

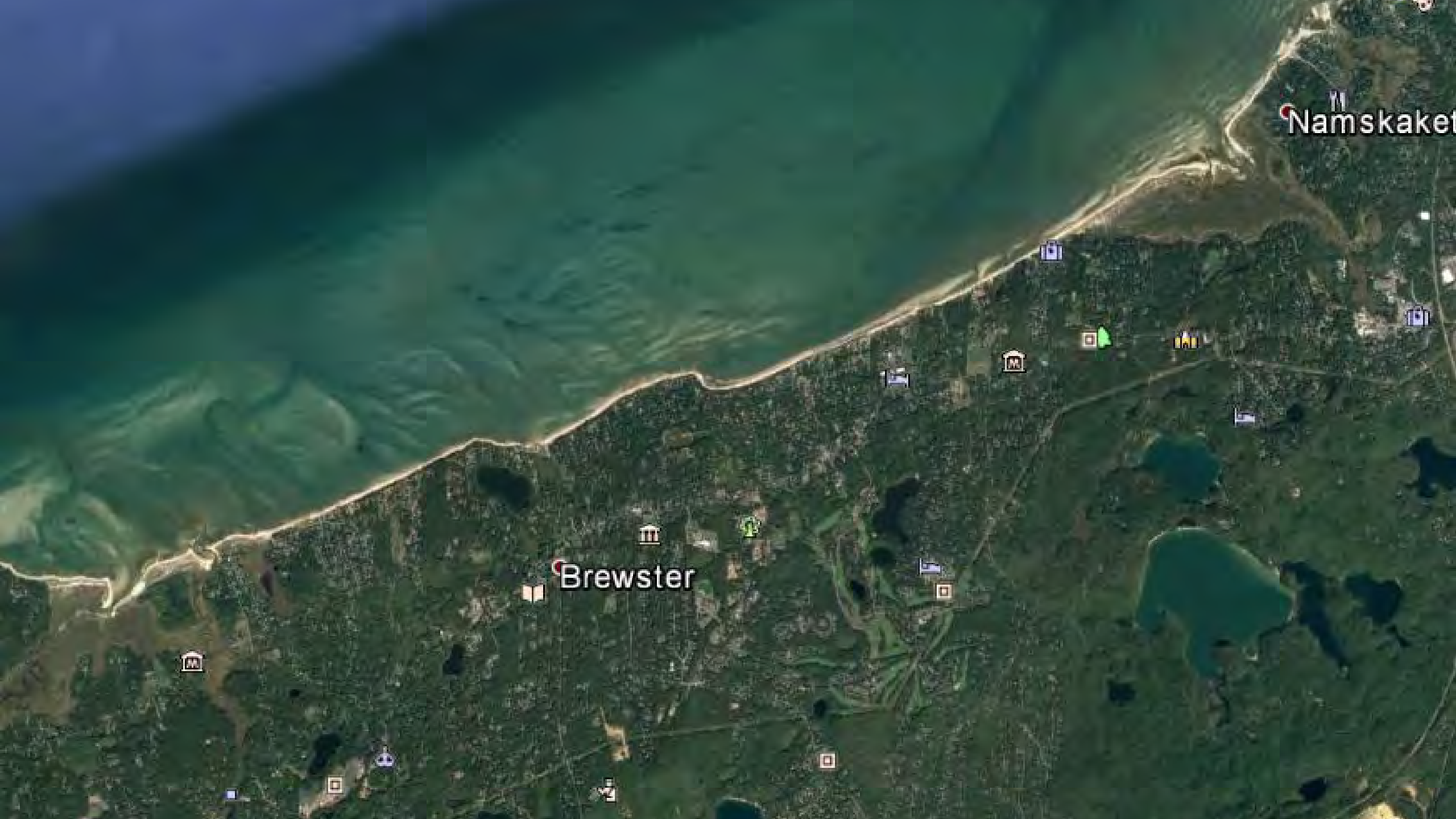
An aerial photograph of a coastal area. In the foreground, there's a body of water with a sandy beach. To the right, there's a residential area with several houses and a road. The background shows a forested hillside. The text is overlaid on a dark blue semi-transparent rectangle.

Local Planning and Public Engagement

Implementation of Living Shorelines at Coastal Access Sites

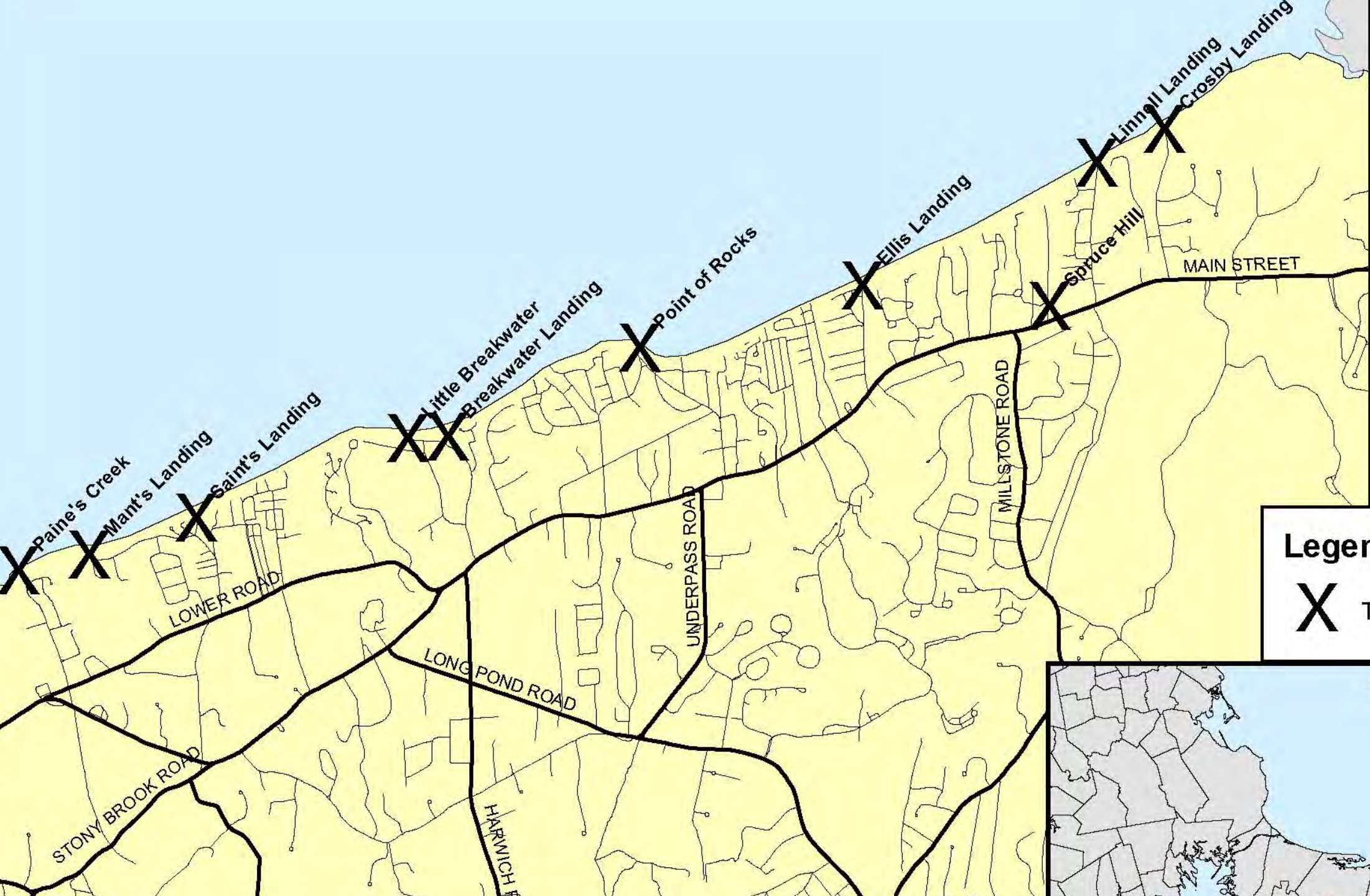
. LOCAL PLANS, REGULATIONS, OR POLICIES SUPPORTING GREEN INFRASTRUCTURE

CHRIS MILLER, TOWN OF BREWSTER DEPARTMENT OF NATURAL RESOURCES



Namskaket

Brewster



Legend

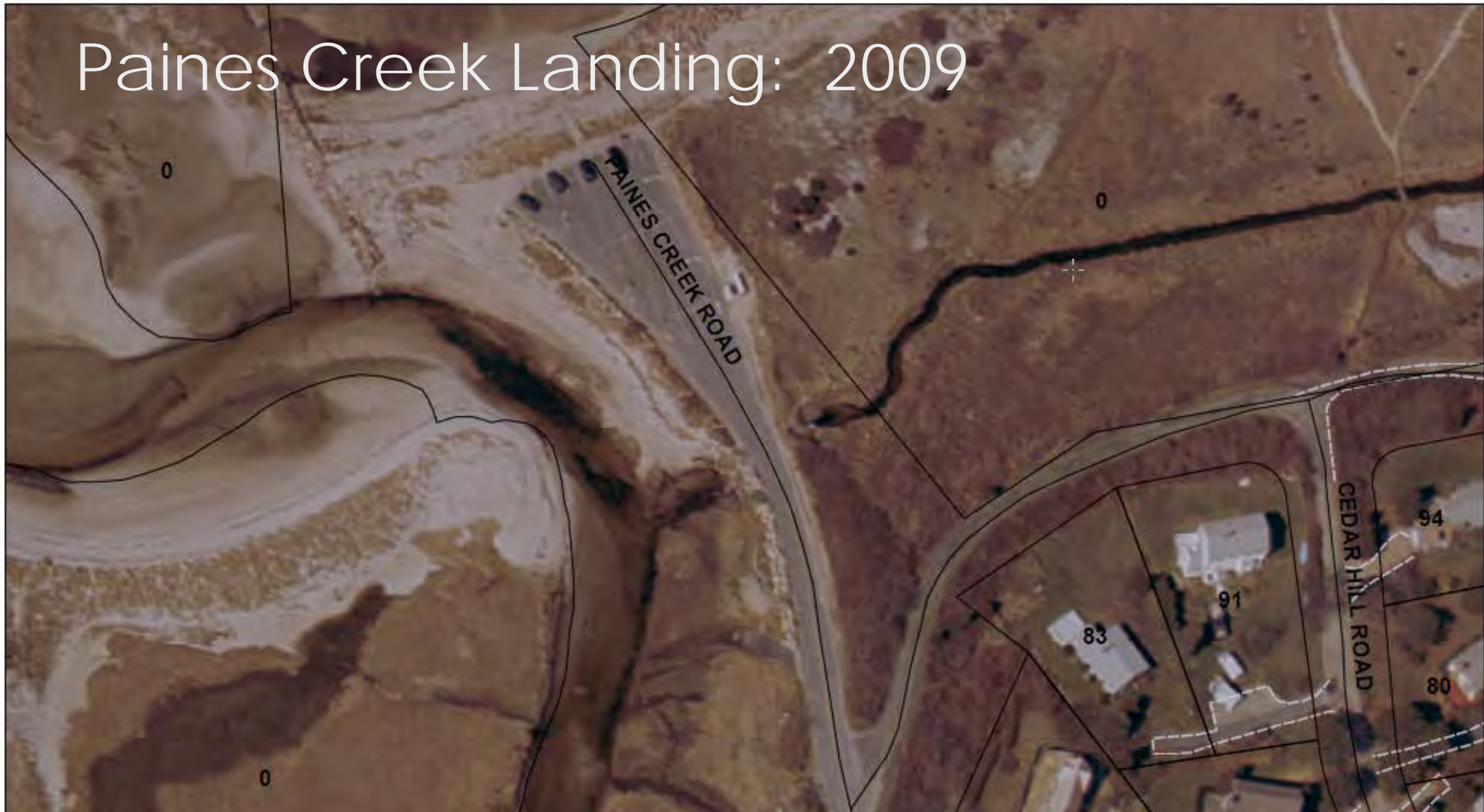
X Town Landings



Paines Creek Landing: 2007



Paines Creek Landing: 2009





Paines: January 2, 2010





March 2010



Local Planning for Retreat

- ▶ Several years of substantial investment in repairs
 - ▶ Selectmen meetings, town meeting expenditures
 - ▶ Selectmen presentation on alternatives
 - ▶ Grant opportunity NRCS Stormwater
 - ▶ Can we promise to maintain infrastructure for 75 years?
- ▶ Rethink investments, use grant, improve stormwater conditions
 - ▶ Removal of pavement = less stormwater
 - ▶ Resilient lot able to withstand inundation
 - ▶ Culvert replacement

Paine's Creek



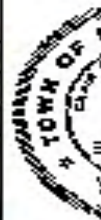
Brewster Coastal Committee

- ▶ June 2013 staff report on beach and landing conditions to Board of Selectmen and a coastal tour.
- ▶ The Board approved a 7-member Coastal Committee which had its first meeting in October, 2014.
- ▶ **CHARGE:**
- ▶ Develop a management plan for Brewster's coastal resources.
 - ▶ Conduct an assessment of the coastal processes, natural resources, existing uses and management practices on Brewster's Cape Cod Bay shore
 - ▶ Identify critical areas, including those that support important uses of the resource, either by humans or coastal species and those that are vulnerable to erosion or affected by upland development

Brewster Coastal Committee

- ▶ Identify a range of alternatives to address:
 - ▶ future management of all the coastal resources of Brewster's bay shore
 - ▶ public access to the bay, including alternatives to onsite parking lots
 - ▶ rising sea levels and increases in storm intensity, including retreat and re-location
- ▶ Recommend on-going, immediate (1-3 years), short-term (4-6 years) and long-term (6+ years) actions
- ▶ Recommend ways of securing funding, including new or changes to current means of generating revenue for coastal management and protection
- ▶ Invite public participation in the execution of its responsibilities.

Breakwater Beach



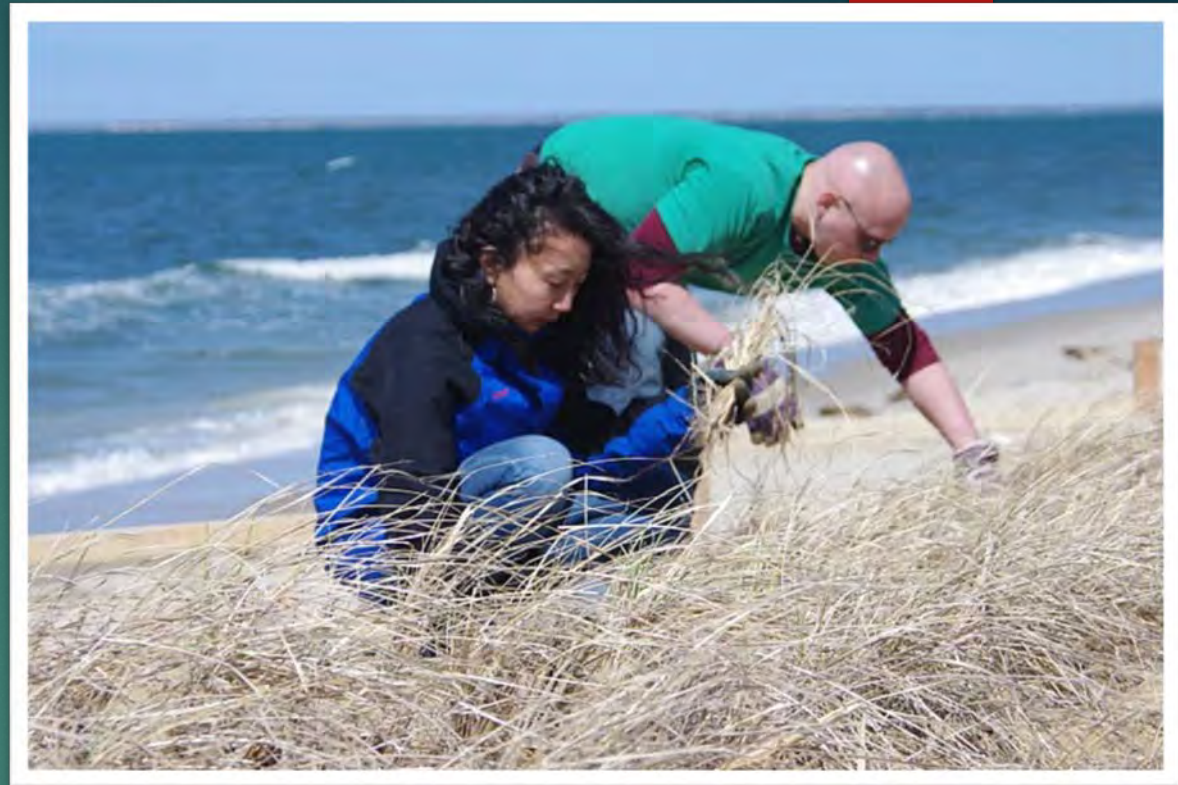
Recurring storm damage







Planting beach grass



- ▶ Alternative spring break, Brandeis University



Breakwater spring 2012



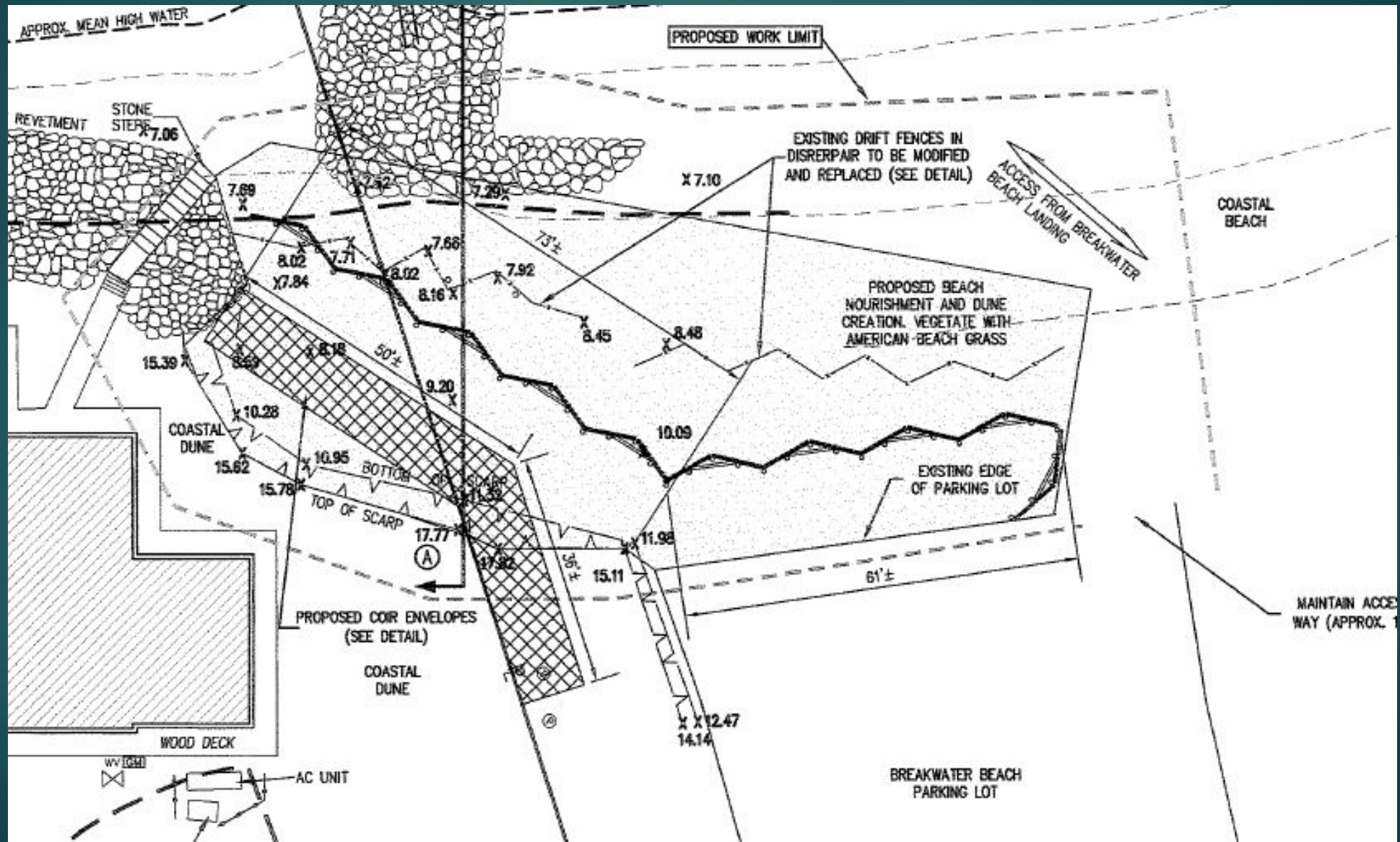
Breakwater February 2013



Breakwater February 2013



End scour from revetment to west



Sturdy sand fence in sacrificial dune at Breakwater

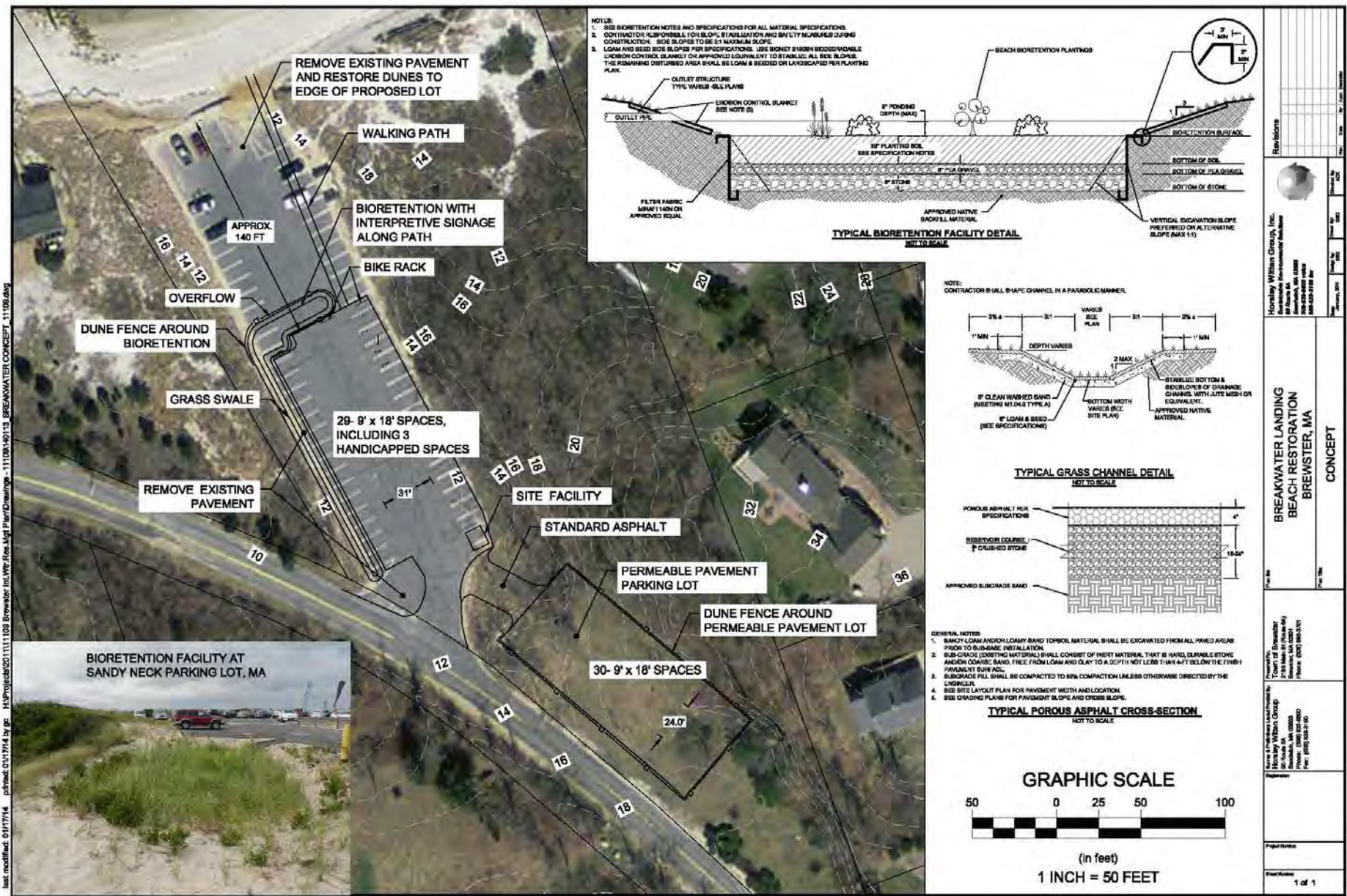




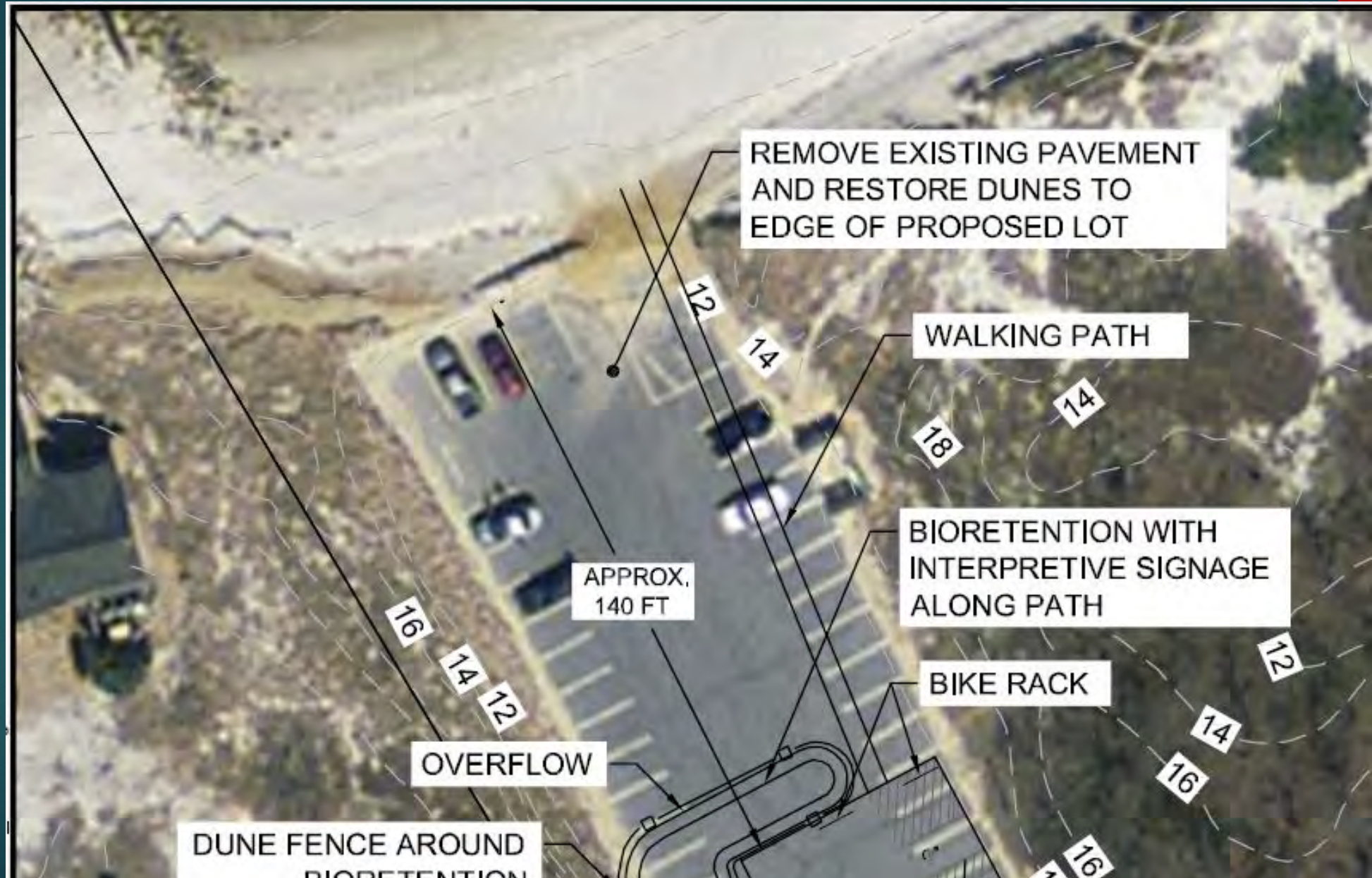
Sturdy fence buried under new dune located slightly further from active beach.



Breakwater Beach Conceptual Plan



Concept: Retreat and rebuild



New replacement lot



Public Outreach

- ▶ Televised beach tours and discussions of alternatives
- ▶ Town meeting articles for funding (twice)
- ▶ Two state CZM grants (design and for construction)
- ▶ Postcards to neighborhood
- ▶ Multiple televised selectmen meetings
- ▶ Articles in newspaper
- ▶ Multiple Brewster Coastal Committee meetings
- ▶ MEPA site visit
- ▶ Historic, Conservation, Planning Board meetings (multiple)

Results?

- ▶ Strong support from Selectmen and boards
- ▶ Many neighbors liked the retreat, if we didn't replace the parking that was lost
- ▶ Some neighbors supporting, but a group formed to oppose the project (and others)
- ▶ Lawsuit, petitions, different designs, confused boards
- ▶ Lots more press and editorials
- ▶ town meeting articles to oppose this and other projects
- ▶ Concurrently, town applied for a CZM Coastal Resiliency Grant to develop community support and understanding of coastal issues.
- ▶ Outcome: Selectment sponsored specific yes/no votes at town meeting; and the project was approved and constructed.



The Channel Way

Breakwater Rd

The Hides Cl

Developing a Coastal Adaptation Strategy for Brewster

- ▶ CZM Coastal Community Resiliency Grant 2016
 - ▶ \$222,000 (\$160,000 grant, \$62,000 local match)
- ▶ Develop a consensus-based Coastal Adaptation Strategy.
 - ▶ A measured and detailed public engagement process is the next step in adapting to Brewster's future coastal change and erosion issues.

Tasks

- ▶ A vulnerability and risk assessment to establish a science-based foundation for policy dialogue on coastal resilience and adaptation
- ▶ A facilitated public participation process that expands citizen, town staff and town committee member's understanding of these vulnerabilities; and builds capacity for evaluating management strategies to respond to changing climate conditions

How?

- ▶ Collect appropriate data and conduct an alternatives analysis of adaptation and resiliency options, responsive to the vulnerability assessment and public consensus
- ▶ Develop a final Strategy that identifies management measures, standards and policies that will enable the Town of Brewster to adapt to, and redesign to accommodate our changing coastal conditions

From the grant applications:

- ▶ We've learned the hard way that without thorough community engagement and a more comprehensive approach to coastal adaptation and resiliency, projects that are technically well designed and appropriate for the location, can be halted in either the finding or permitting process if citizens object to the project.
- ▶ Brewster's Breakwater beach retreat, dune restoration and green stormwater management plan, funded in last year's round of CZM CCRC grants, is now in the DEP appeals process. Citizen opposition has many layers; however an important message out of this is the need for a more comprehensive plan for addressing coastal change.

Climate Adaptation

- ▶ Brewster's entire coast is currently in the FEMA VE flood zone and most or all of its tidal marsh and creek system are mapped as AE.
- ▶ There are 1,138 land parcels within these zones.
- ▶ In the past five years, extensive parts of coastal Brewster have been exposed to storm surge impacts, including dune washover, flooding and significant erosion. In some areas, up to 20 feet of dune/coastal bank have been lost in a single storm event.

Public Beach Access Issues

2014:

- ▶ 6,411 resident beach stickers
- ▶ 4,355 seasonal and visitor stickers
- ▶ Approximately 300 total spaces
- ▶ Stickers required 9am to 3pm daily June 15 through labor day.

CZM Grant

► **Public Engagement team**

- The Consensus Building Institute (CBI);
- The Cape Cod Commission;
- Brewster Coastal Committee (BCC); and
- Town of Brewster staff

► **Technical Advisory team**

- Horsley Witten Group (HWG);
- Coastal Geologist, LEC Environmental
- The Association to Preserve Cape Cod (APCC); and
- The Center for Coastal Studies (the Center)

Brewster Coastal Advisory Group (BCAG)

- ▶ CBI created a representative group of 24 people to provide targeted input and help guide strategy decisions, including the 7 member Brewster's Coastal Committee (BCC).
- ▶ Members of the BCAG were selected, based on applications of interest, to represent a range of perspectives, demographics, and points of view within the community.
- ▶ All BCAG meetings were open to the public and include time for public input.
- ▶ BCAG was engaged during the initial data gathering and vulnerability assessment process.

Liasons to BCAG

- ▶ Appointed representatives from Town committees and boards:
 - ▶ Bikeways Committee
 - ▶ Council on Aging
 - ▶ Department of Conservation and Recreation (Nickerson SP)
 - ▶ Natural Resources Department
 - ▶ Open Space Committee
 - ▶ Selectmen

Sea level rise, erosion, storms

- ▶ Technical team prepared relevant data and studies
 - ▶ Century scale sediment budget for the Brewster flats
 - ▶ Expected sea level rise
 - ▶ Storm surge
 - ▶ Erosion rates
 - ▶ Planning horizons

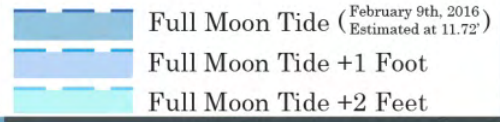
BCAG required many more meetings than anticipated

- ▶ A group of 24 members plus liaisons, many of whom wanted to have input throughout the process, added complexity.
- ▶ Data and visualizations were evolving; and each draft brought up new questions and discussions.

20, 40 and 60 Years

- ▶ Brewster BCAG chose the following timeframes and future scenarios for the mapping and analyses of sea level rise and storm surge impacts on Brewster's coast:
 - ▶ Time horizons of 20 years and a one foot rise in sea level, 40 years (~ two feet), and 60 years (~ four ft) to provide for both short- and long- term impacts, and
 - ▶ Storm surge levels of two, four, and eight feet.

Paine's Creek Landing



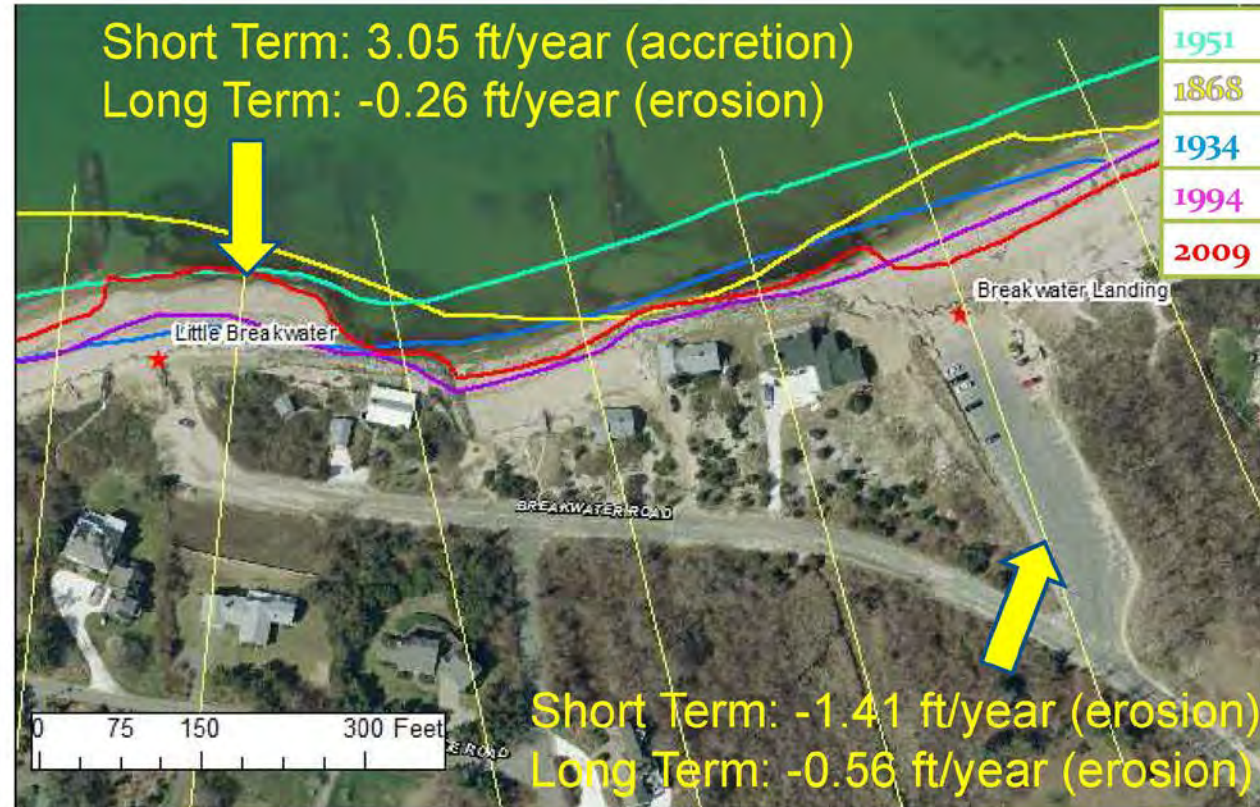


LEGEND

- Mean High Water (MHW)
- MHW + 2' Sea Level Rise
- MHW + 4' Sea Level Rise
- MHW + 2' SLR + 6' Storm Surge
- MHW + 4' SLR + 6' Storm Surge

Mant's Landing

Long term erosion trends



**Breakwater and Little Breakwater Landings
Historic Shorelines, Erosion Rates and Variability**

Flood risks



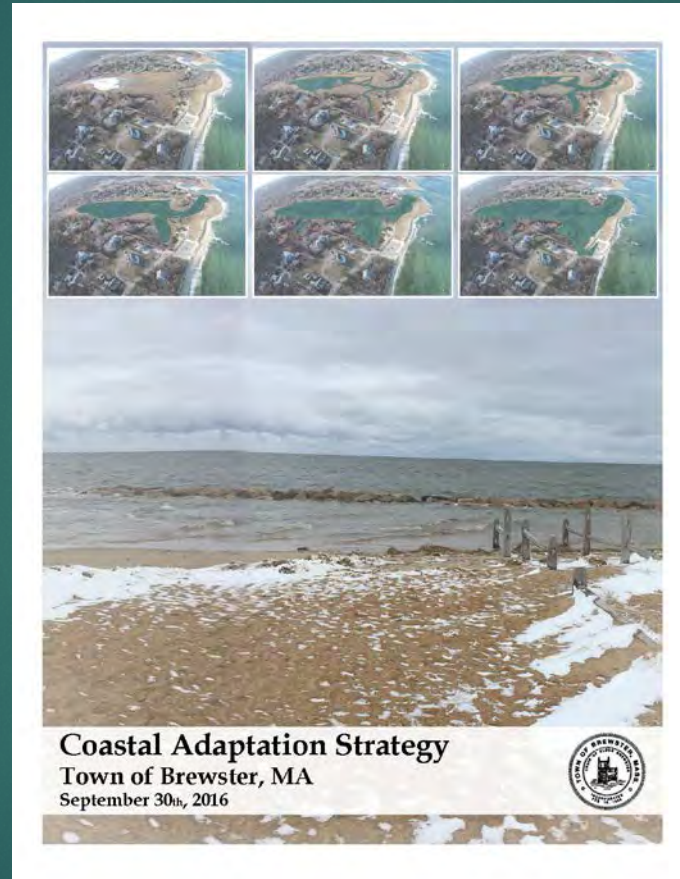
Survey of 6,980 Residents/Visitors

- ▶ People value the tidal flats, the natural setting of beaches and surrounding areas, the wildlife and untouched beauty, and the lack of commercial development.
- ▶ When asked to select the option they use most often to get to the beach, 81% indicated that they drive or carpool, 15% walk, 3% bike, and less than 1% either take the bus or some other mode of transportation.

Public Visioning Workshop

- ▶ Public discussion of the central questions for the project—what does the community envision for its coastal areas, and how can that vision be made more resilient to the impacts of climate change?

Final Report: Coastal Adaptation Strategy



The Strategy

- ▶ A framework for future decision-making about Brewster's public coastal areas. It will assist the Town in meeting the diverse access needs of the community and adapting to coastal change, sea level rise, storm surge, and shoreline erosion.

Results

- ▶ Eight public meetings between February and September 2016, with a public visioning session in April.
- ▶ Consensus on a set of guiding principles, many town-wide approaches for coastal adaptation, and a set of recommendations to guide next steps and implementation
- ▶ The Strategy is intended to lay the groundwork for future discussions and the development of an implementation plan – the Brewster Coastal Resource Management Plan.

The Strategy includes:

- ▶ A consensus statement of the core, guiding principles that collectively articulate the BCAG's vision and values for the management of Brewster's public coastal areas;
- ▶ An analysis of coastal vulnerabilities and potential impacts from sea level rise and storm surge on a landing-by-landing basis;
- ▶ A summary of findings from a resident survey on public beach use and access needs;
- ▶ A preliminary analysis of potential approaches which have promise for meeting the core principles, and
- ▶ Consensus recommendations for action steps to translate the strategy into an effective plan that can be implemented.

Vision

- ▶ Brewster will preserve and protect the community's coastal resources and expand access to its public beaches through public consensus, and in ways that preserve the natural habitat and peaceful character of the coastal environment and coastal neighborhoods, respect the overall coastal and land-based ecosystem, and adapt to long-term projections for coastal change.

Guiding Principals

- ▶ All decisions made about the future of Brewster's public coastal areas should uphold the following community values, priorities, and desires (listed in no particular order):

Access

- ▶ Maintain and expand the opportunities for all to access Brewster's public beaches year-round. Meet peak season access needs by exploring opportunities at all public access points, and through alternative means, including off-site parking, improved biking and pedestrian access, and investigation of shuttle options.
- ▶ Also consider those with limited mobility and users of wheelchairs, families, commercial and recreational shell-fishermen, and emergency access, and the safety needs of providing and balancing this access for all.

Natural Beauty

- ▶ Protect and maintain the natural beauty, non-commercial, peaceful, quiet, spacious, and “small feel” of Brewster’s coast, beaches, and coastal neighborhoods, and safeguard their long-term significance for town residents and visitors.

Science-based, innovative, and realistic

- ▶ Seek long-term solutions based on the best available science that are innovative, realistic, and achievable; that work along with nature and build climate resiliency today and into the future; and that are both environmentally and fiscally sustainable.

Holistic

- ▶ Protect the whole coastal system, including beaches and dunes, wildlife habitat, salt marshes, and other ecosystem services. Seek actions appropriate to coastal projections and community needs that build on and enhance the coast as well as the ecosystem as a whole.

Adaptive

- ▶ Recognize that the changing nature of coastal resources requires flexibility and adaptive planning, with ongoing monitoring of changing conditions and community needs, to best respond to new technologies, opportunities, and scientific uncertainties.

Consensus Based

- ▶ Provide for public input and build community consensus through all phases of the planning and implementation of the Coastal Adaptation Strategy.

Key Points: Change is Hard

- ▶ People come to Cape Cod for the water.
- ▶ Beaches are sacred places to many people
- ▶ Memories aren't exact
- ▶ Many people are here only in the summer, after repairs are made and storms are a distant memory
- ▶ People's needs may change over time.
- ▶ Beaches are used year-round and seasonal uses change.
- ▶ The process takes time and active outreach
- ▶ Compromise often doesn't feel good.