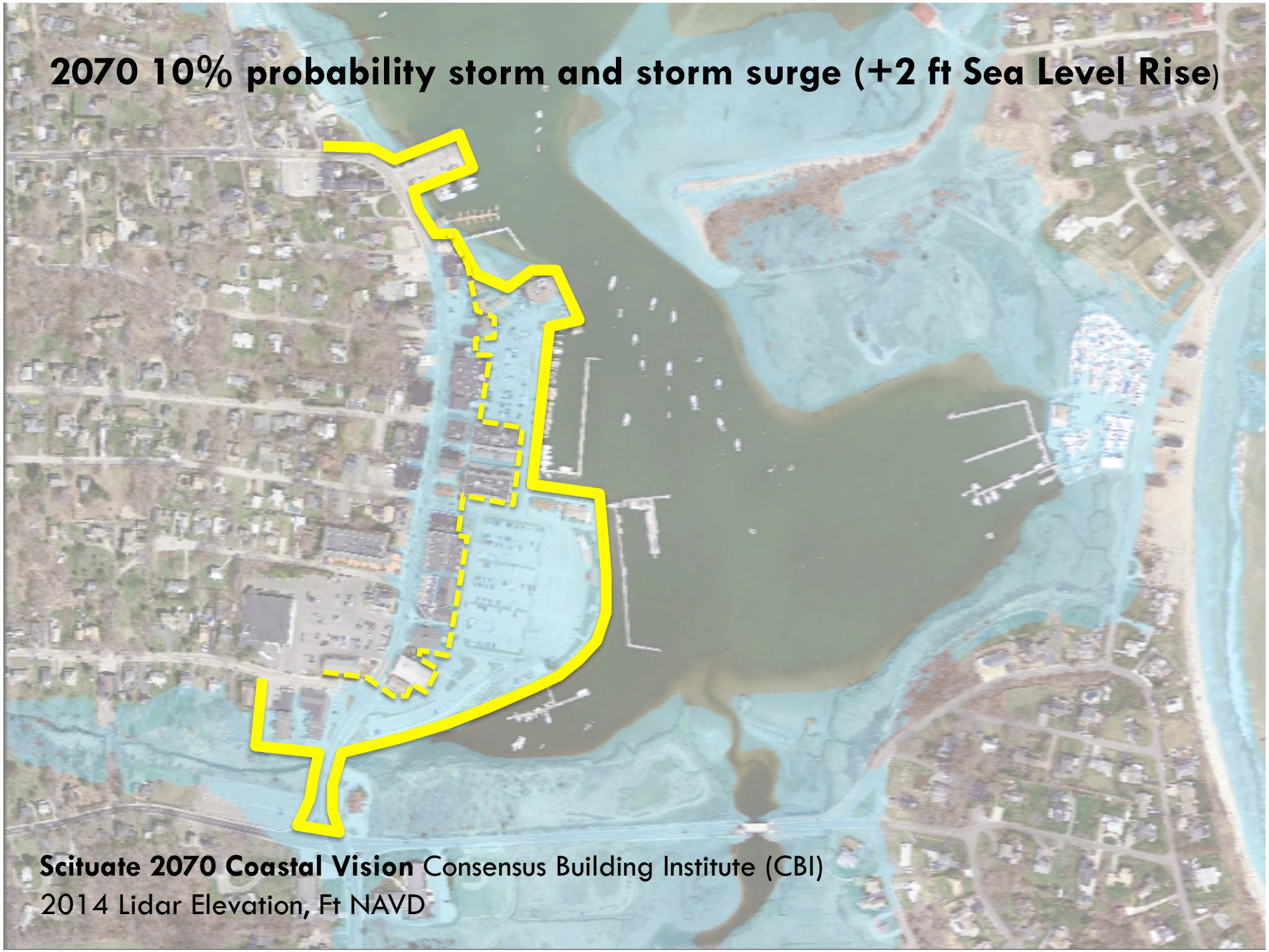
Cole Parkway sub-area
aerial image

F. Consider long-term lease for a future mixed-use structure with the Harbormaster and Coast Guard as ground floor tenants that could provide a funding source for improvements.

G. A more visionary concept for this large parking area would be extend the coastal park further inland while increasing the height of the park's topography to allow parking under it.

E. Elevate a coastal amenity area, either in the existing footprint of the landscape buffer or expand an amenity area into the parking lot. As shown, it displaces about 55 parking spaces.


2070 10% probability storm and storm surge (+2 ft Sea Level Rise)
Scituate 2070 Coastal Vision Consensus Building Institute (CBI)
2014 Lidar Elevation, Ft NAVD

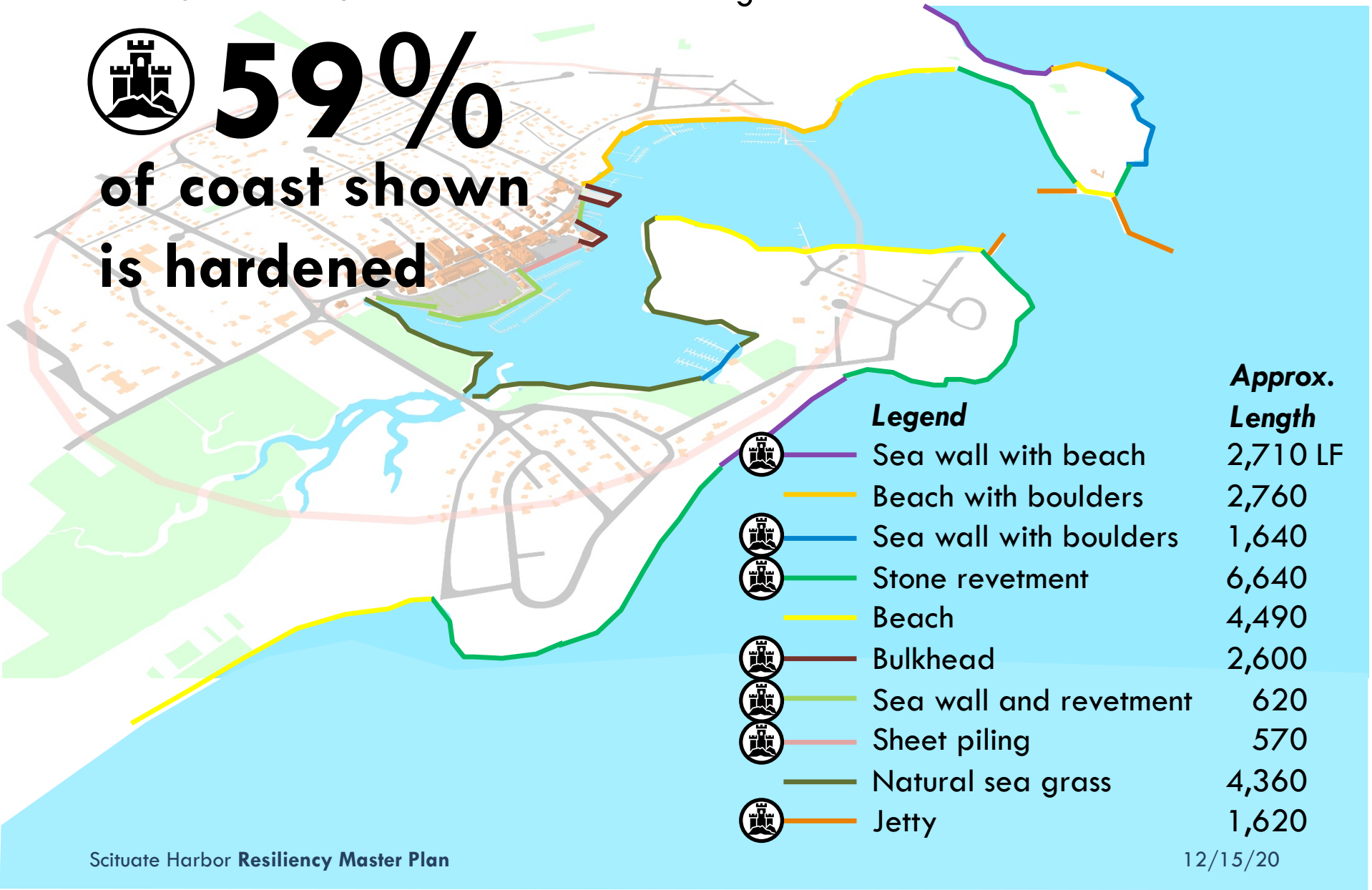

2070 10% probability storm and storm surge (+2 ft Sea Level Rise)
Scituate 2070 Coastal Vision Consensus Building Institute (CBI)
2014 Lidar Elevation, Ft NAVD

Existing Coastal Conditions

About 5 miles of Scituate coast shown in diagram

59%

of coast shown is hardened

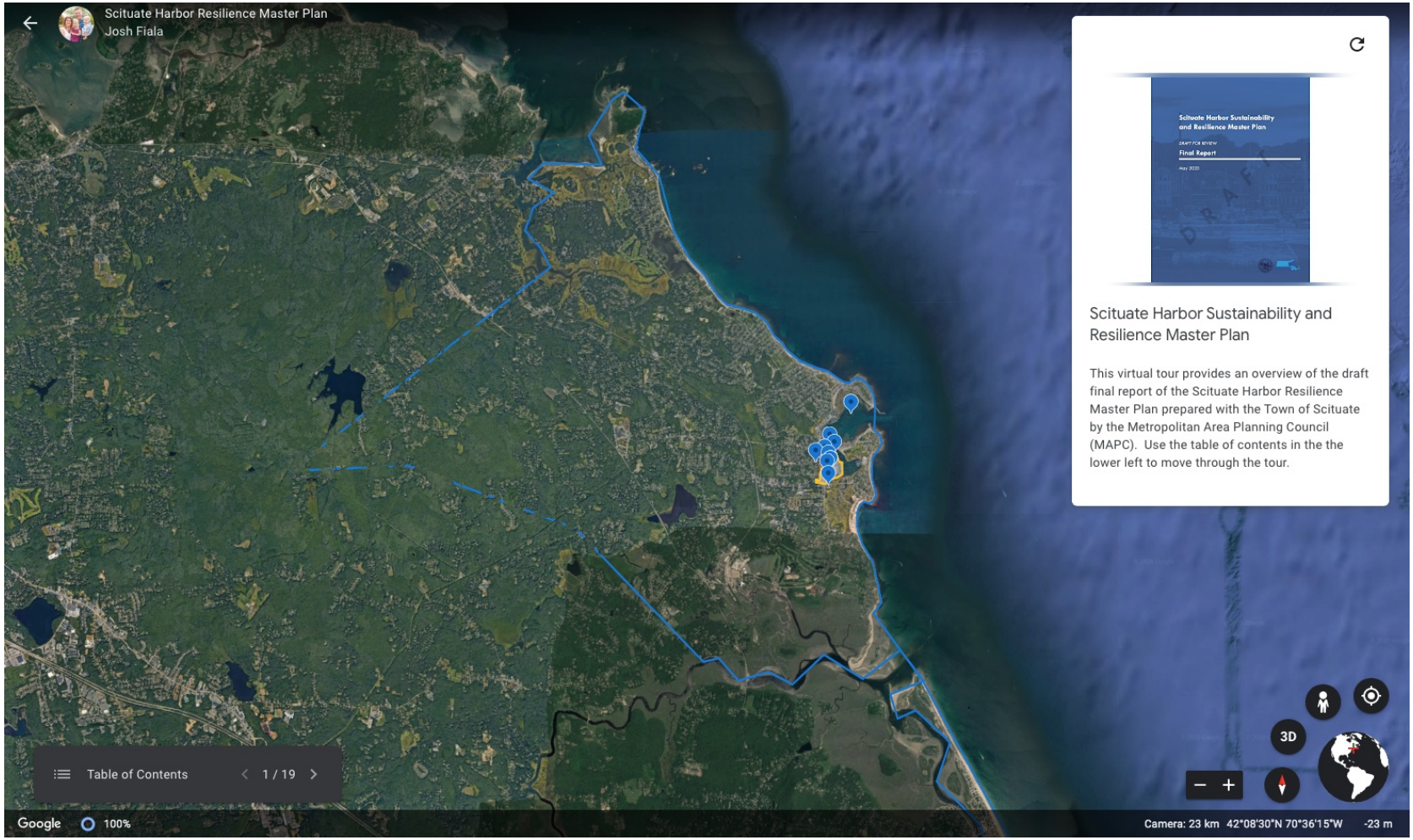


Legend	Approx. Length
Sea wall with beach	2,710 LF
Beach with boulders	2,760
Sea wall with boulders	1,640
Stone revetment	6,640
Beach	4,490
Bulkhead	2,600
Sea wall and revetment	620
Sheet piling	570
Natural sea grass	4,360
Jetty	1,620

For a virtual tour of the final recommendations visit:

https://bit.ly/ScituateHarborGoogleEarth

Click "Present" and use the arrows (bottom left) to advance content



Scituate Harbor **Resiliency Master Plan**

Board of Selectmen

December 15, 2020

Photo: Town of Scituate Harbormaster