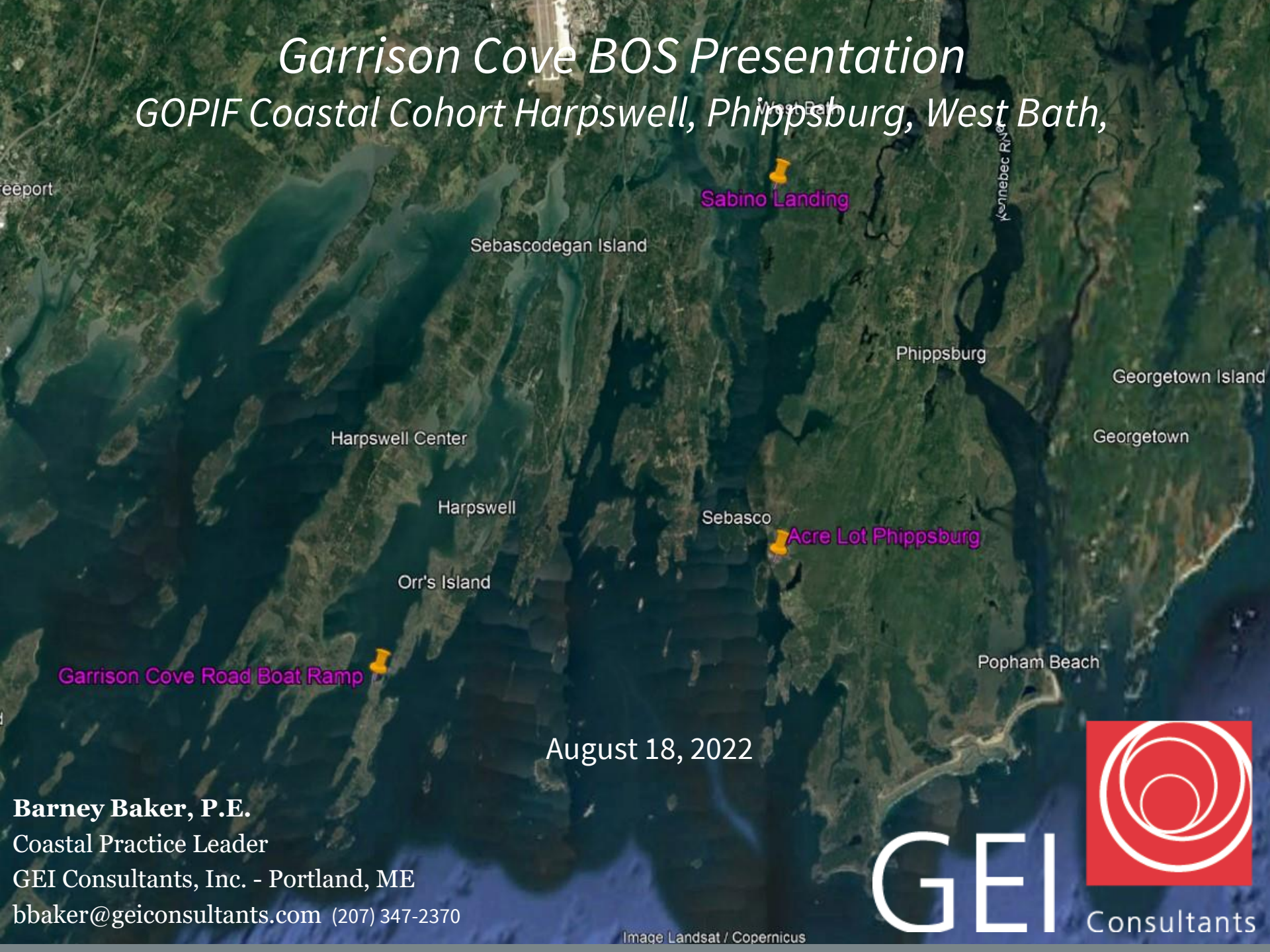


# *Garrison Cove BOS Presentation*

## *GOPIF Coastal Cohort Harpswell, Phippsburg, West Bath,*



August 18, 2022

**Barney Baker, P.E.**  
Coastal Practice Leader  
GEI Consultants, Inc. - Portland, ME  
[bbaker@geiconsultants.com](mailto:bbaker@geiconsultants.com) (207) 347-2370



Image Landsat / Copernicus



# Sponsors



## Governor's Office of Policy Innovation and the Future

*Fostering collaboration and innovative solutions to help solve Maine's most important long-term challenges.*



## New England Environmental Finance Center

*Since 2001, the New England Environmental Finance Center (EFC) at the University of Southern Maine has worked to build local capacity to pay for the growing cost of protecting critical environmental resources and fostering resilient communities.*



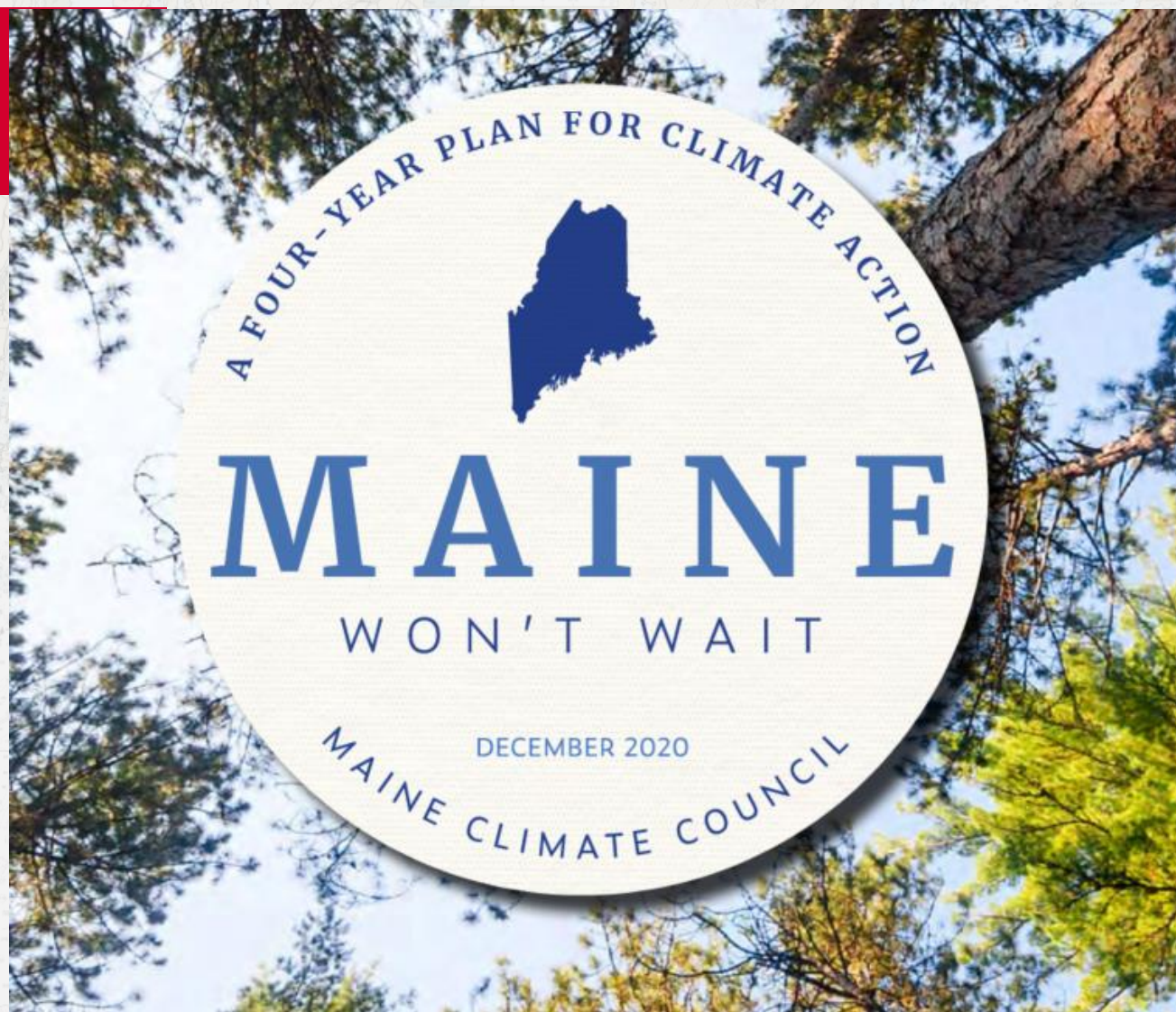
## Casco Bay Estuary Partnership

*The Casco Bay Estuary Partnership, one of 28 National Estuary Programs nationwide, is a collaborative effort of people and organizations interested in protecting and restoring the Bay.*





# Maine Climate Council



[https://www.maine.gov/climateplan/sites/maine.gov.climateplan/files/inline-files/MaineWontWait\\_December2020\\_printable\\_12.1.20.pdf](https://www.maine.gov/climateplan/sites/maine.gov.climateplan/files/inline-files/MaineWontWait_December2020_printable_12.1.20.pdf)





# Project Purpose and Goal

- 1. Investigate the resiliency of three (3) waterfront sites with respect to existing use and future use with consideration of climate change and sea level rise.**

Garrison Cove Boat Ramp; Town of Harpswell

Acre Lot Wharf; Town of Phippsburg

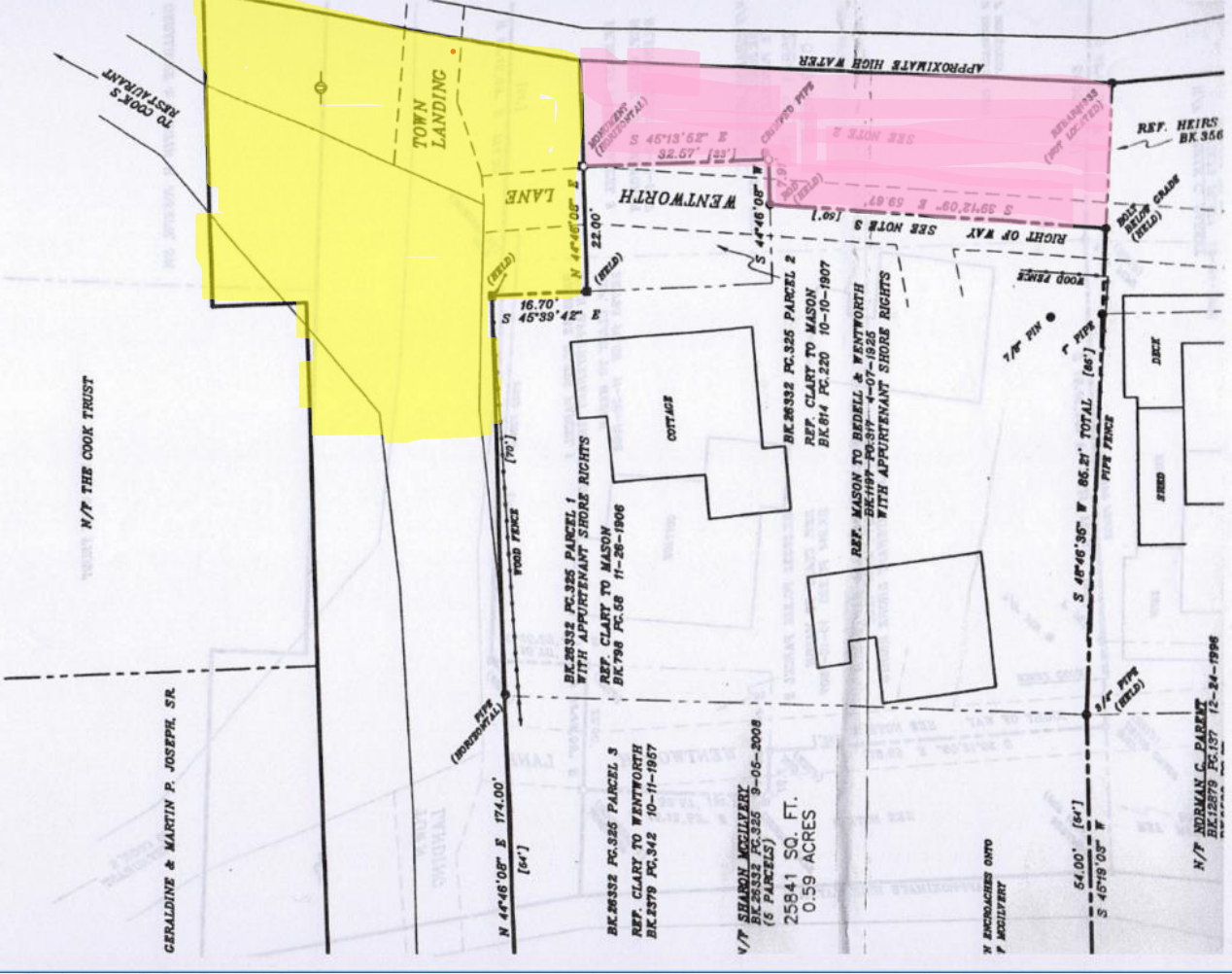
Sabino Landing- Town of West Bath

- 2. Work with Community stakeholders to investigate and develop resiliency measures and adaptation strategies.**





## Town Properties





# Drone Survey





# Drone Survey





# Drone Survey





# Drone Survey





# Garrison Cove USERS

## 1. COMMERCIAL FISHERMAN

- SHELLFISH HARVESTERS
- OTHERS

## 2. NEIGHBORHOOD RESIDENTS

- BOAT LAUNCHING
- KAYAKS
- SEASONAL DOCK INSTALLATION

## 3. TOWN/PUBLIC

- GENERAL LAUNCHING AND RETRIEVAL OF GEAR
- USE LIMITED BY PARKING, ALTHOUGH USERS SEEK PERMISSION FROM COOKS LOBSTER TO PARK IN THERE PARKING LOT





# Site Use Observations

## 1. LANDSIDE USE

- VEHICLE TURNING
- LIMITED CIRCULATION

## 2. INTERTIDAL USE

- VEHICLES/TRAILORS USE BEACH
- FLOAT STAGING

## 3. BOAT RAMP FUNCTIONS WELL

- USES NATURAL GRADE OF THE BEACH (12.8%) . This is close to the optimum range (13% TO 15%).
- STRAIGHT ALIGNMENT
- CAN ONLY LAUNCH ONE BOAT AT A TIME ON THE RAMP





# Zoning

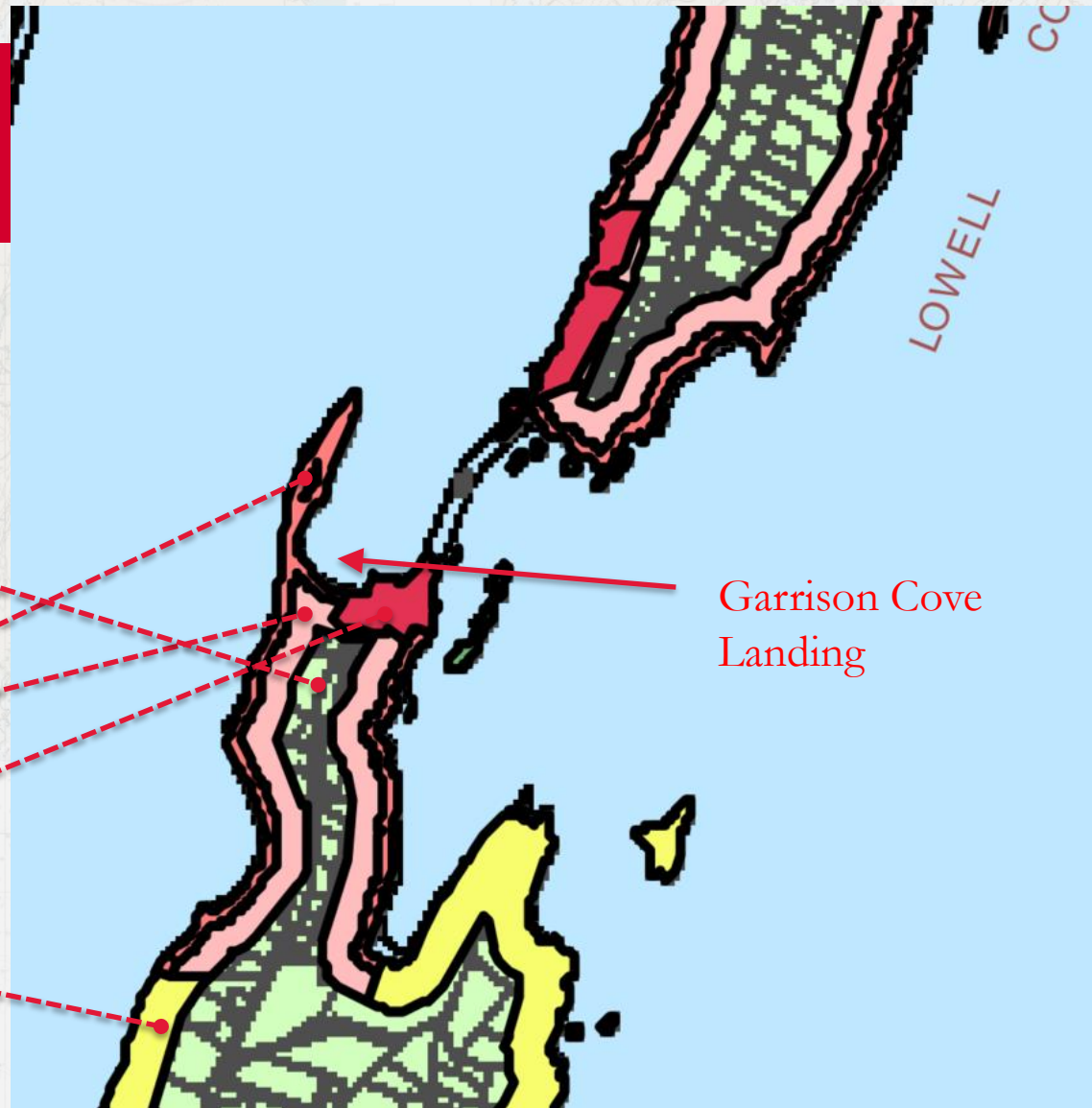
## LEGEND

### Additional Features

- Parcels
- Zoned Wetlands
- Ponds
- Streams

### SHORELAND ZONING

- Commercial Fisheries Marine Activities 1
- Commercial Fisheries Marine Activities 2
- Eagle Island Historic
- Mitchell Field Marine Business
- Resource Protection
- Shoreland Business
- Shoreland Residential
- Tower District





# Town Planner Zoning Notes

1. The shoreline is subject to shoreland zoning and is covered by the Shoreland Zoning Ordinance
2. The strip of land upland of the Highest Annual Tide (HAT) Line is zoned Commercial Fisheries I (CF I) for a distance of 75 feet inland of the HAT line. Beyond 75 feet it is zoned CF II.
3. As a functionally water dependent use, the boat launch is allowed but probably requires PB review under the Site Plan Review Ordinance if major changes are proposed.
4. Normally parking is required to be set back 75' from the HAT Line but there is a provision that allows the parking setback in the CF I to be reduced to as little as 25' to serve a commercial fishing or functionally water dependent use. Given the history of the parcel and its size and shape I guess the possibility of a variance exists to go closer to the HAT Line but that could raise issues with DEP and create a questionable precedent.





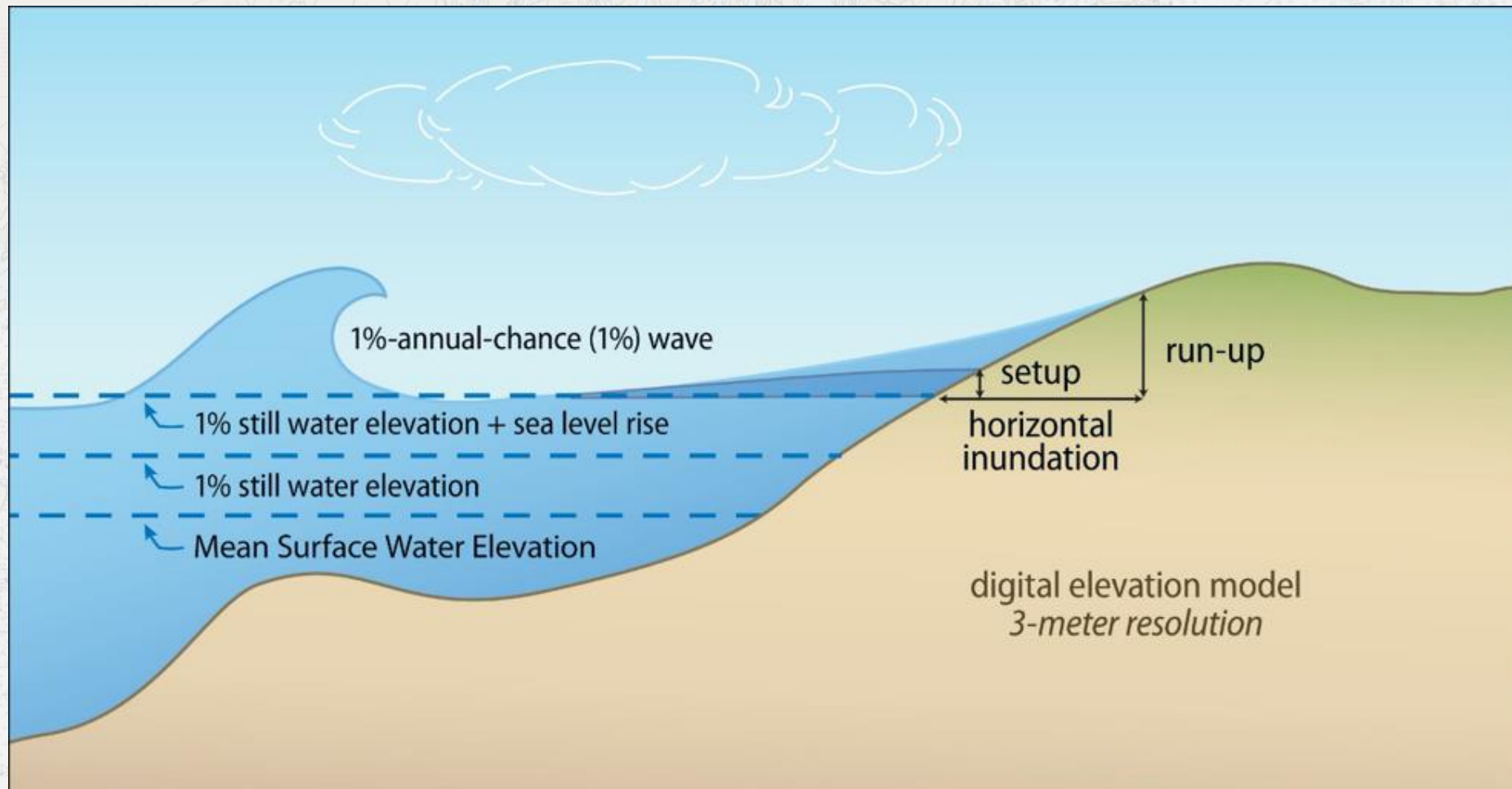
# SITE INUNDATION

PROJECT ELEVATIONS (BY DATUM)			
ELEVATION	CHART (ft)	NAVD88 (ft)	Notes
Prepare to Manage_5.0 + BFE	23.3	18.0	Maine Climate Council Sea Level 2070 Rise
Commit to Manage_2.4 + BFE	20.7	15.4	
FEMA Base Flood	18.3	13.0	Zone AE-PRELIMINARY 3.28.2018
Stillwater 0.2% Annual Chance	15.0	9.7	FIS Cumberland County Transect 136 (Casco BAY)
Stillwater 1% Annual Chance	14.4	9.1	
Stillwater 2% Annual Chance	14.0	8.7	
Stillwater 10% Annual Chance	13.4	8.1	
Top of Ramp	13.3	8	Approx. Existing Grade
HAT Highest Annual Tide	11.3	6.8	2018 MEDEP Predictions for Wilson Cove Middle Bay
MHHW	9.9	4.6	BASED ON NOAA TIDAL BM 8418150 "Portland"
NAVD88	5.3	0.0	
MLLW	0.0	-5.3	



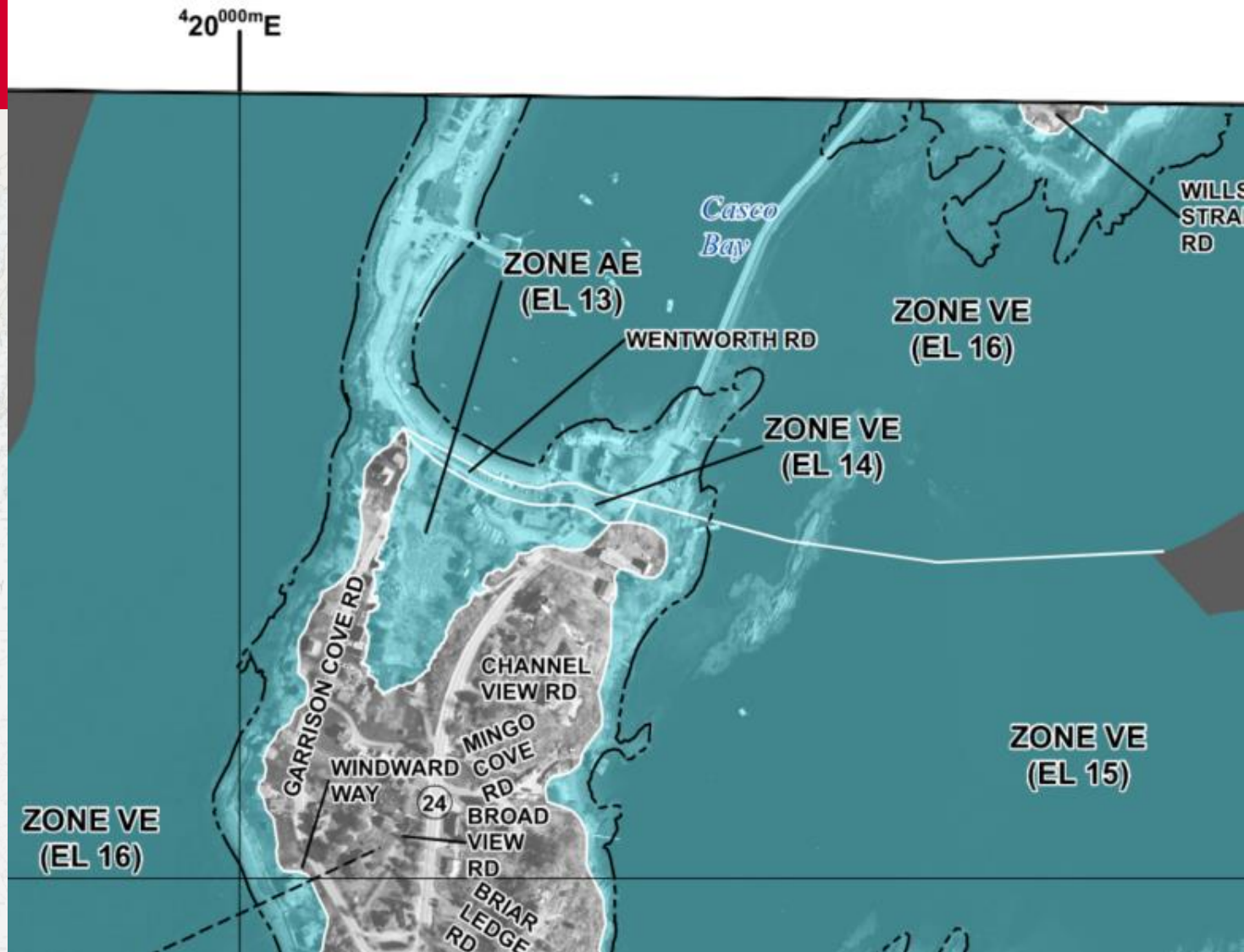


# Superimpose Sea Level Rise





# FEMA FLOOD MAPPING (Historical Data)

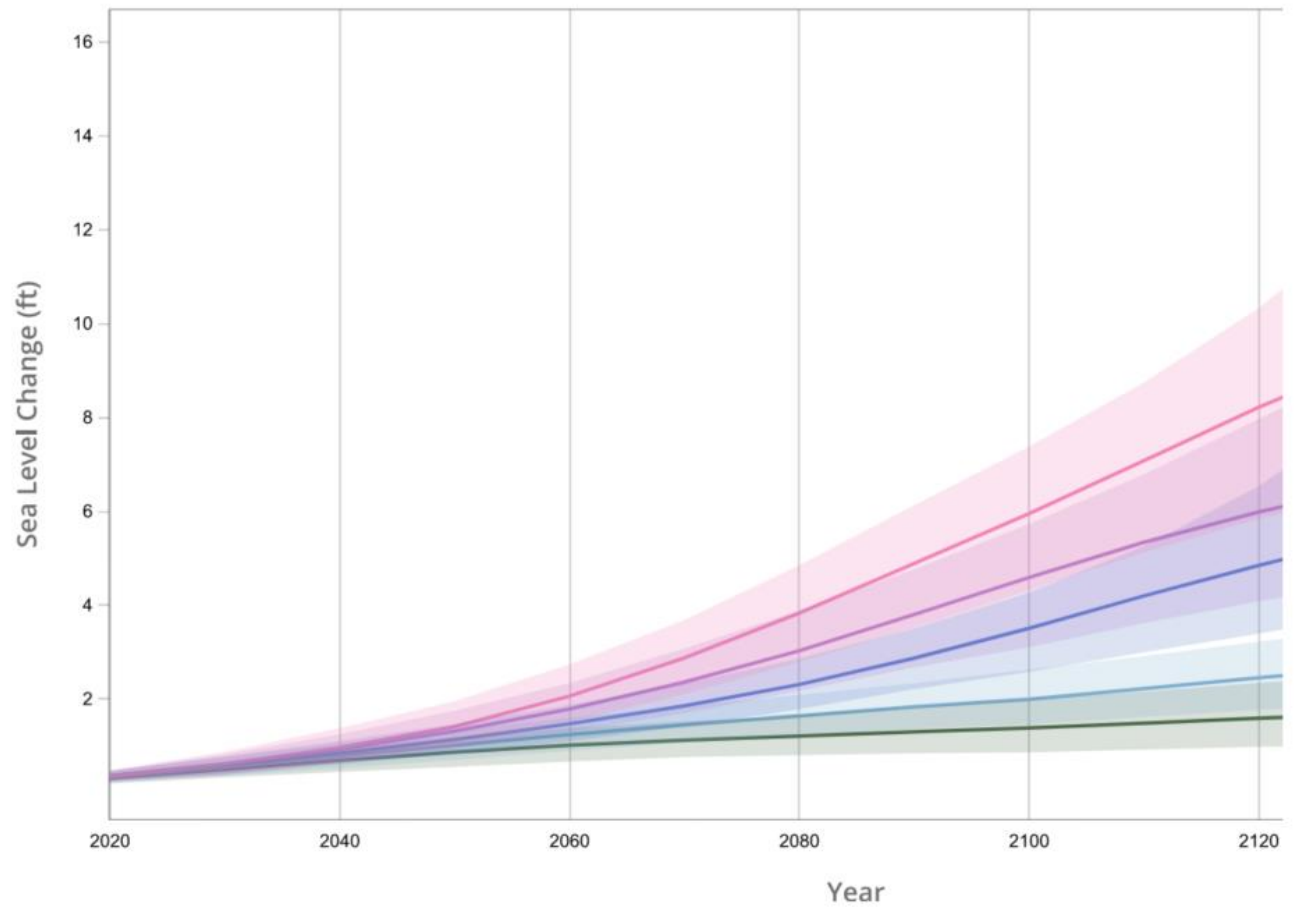




# INTERAGENCY SEA LEVEL RISE TOOL

## Median/Likely range

- Low
- Intermediate Low
- Intermediate
- Intermediate High
- High





# Sunny Day Flooding

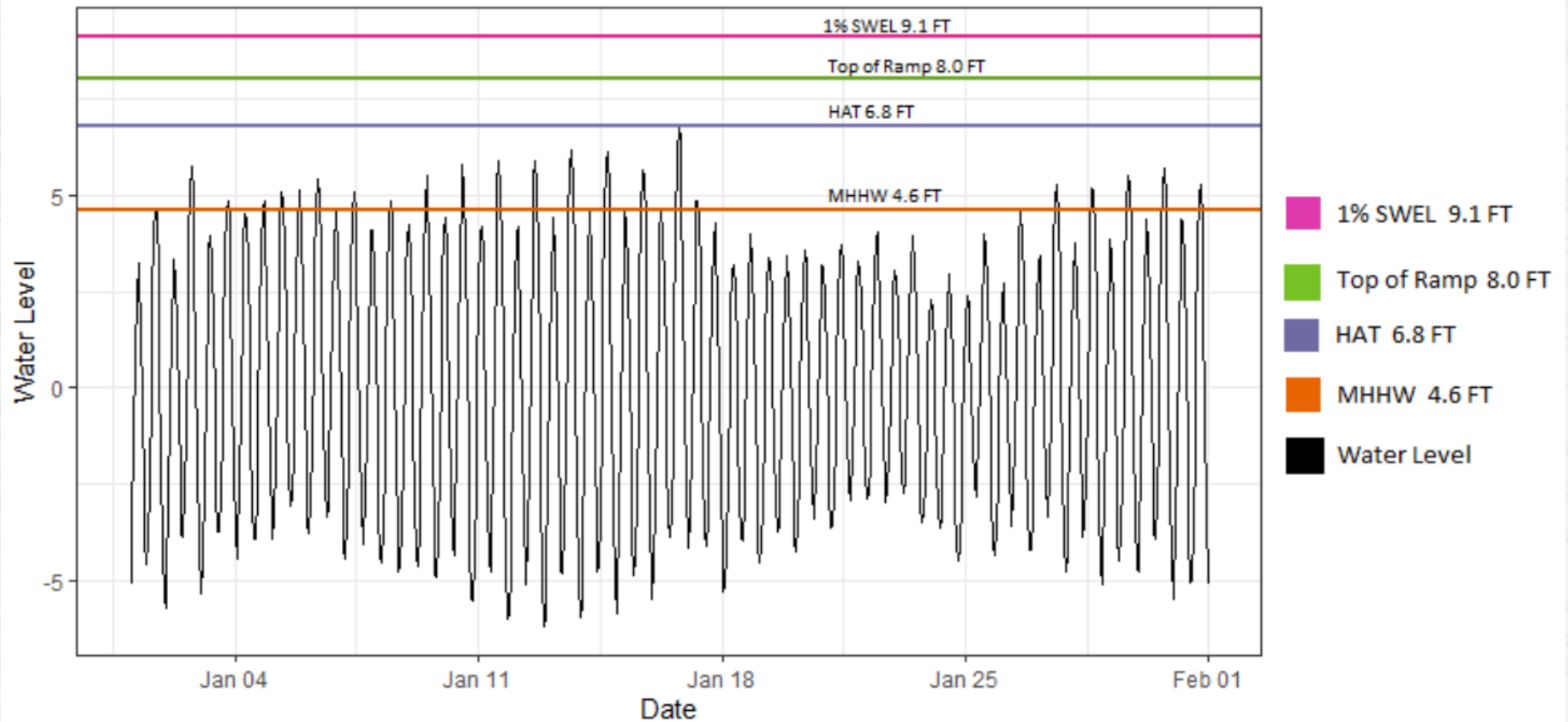
Site Entrance/Top of Ramp (NAVD 88)	FEMA MODEL (NAVD88 FT)				Maine Climate Council Predicted Sea Level Rise (FT)								
	Base Flood	Stillwater Inundation			Average Inundation Hours/Day_Based on Portland Tidal Gauge								
		10 Year	100 Year	500 Year	Existing Conditions	COMMIT to Manage (C2M)				PREPARE to Manage (P2M)			
					Current	2030 (0.8 ft)	2050 (1.5 ft)	2070 (2.4 ft)	2100 (3.9 ft)	2030 (1.4 ft)	2050 (3.0 ft)	2070 (5.0 ft)	2100 (8.8 ft)
8.0	13	8.1	9.1	9.7	0.00016	0.0012	0.013	0.16	1.76	0.0096	0.49	4.63	12.4





# January 2022 Tidal Data (No Wave Action)

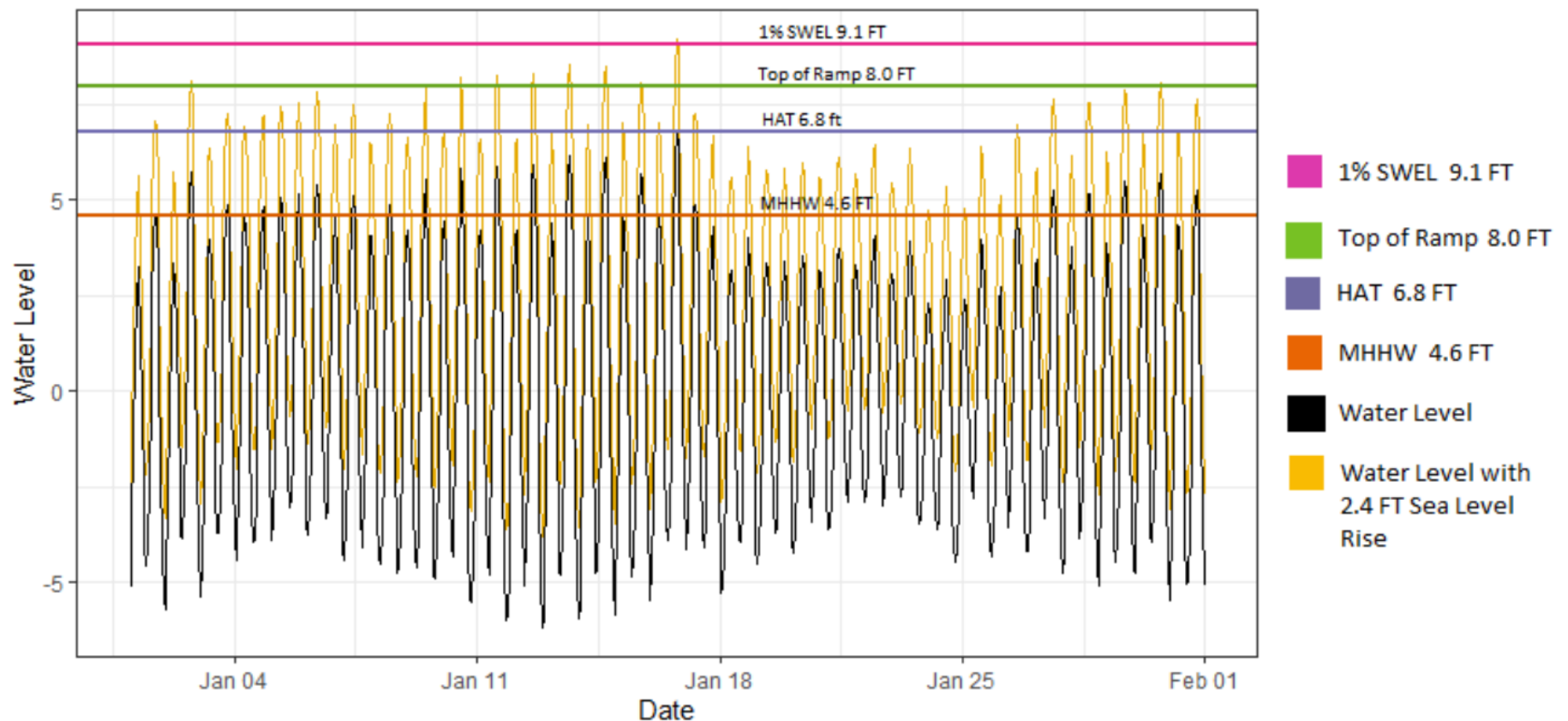
Diurnal Tidal Cycle





# January 2022 Tidal Data w/ SLR (No Wave Action)

Diurnal Tidal Cycle with 2.4 ft Sea Level Rise





# Proposed Improvements





# On Site Improvements

## 1. Shorefront Resiliency

- Raise Grade.
- Armoring
- Plantings

## 2. Site Circulation

- Paving
- Striping
- Relocate Pole
- Beach access Point

## 3. Parking (Offsite Parking Required)

- Beach use at low tide
- Waiting/Unloading in Circulation Area

## 4. Boat Ramp

- Maintain existing gradient (Same as beach)
- Precast Concrete Planks
- Width 12-ft to 14-ft



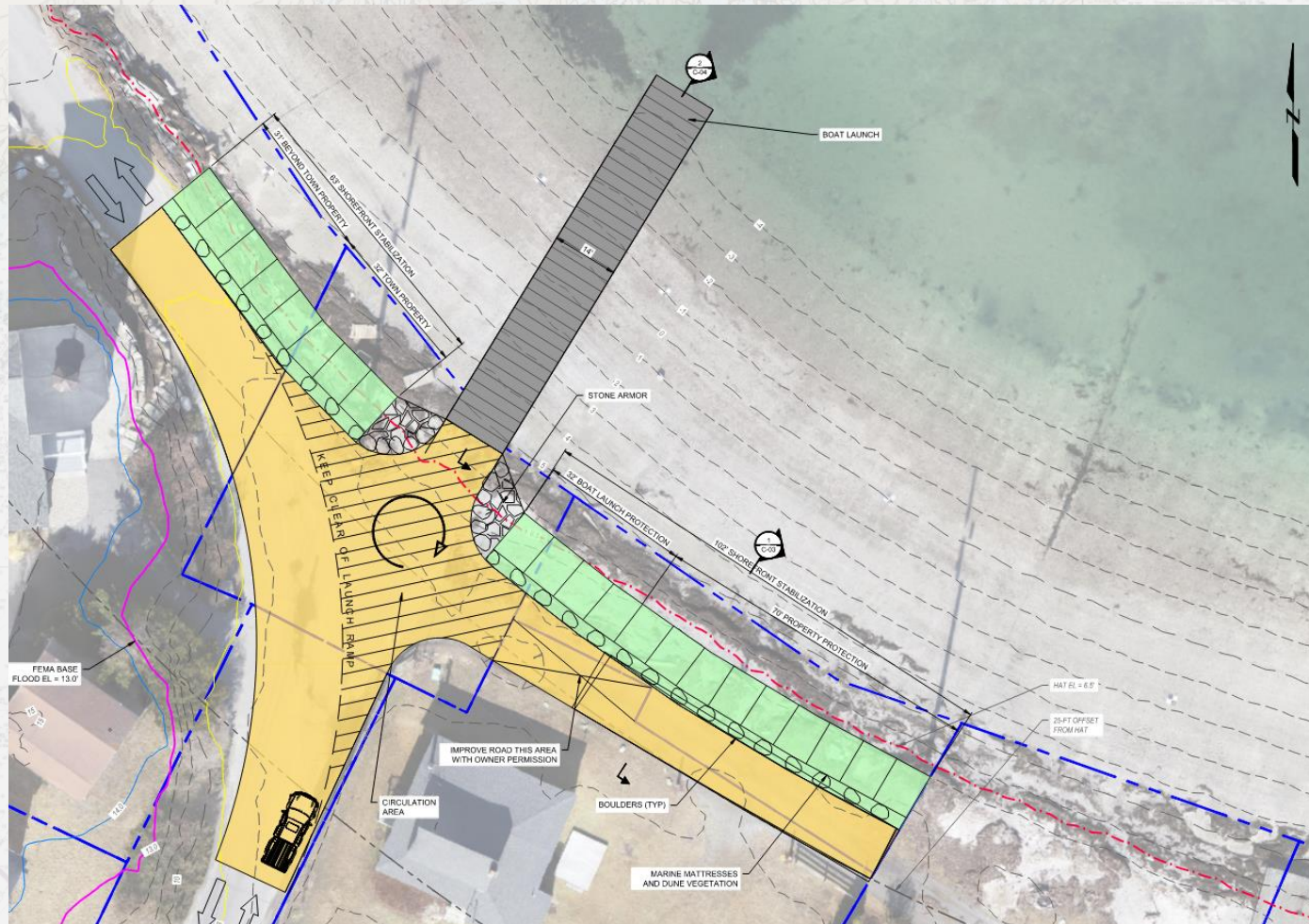


## Proposed Improvements



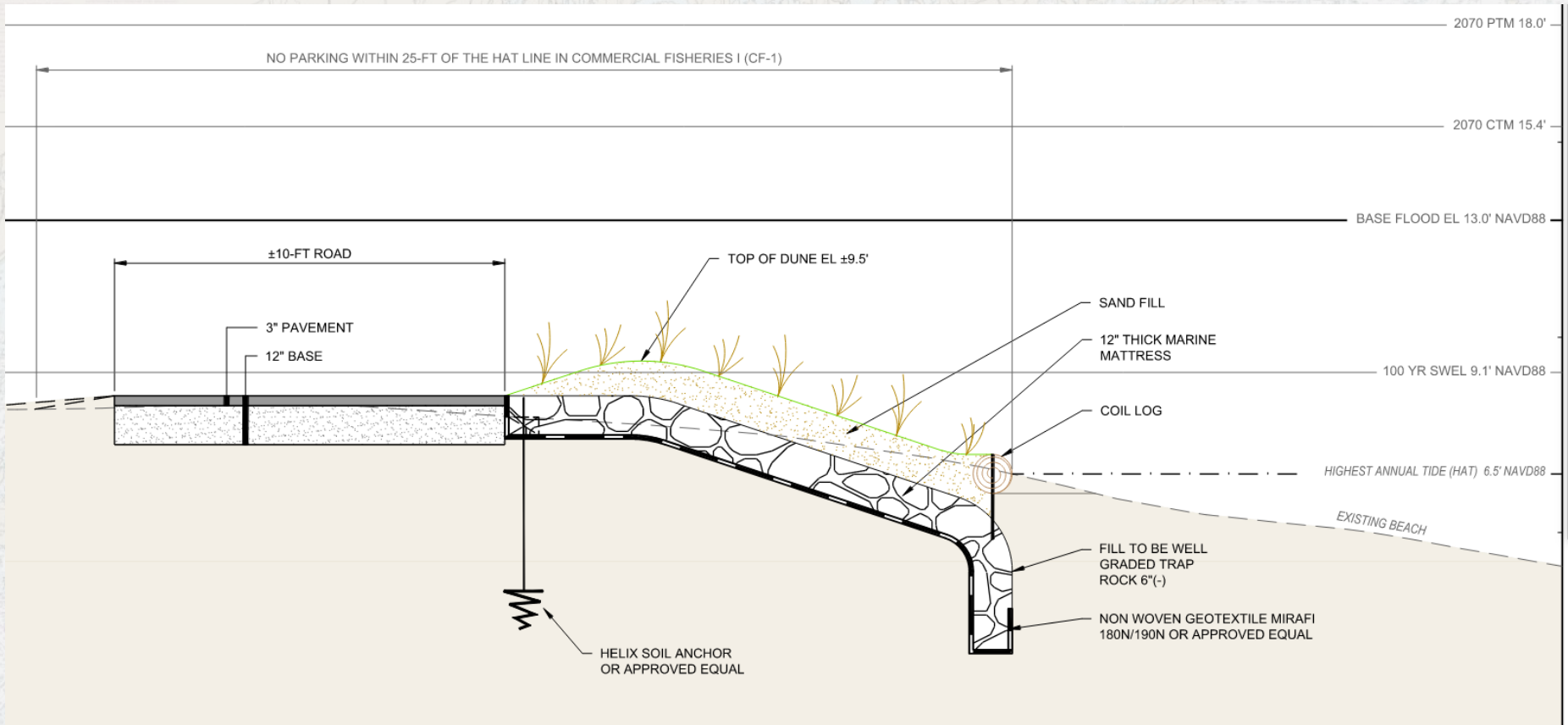


# Proposed Improvements





# Proposed Improvements



**EMBANKMENT SECTION**  
SECTION 1  
SCALE: 1" = 2'



# Proposed Improvements





# Proposed Improvements



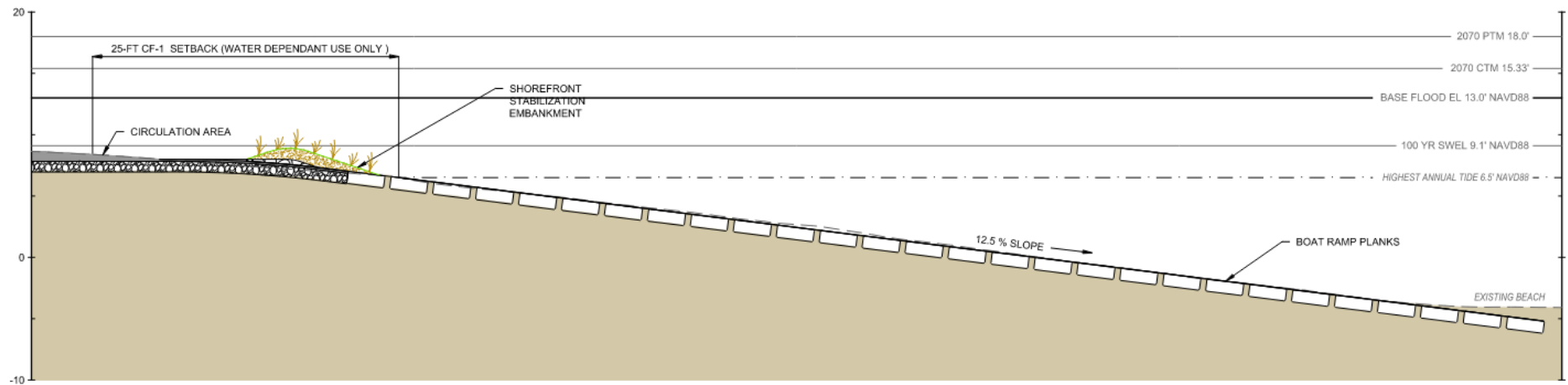


# Proposed Improvements





# Proposed Improvements



BOAT LAUNCH  
SECTION 2 SCALE: 1" = 5'





# On Site Improvements

Concept Design Budget Estimate					
ITEM	Total QTY	Unit	Unit Cost	Total Cost	NOTES
<b>Mobilization</b>					<b>\$ 34,700</b>
Mobilization/Demobilization	1		\$17,000	<b>\$ 17,000</b>	7% of total construction cost
Existing Demolition & Disposal	1	LS	\$ 3,500	<b>\$ 3,500</b>	Town Dump
Maintenance of Traffic	1	LS	\$ 2,000	<b>\$ 2,000</b>	
Bonding & Insurance		0.05		<b>\$ 12,200</b>	(5% of Construction Cost)
<b>Shorefront Resiliency</b>					<b>\$ 142,824</b>
Stone Armor	40	CY	\$ 250	<b>\$ 10,037</b>	
Marine Mattress (6-ftx16-ft)	28	EA	\$ 2,500	<b>\$ 68,750</b>	
Trap Rock 8-inch minus	110	CY	\$ 150	<b>\$ 16,500</b>	
Helix Anchors	20	EA	\$ 1,000	<b>\$ 20,000</b>	Total Cost/LF=
Sand	183	CY	\$ 50	<b>\$ 9,167</b>	865.6
Coir Log	165	LF	\$ 20	<b>\$ 3,300</b>	
Geotextile Fabric	293	SY	\$ 8	<b>\$ 2,200</b>	
Planting	1980	LF	\$ 4	<b>\$ 7,920</b>	
6"-8" Underdrain	165	LF	\$ 30	<b>\$ 4,950</b>	
<b>Site Circulation</b>					<b>\$ 35,386</b>
Underwater Backfill	19	CY	\$ 50	<b>\$ 926</b>	New Pavement only
12.5 mm Hot Mix Asphalt	100	TON	\$ 225	<b>\$ 22,500</b>	3" @ 110/SY/IN thick/2000
Type D Subbase	11	CY	\$ 55	<b>\$ 585</b>	18" of subbase
Geotextile Fabric	115	SY	\$ 5.00	<b>\$ 575</b>	
Boulders	216	LF	\$ 50.00	<b>\$ 10,800</b>	
<b>Boat Ramp</b>					<b>\$ 24,529</b>
Concrete Planks	37	CY	\$ 450	<b>\$ 16,528</b>	14 ft x 4 ft x 0.66 ft
Trap Rock	37	CY	\$ 150	<b>\$ 5,509</b>	1 ft of trap rock
Crushed Stone	20	CY	\$ 75	<b>\$ 1,500</b>	6" of crushed stone
Geotextile Fabric	198	SY	\$ 5.00	<b>\$ 992</b>	under asphalt pn boat ramp
<b>Site Work</b>					<b>\$ 6,700</b>
Overhead Service Protection	1	LS	\$ 500	<b>\$ 500</b>	
Relocate Pole	1	LS	\$ 1,200	<b>\$ 1,200</b>	
Signage Allowance	1	LS	\$ 1,000	<b>\$ 1,000</b>	
Erosion Control - Allowance	1	LS	\$ 2,500	<b>\$ 4,000</b>	
<b>Construction Subtotal</b>				<b>\$ 244,138</b>	<b>\$ 244,138</b>
<b>Construction Contingency</b>				<b>15% \$ 36,621</b>	<b>\$ 36,621</b>
<b>Engineering &amp; Survey Servi</b>					<b>\$ 27,414</b>
<b>Design, Permitting, Construction Support</b>			<b>10.0%</b>	<b>\$ 24,414</b>	
<b>Survey (Boundary &amp; Topo)</b>	<b>1</b>	<b>LS</b>	<b>\$ 3,000</b>	<b>\$ 3,000</b>	
<b>2022 Project Budget</b>				<b>\$308,173</b>	<b>\$ 308,173</b>



# Off Site Improvements

## 1. Dedicated Parking

- Abutter Agreement
- Parcel Acquisition

## 2. Waterfront Planning

- Temporary Moorings
- Deepwater Access
- Working Waterfront Use Evaluation





# THANK YOU!

Barney Baker P.E.  
Coastal Practice Leader  
207-347-2370  
[bbaker@geiconsultants.com](mailto:bbaker@geiconsultants.com)

GEI



Consultants

Consulting  
Engineers and  
Scientists

44  
TOWN LANDING

GARRISON COVE

45

47

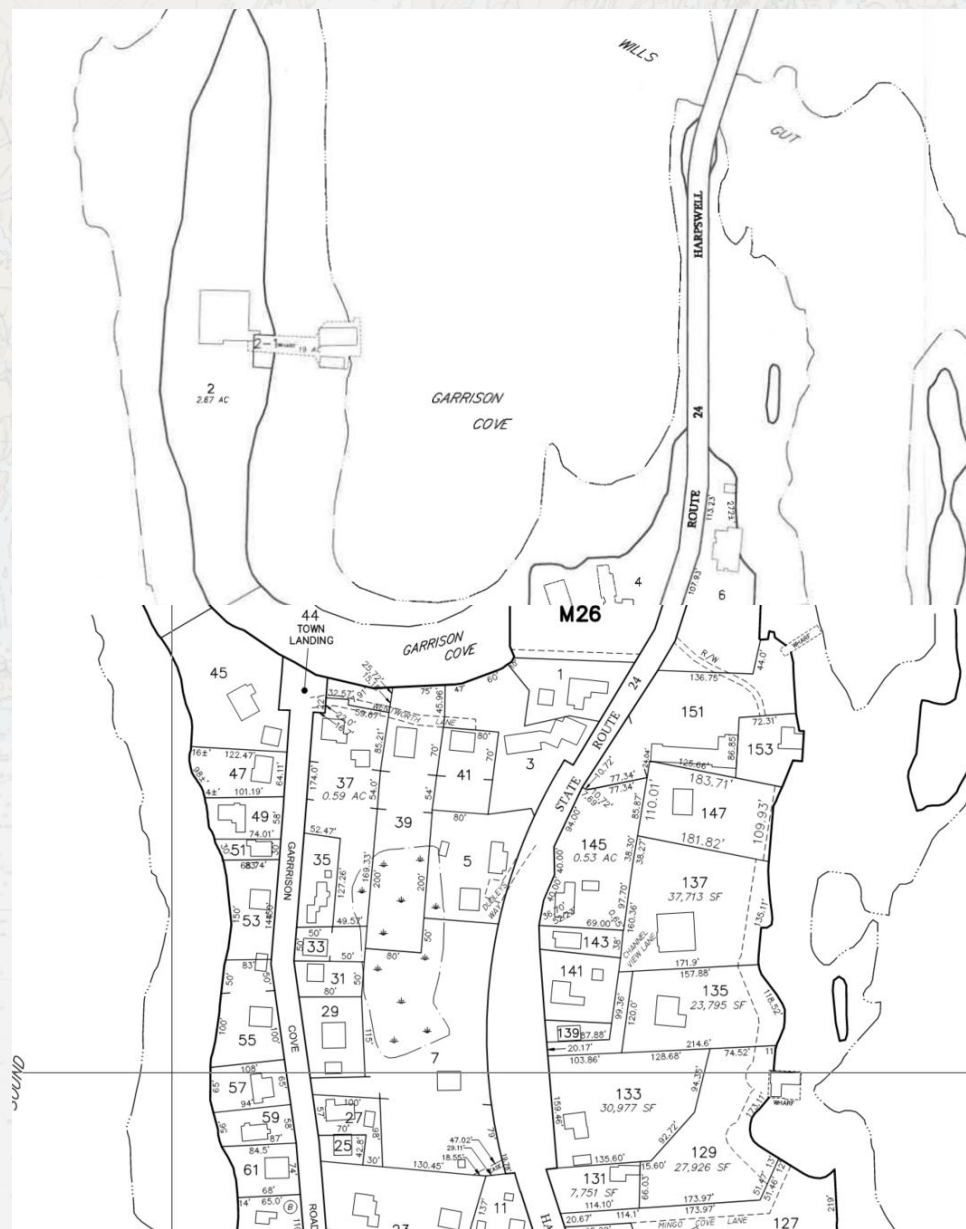
49

37  
0.59 AC

39

41

43





## 2005 Comprehensive Plan

The 1993 Comprehensive Plan identified 13 areas of shoreline public access ‘that are believed to be publicly owned.’ Organized according to geographic distribution, these include:

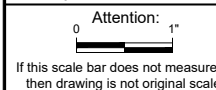
Bailey Island	Mackerel Cove, Garrison Cove, Giant Stairs and York Landing
Orrs Island:	Steamboat Hill Road
Great Island	Bethel Point
Cundy’s Harbor	Holbrook Street
North Harpswell	Wharf Road, Hildreth Road
Harpswell Center	Lookout Point, Wood Landing Point
South Harpswell	Pott’s Point, Basin Cove/Ash Point, Stover’s Cove.





GO-PIF STUDY

P.E. No.:	PE#
Approved:	APP_NAM
Checked:	CHK_BY
Drawn:	DRWN_B
Designed:	DSN_BY
GEI Project	2104760

[illegible]

0		
NO.	DATE	ISSUE/REVISION

SHEET NAME

## EXISTING CONDITIONS PLAN

SHEET NO.

**C-01**




**FOR REVIEW**





**Attention:**



If this scale bar does not measure 1" then drawing is not original scale.

[illegible]

NO.	DATE	ISSUE/REVISION	APP
-----	------	----------------	-----

SHEET NO.


**C-02**





P.E. No.:	PE#
Approved:	APP_NAME0
Checked:	CHK_BY
Drawn:	DRWN_BY
Designed:	DSN_BY
GEI Project	2104760

**Attention:**



If this scale bar does not measure 1" then drawing is not original scale.

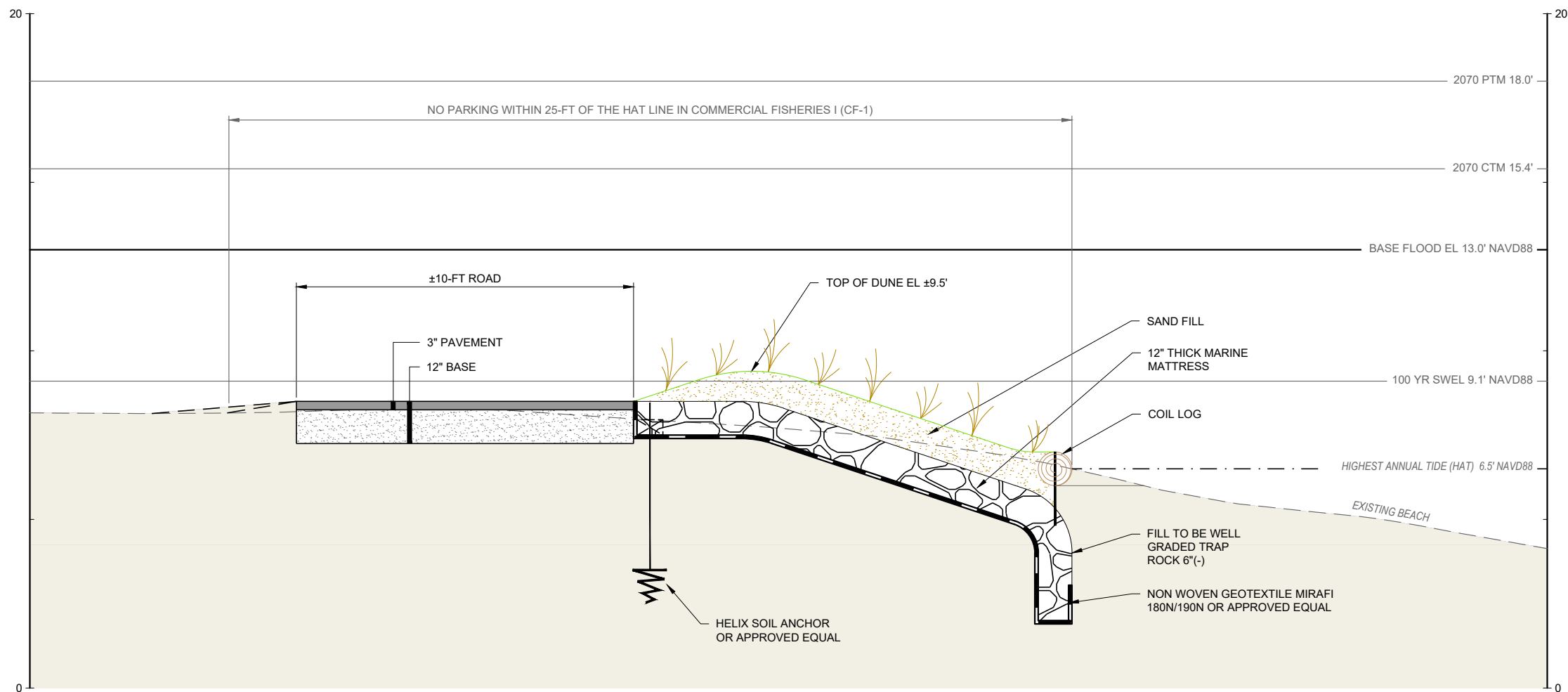
0			
NO.	DATE	ISSUE/REVISION	APP

SHEET NAME

**EMBANKMENT  
SECTION**

SHEET NO.

**C-03**



EMBANKMENT SECTION  
SECTION 1 SCALE: 1" = 2'

BAKER, BARNEY B:\Working\HARPSWELL, TOWN OF\2104760 - 21-57 GOPIF Study\00\_CAD\Design\Working\GARRISON\2104760 GO-PIF Study Garrison Cove.dwg - 8/16/2022

**FOR REVIEW**





TOWN OF  
HARPSWELL


HARPSWELL,  
MAINE

# GO-PIF STUDY

GARRISON COVE LANDING  
BAILEY ISLAND  
HARPSWELL, MAINE

<i>P.E. No.:</i>	PE#
<i>Approved:</i>	APP_NAME0
<i>Checked:</i>	CHK_BY
<i>Drawn:</i>	DRWN_BY
<i>Designed:</i>	DSN_BY
<i>GEI Project</i>	2104760

Attention:



If this scale bar does not measure 1" then drawing is not original scale.

[illegible]

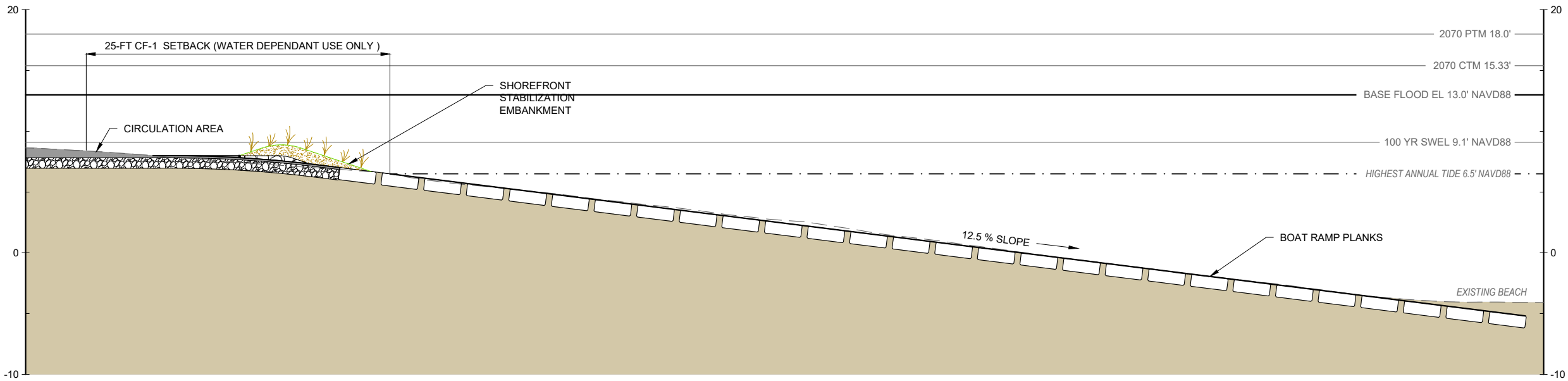
NO.	DATE	ISSUE/REVISION	APP
-----	------	----------------	-----

SHEET NAME

## BOAT RAMP PROFILE

SHEET NO.

## C-04



# BOAT LAUNCH

---

SECTION 2      SCALE: 1" = 5'

**FOR REVIEW**

BAKER, BARNEY B:\Working\HARPSWELL, TOWN OF\2104760 - 21-57 GOIF Study\00 CAD\Design\Working\GARRISON\2104760 GO-PIF Study, Garrison Cove.dwg - 8/16/2022



Concept Design Budget Estimate					
ITEM	Total QTY	Unit	Unit Cost	Total Cost	NOTES
Mobilization				\$	34,700
Mobilization/Demobilization	1		\$ 17,000	\$ 17,000	7% of total construction cost
Existing Demolition & Disposal	1	LS	\$ 3,500	\$ 3,500	Town Dump
Maintenancace of Traffic	1	LS	\$ 2,000	\$ 2,000	
Bonding & Insurance		0.05		\$ 12,200	(5% of Construction Cost)
Shorefront Resiliency				\$	142,824
Stone Armor	40	CY	\$ 250	\$ 10,037	
Marine Mattress (6-ftx16-ft)	28	EA	\$ 2,500	\$ 68,750	
Trap Rock 8-inch minus	110	CY	\$ 150	\$ 16,500	
Helix Anchors	20	EA	\$ 1,000	\$ 20,000	Total Cost/LF=
Sand	183	CY	\$ 50	\$ 9,167	865.6
Coir Log	165	LF	\$ 20	\$ 3,300	
Geotextile Fabric	293	SY	\$ 8	\$ 2,200	
Planting	1980	LF	\$ 4	\$ 7,920	
6"-8" Underdrain	165	LF	\$ 30	\$ 4,950	
Site Circulation				\$	35,386
Underwater Backfill	19	CY	\$ 50	\$ 926	New Pavement only
12.5 mm Hot Mix Asphalt	100	TON	\$ 225	\$ 22,500	3" @ 110/SY/IN thick/2000
Type D Subbase	11	CY	\$ 55	\$ 585	18" of subbase
Geotextile Fabric	115	SY	\$ 5.00	\$ 575	
Boulders	216	LF	\$ 50.00	\$ 10,800	
Boat Ramp				\$	24,529
Concrete Planks	37	CY	\$ 450	\$ 16,528	14 ft x 4 ft x 0.66 ft
Trap Rock	37	CY	\$ 150	\$ 5,509	1 ft of trap rock
Crushed Stone	20	CY	\$ 75	\$ 1,500	6" of crushed stone
Geotextile Fabric	198	SY	\$ 5.00	\$ 992	under asphalt pn boat ramp
Site Work				\$	6,700
Overhead Service Protection	1	LS	\$ 500	\$ 500	
Relocate Pole	1	LS	\$ 1,200	\$ 1,200	
Signage Allowance	1	LS	\$ 1,000	\$ 1,000	
Erosion Control - Allowance	1	LS	\$ 2,500	\$ 4,000	
Construction Subtotal				\$ 244,138	\$ 244,138
Construction Contingency			15%	\$ 36,621	\$ 36,621
Engineering & Survey Servc				\$	27,414
Design, Permitting, Construction Support			10.0%	\$ 24,414	
Survey (Boundary & Topo)	1	LS	\$ 3,000	\$ 3,000	
2022 Project Budget				\$ 308,173	\$ 308,173