

Building Shoreline Resiliency in Marshfield & Duxbury Through Beach & Dune Nourishment

Public Meeting – June 14, 2023

Source: Wicked Local





Source: marinas.com



Source: New England Air Photography

Meeting Agenda

- Introductory Remarks – Towns of Marshfield & Duxbury
- Project Background & Goals
- Nourishment Designs
- Status of Permitting
- Next Steps
- Questions & Answers

Goal : Enhance Resiliency of Critically Eroded Shorelines

- Protect public & private properties from storm damage
- Protect existing seawalls & revetments
- Minimize wave overtopping & flooding
- Restore recreational beach
- Restore coastal ecosystem



Source: Patriot Ledger

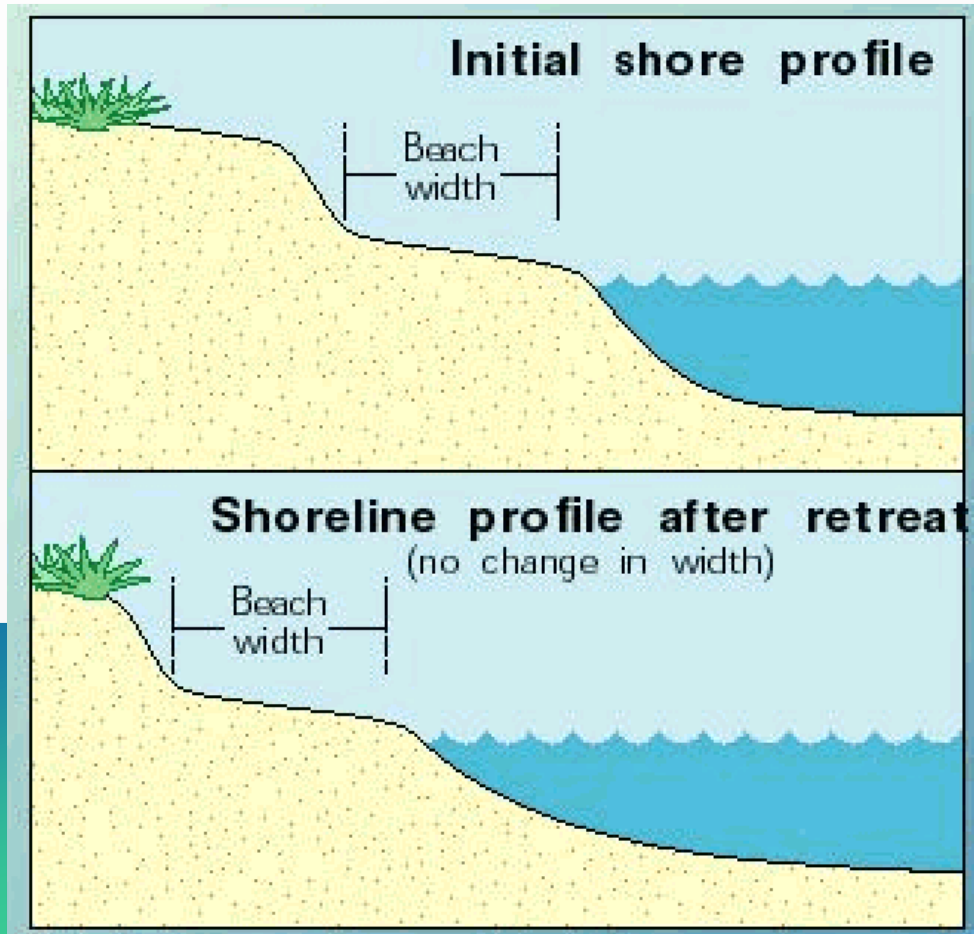


Source: Patriot Ledger

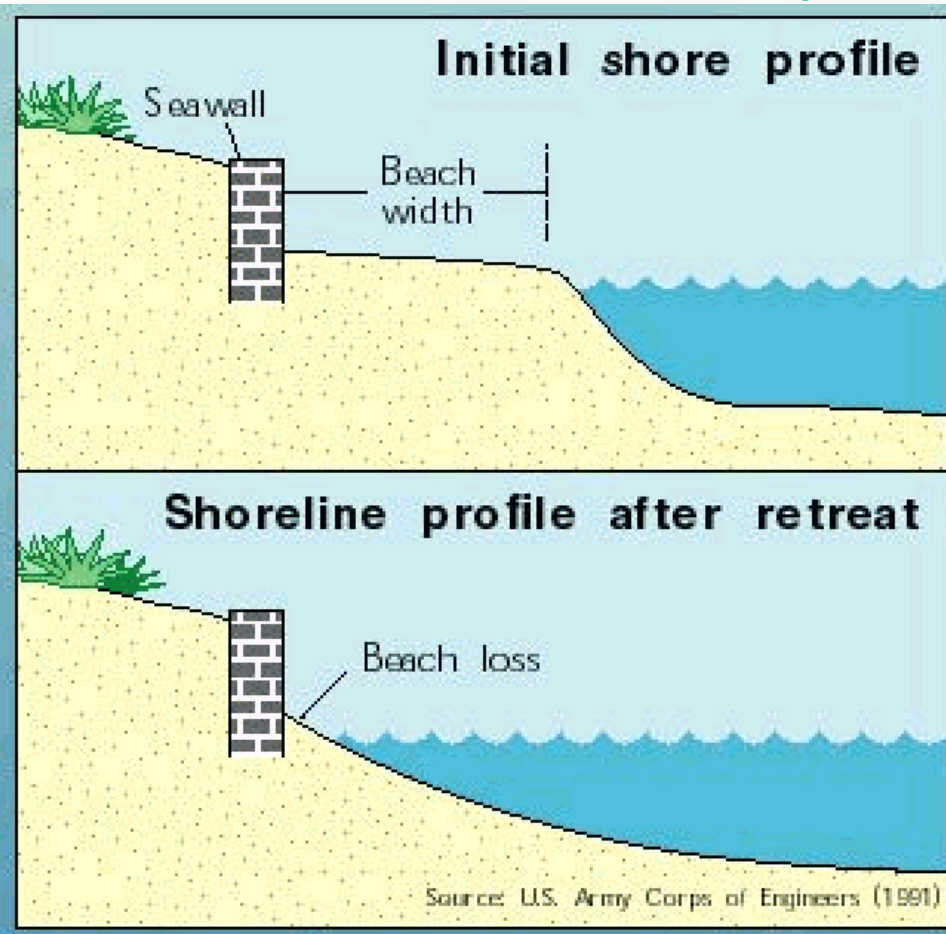
Coastal Armoring Impacts

- Benefits: last line of defense for erosion
- Disadvantage: adversely impacts beaches

*Natural beaches:
maintain beach width & elevation*

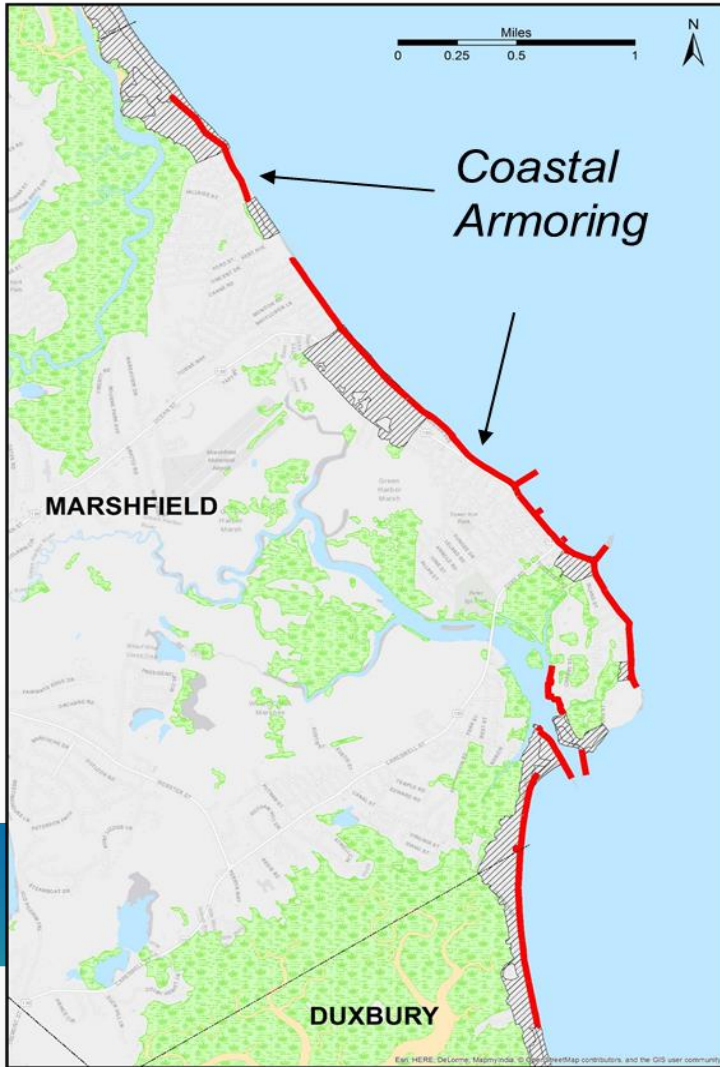


*Armored shorelines:
beach narrows & elevation drops*



Source: U.S. Army Corps of Engineers (1991)

Coastal Armoring Impacts



- *Lower beach elevation → deeper water during storms*
- *Deeper water → larger waves impacting the walls*
- *Larger waves → more overtopping*
- *More overtopping → increased damage*





Accomplishments To Date

Funding via CZM Coastal Resiliency Grants

- FY20: \$234,546
 - ✓ ID beaches suitable for nourishment
 - ✓ Develop engineering designs
- FY21: \$281,318
 - ✓ Filed permit applications
- FY22: \$94,141
 - ✓ Respond to agency questions
 - ✓ Follow-up to ensure permits issued
- Public outreach included in each year

Rexhame Public Beach



- 8.2 acres
- 33,870 cy fine to medium-grained sand with some gravel
- 1,650 linear ft -Town of Marshfield property
- Benefits for:
 - ✓ Storm damage protection
 - ✓ Recreation
 - ✓ Shorebird habitat



Winslow Ave. Beach (Porter St. To Rexhame Rd.)



- 4.5 acres
- 17,850 cy cobble and gravel sized sediment
- 1,540 linear ft -Town of Marshfield property
- Benefits for:
 - ✓ Storm damage protection



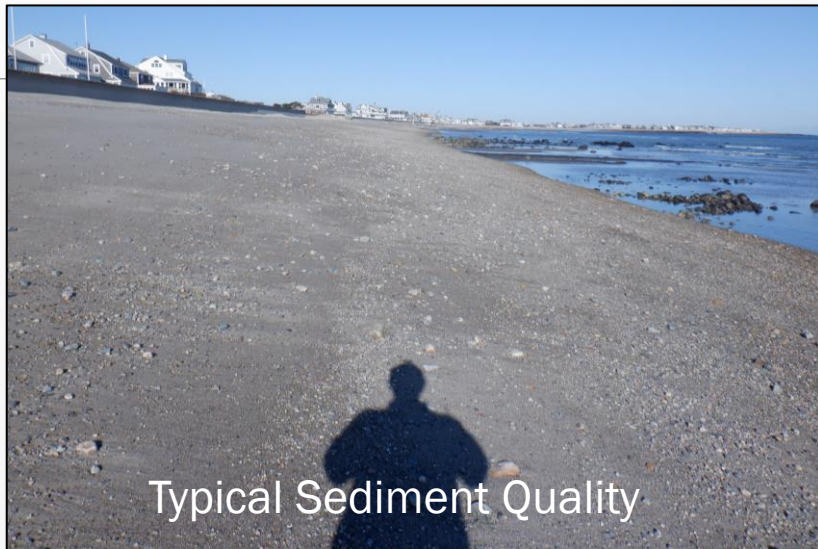
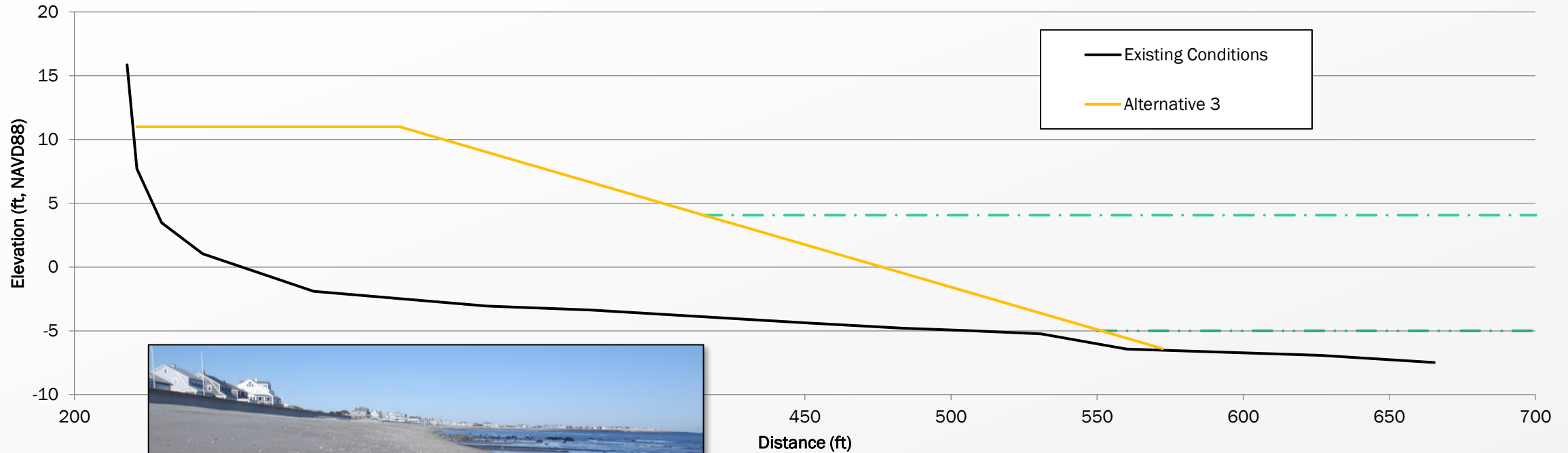
Bay Ave. & Gurnet Rd. Beaches (N of Pearl St. to end of Ocean Rd. South)

- 38.1 acres
- 480,640 cy sand mixed with gravel & cobble (84,977 cy in Marshfield/395,663 cy in Duxbury)
- 5,090 linear ft (900 ft in Marshfield/4,190 ft in Duxbury)
- 16 properties in Marshfield
- 66 properties in Duxbury
- Benefits for:
 - ✓ Storm damage protection
 - ✓ Reduced wave overtopping
 - ✓ Recreation
 - ✓ Shorebird habitat



Bay Ave. & Gurnet Rd. Beaches – Cross Section

Transect 19 - Bay Ave Beach



- 90 ft wide berm at elevation 11 ft NAVD88
- Gradual 15H:1V seaward slope

Permit Status for Beach Nourishment

| Permitting Agency | Marshfield | Duxbury |
|--|------------|------------|
| Conservation Commissions | ✓ | ✓ |
| MA Department of Environmental Protection Waterways Division | ✓ | ✓ |
| Coastal Zone Management | ✓ | ✓ |
| US Army Corps of Engineers | In Process | In Process |



Grant Funding is Available

- Construction will have to be done in phases over a period of years.
- Both Towns have reserve funds that can be used for grant match funds. Would not require approval of a funding article at Town Meeting.
- CZM Coastal Resiliency grant program has a 2M cap for the FY24 projects.
- Marshfield plans to apply for 1M a grant with 25% match that will allow for completion of 55% of the project.
- Duxbury plans to apply for a 2M a grant with 25% match that will allow for completion of 25% of the project.
- Funding article at Town Meeting articles in Fall 2023 for Marshfield and Spring 2024, 2025, & 2026 in Duxbury could be used to add sediment until the full project is built.
- Best case scenario is that nourishment would start this winter.

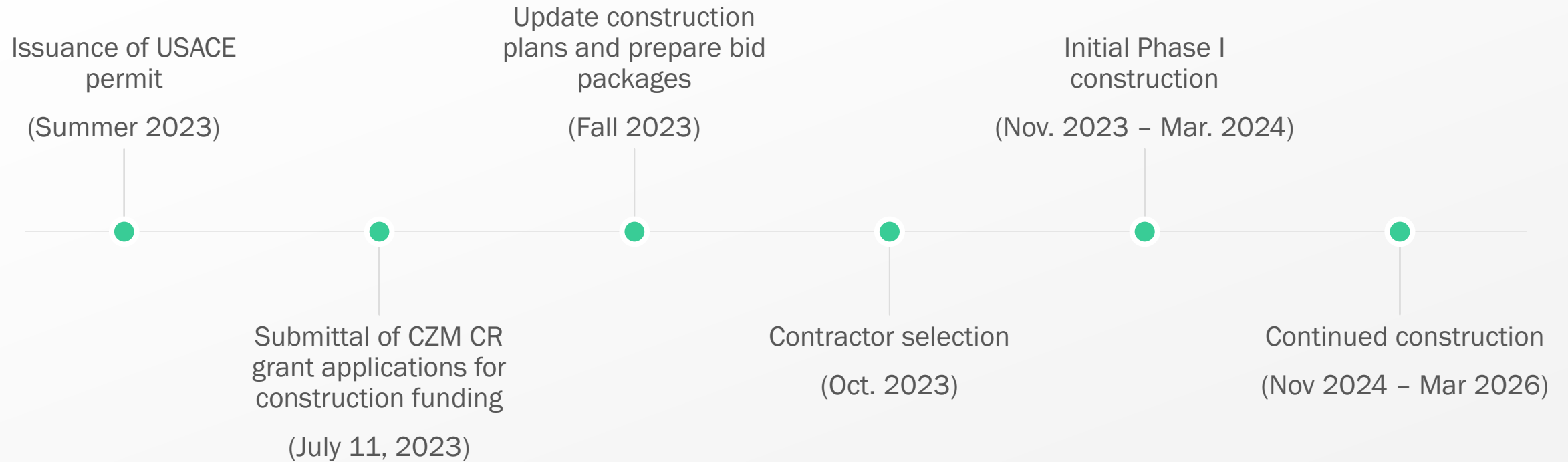


Bay Ave. & Gurnet Rd. Beach Potential Construction Phase I Winter 2023/2024

- Marshfield – 55% of design volume (46,600 cy)
- Duxbury – 25% of design volume (98,900 cy)
- Could extend length of Phase I nourishment area by altering the width and/or other design parameters
- Design parameters would be adjusted prior to construction to maximize benefits based on available funding



Anticipated Schedule



June 14, 2023

Questions & Answers

What type of sediment will be used for the nourishment?

- *The nourishment must match current sediments on the beaches; mixture of sand, gravel, cobble. Upland sediment used for nourishment will initially have a reddish iron staining, but this will bleach out over time as the material is washed, bleached, and tumbled by the water.*

What time of year will construction take place?

- *The permits allow nourishment from Sept. 1 to March 31.*





Questions & Answers

How will the sediment get to the beach?

- Sediment will be trucked to the beach in tractor trailers, dumped in a stockpile area, and then reloaded into end dumps for transport down the beach. Front end loaders will spread the sediment to meet the nourishment design.

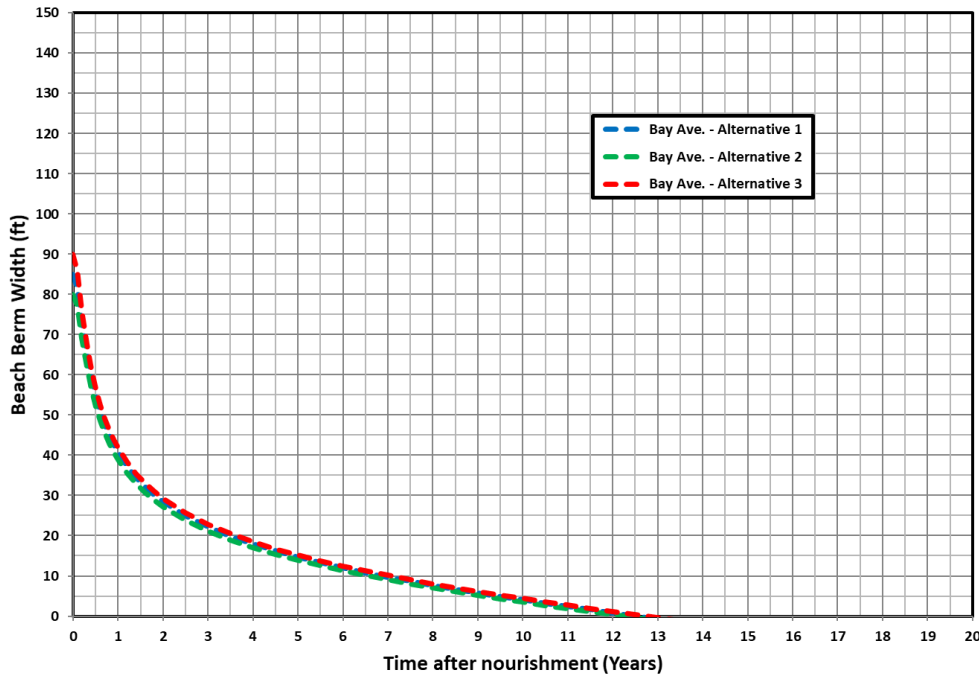
How long will it take to construct the project?

- It is expected that the projects will be constructed in phases over a 2-4 year period. Work will likely be ongoing for 4-5 months between Oct. and Mar.

What volume of truck traffic can be expected?

- Approx. 3,000 cubic yards (or 100 truck loads) of sediment will be delivered to the beach each day.

Beach Berm Width Remaining



Questions & Answers

How long will the nourishment last?

- *Engineering analyses suggest that renourishment will be needed every five years when approximately 80% of the sediment has spread outside the original footprint. Net transport is to the south, so material placed at the north end of the nourishment footprint will move into the footprint to the south.*

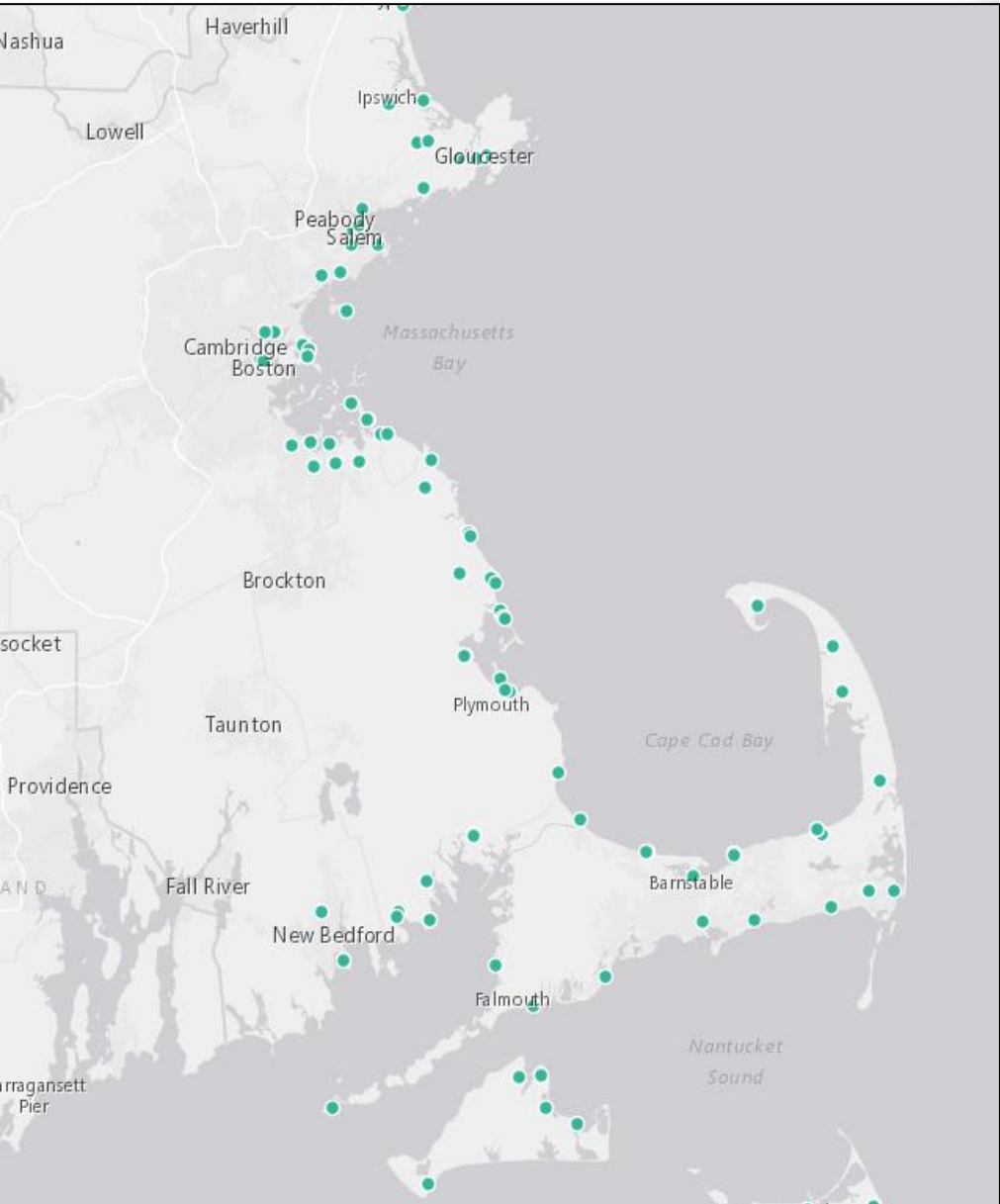
Will there be impacts to water quality during the nourishment?

- *Fine-grained material in the upland sediments will become suspended in the water column when the nourishment is inundated. A cloudy plume may appear in the nearshore area until the fines are washed away.*

Thank you

Question and Answer Session

Submit Written
Questions/Comments to:
gguimond@townofmarshfield.org
cryan@town.duxbury-ma.gov



Public Meeting Mar. 9, 2023