

Town and County of Nantucket Select Board • County Commissioners

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C. Elizabeth Gibson
Town & County Manager

***AGENDA FOR THE MEETING OF THE
SELECT BOARD
APRIL 13, 2021 - 4:00 PM
REMOTE PARTICIPATION VIA ZOOM
PURSUANT TO GOVERNOR BAKER'S MARCH 12, 2020
ORDER REGARDING OPEN MEETING LAW
NANTUCKET, MASSACHUSETTS***

Join Zoom Meeting

<https://zoom.us/j/97280426580?pwd=R2g5T0RmNFk5c0hsSXRsMDRmQUVOdz09>

Meeting ID: 972 8042 6580
Passcode: 408480

- I. WORKSHOP MEETING WITH COASTAL RESILIENCE ADVISORY COMMITTEE AND TOWN STAFF WITH ARCADIS REGARDING BAXTER ROAD ENGINEERING FEASIBILITY ASSESSMENT.***
- II. ADJOURNMENT***



FOCUS GROUPS ROUND 1 AGENDA

Pre-Work:

1. Review and confirm the Resources Registry.
2. Take the pre-meeting survey.

Agenda:

1. Overview: What is the Baxter Road Feasibility Assessment?
2. Timeline: Review the relevant resources and timeline of events
3. Alternatives: Review and define the alternatives
4. Foster Agreement on prioritizing solutions
5. Summary of Next Steps/Action Items

Scope of Work

Baxter Road Engineering Feasibility Assessment, Town of Nantucket, MA

January 29, 2021

The scope of work for the Baxter Road Engineering Feasibility Assessment covers Baxter Road and related public infrastructure from the Sankaty Lighthouse to Butterfly Lane in Siasconset, including the adjacent private parcels.

A summary of work for each project task included in the scope of work is provided below.

Task 1 – Review of existing information

Task 1 involves a review of existing conditions and information to inform analysis and community engagement steps. This includes the following:

- Previous planning studies
- Prior bluff coastal analysis and monitoring reports
- Prior Conservation Commission submittals and findings

Task 1 will also include an assessment of the impacts to the tax base for one selected alternative, as listed under Task 3.

Assumptions: Nantucket staff will provide the relevant previous reports and documentation. For the tax base impacts analysis, Nantucket will provide assessors data by parcel in GIS and spreadsheet format for use in analysis.

Task 2 – Stakeholder engagement

The goal of Task 2 is to reach consensus on:

- acceptable risk
- consequences of alternatives and consequences of inaction
- the path forward based on technically feasible alternatives
-

Stakeholders we will work with include the following:

- Sconset Beach Preservation Fund
- Nantucket Coastal Conservancy
- Nantucket Land Council
- Sconset Trust
- Select Board
- Conservation Commission
- Sankaty Golf Club
- Sconset Residence Association

- Town Staff
- Quidnet Squam Association
- Coastal Resilience Advisory Committee

Arcadis will lead and facilitate all stakeholder engagement meetings. The meetings include in the scope are as follows:

- Up to three 1:1 or Group Interviews
- Three Focus Group meetings x 2 for a total of six meetings. Currently it is envisioned that we will split the above list of stakeholders into three groups. We will hold two meetings with each group to reach goals of consensus building.
- Two Community or at large Meetings
- Attendance at up to three Board or Committee meetings to provide updates on materials presented/findings from the other meetings.
- An additional item included in the public engagement is an overview of information on assessments/betterments as a funding alternative. This will show cases throughout the country and specific to Mass General Law. It does not include actual calculations of betterment fees for the work of this project.

Assumptions: Town will provide staffing support and attend all meetings. Nantucket will coordinate, select attendees, provide announcements/advertisements/postings of materials for all Task 2 meetings, including any requirements under Massachusetts Open Meeting Law. All meetings are assumed to be virtual.

Task 3 – Alternatives / Engineering Feasibility Analysis

This high-level alternatives / feasibility assessment will focus on the following considerations for up to five alternatives:

Definition of purpose – what is the alternative intended to do?

Service life – for what period of time would the alternative be effective in preventing significant bluff erosion.

Initial construction cost – order of magnitude estimates for comparison between alternatives.

Operations and Maintenance – costs and other considerations; order of magnitude to compare between alternatives.

Constructability – identify likely issues which could impact the ability to implement the alternative.

Other feasibility issues – will vary with alternative but items may include supply (for sand); need for land acquisition; access; emergency services; adjacent impacts; etc.

The team will consider up to five alternatives within the framework outlined above. These alternatives include:

- Bluff stabilization
- Nourishment – sand replacement, plantings
- Retreat /Relocate road
- No Action
- Homeowner/Community Outreach on SOP (Standards of Practice) & BMP (Best Management Practices)

The alternative analysis will be presented in a narrative format with limited quantitative values as appropriate. A matrix summary will also be provided to support outreach activities. The matrix would be suitable for ranking and scoring, but that work would be completed as part of other tasks.

No additional modeling will be completed at this time. Note we will need to utilize the modeling results being provided from the ongoing Coastal Resilience Plan. Service life and feasibility assessments will be based on previous studies, ongoing work, available published standards, and expert opinion. Engineering analysis will be limited during this phase to only as needed to supplement existing data sources in order to develop construction cost estimates, O&M estimates or make high-level feasibility assessments.

Task 4 – Summary of Findings & Recommendations

Prepare a memorandum summarizing the alternatives and concept plan for moving forward based on analysis and community engagement. Provide a prioritized action plan outline for adaptation over time based on selected alternative. Includes overview of near-term next steps and longer-term critical milestones/decision points the Town can use to focus investment based on changing conditions.

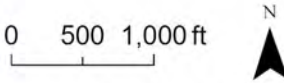


Buildings in Coastal
Erosion Hazard Zone

- Outside
- 2030
- 2050
- 2100

DRAFT

Scale: 1:9,000



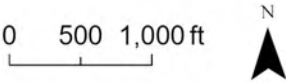


Roads in Coastal
Erosion Hazard Zone

- 2030
- 2050
- 2100

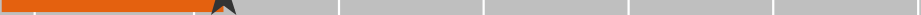
DRAFT

Scale: 1:9,000





Baxter Road Engineering Feasibility Assessment

	2021							
TASKS	February	March	April	May	June	July	August	September
Notice to Proceed / Kickoff	<i>NTP</i> <i>Kickoff</i> 							
Task 1 – Review of Existing Information		 						
Task 2 – Stakeholder Engagement *								
Task 3 – Alternatives and Engineering Feasibility Analysis								
Task 4 – Final Memorandum					 			

★ Significant Deliverable

● Meetings

* Meetings assumed to be virtual



Person Hour and Fee Schedule
for
Baxter Rd Engineering Feasibility
Town of Nantucket, MA



Task	Task Description	PD / QA/QC/ SE II	PM/SE	E	TS/A	C	Total Hours	Subtotals	Other Direct Costs	Totals
100	Project Kickoff, Initial Information Gathering	38.00	16.00	20.00	0.00	4.00	78.00	\$ 16,971	\$ -	\$ 16,971
200	Community and Stakeholder Engagement	40.00	150.00	60.00	0.00	60.00	310.00	\$ 52,490	\$ 800	\$ 53,290
300	Methodology, Environment, and Identifying Coastal Flood and Erosion Hazards	55.00	116.00	88.00	124.00	0.00	383.00	\$ 64,600	\$ 400	\$ 65,000
400	Summary of Findings & Recommendations	24.00	40.00	30.00	0.00	40.00	134.00	\$ 22,417	\$ 300	\$ 22,717
Total Project Costs		157	322	198	124	104	905	\$ 156,478	\$ 1,500	\$ 157,978

Notes:

1) PD: Project Director / QA/QC: Quality Assurance / Quality Control (Technical Expert) / SE II: Staff Engineer II; PM: Project Manager; SE: Staff Engineer; E: Engineer; TS/A: Technical Support / Admin, Project Assistant; C: Clerical



BAXTER ROAD, NANTUCKET

Feasibility Assessment and Solutions

Date April 13, 2021



Today's Facilitation Team



KEREN BOLTER, PHD

Senior Resilience Planner

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KATHRYN EDWARDS, PE

Principal Engineer / Project Manager

e kate.edwards@arcadis.com



IRENE WATTS, PHD

Senior Coastal Modeler

e irene.watts@arcadis.com

Today's Discussion:

- What is the **Baxter Road Feasibility Assessment** and what have we done so far?
- What should we **name** this project?
- What should the **mission statement** be?
- What **risks** have we seen on Nantucket's Baxter Road?
- **Your** perspectives, priorities, and preferences
- How can we agree on a **solution** that works for everyone?
- A short- and long-term vision for Baxter Road's **resilient future**

A large blue triangle pointing to the right, positioned to the left of the section header.

Meeting Goals

- **Hear** YOUR input
- **Share** what we have done so far and the roadmap ahead
- **Gather** feedback, data suggestions, and recommendations
- **Confirm** previous studies and data review list
- **Define** the 5 alternatives being considered for Baxter Rd
- **Begin to create** a consensus that works for everyone

Ground Rules & Instructions

1

Stay mentally and physically present and **listen actively**

2

Contribute to meeting goals by **sharing ideas and asking questions**



- 1 Go to **PollEv.com**
- 2 Enter **KBOLTER833**

Where do you spend most of your time when you are in Nantucket (can be live, work, vacation)?



Historic Sea Levels



Sea Level Rise Projections for Nantucket MHHW

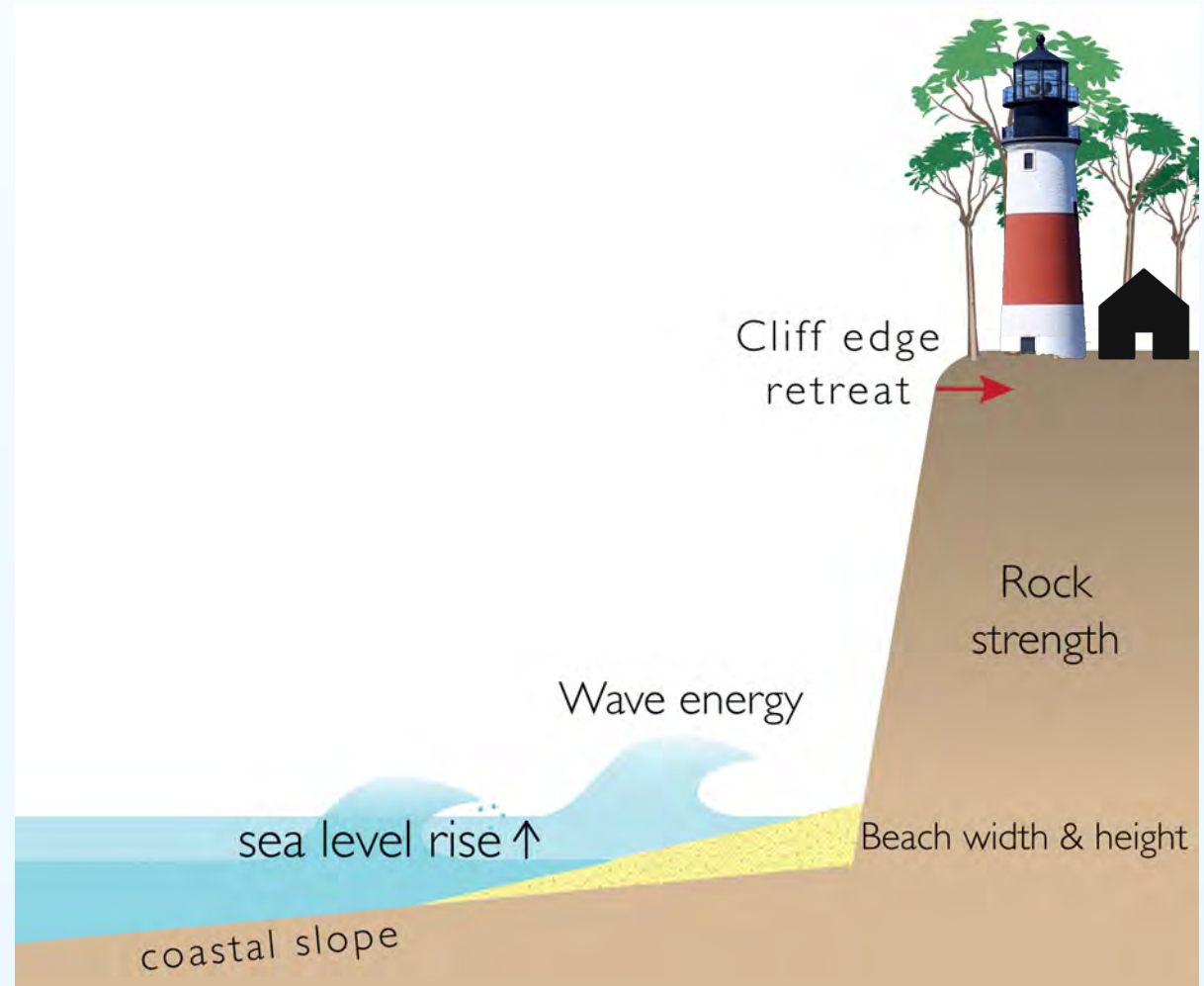
Scenario	Today	2030	2050	2070	2100
High (ft)	1.5	3.0	4.3	6.1	9.7

Relative Annual Sea Level Rise and Future Scenarios for Nantucket, MA from Massachusetts Statewide Climate Projections (Northeast Climate Science Center, UMASS Amherst) March 2018

Connecting Sea Level Rise To Erosion

Factors that can affect coastal bluff erosion, include:

sea level rise, wave energy, coastal slope, beach width, beach height, ground water/drainage, rock strength, and structures



<https://www.usgs.gov/media/images/factors-can-affect-coastal-cliff-erosion>

PROJECT OVERVIEW

Baxter Road Engineering Feasibility Assessment

- 1 – Review of Existing Information
- 2 – Stakeholder Engagement
- 3 – Alternatives / Engineering Feasibility Analysis
- 4 – Summary of Findings & Recommendations

Gaining Consensus

- How do we gain consensus on the best roadmap to prepare for changing conditions and the future of Baxter Rd?
- Where should we prioritize investments?



Photo: Google Earth, 2018

Active and Empathetic Listening

An empathic listener works to keep the speaker from feeling or becoming defensive. To do this, avoid asking direct questions, arguing with what is being said, or disputing facts.

The evidence can be considered later. For now, concentrate fully on what is being said and how the speaker feels.

Use “I feel”...statements and not “You” statements

What do you think is a good name for this project?

Future of sconset bluff and beach

Sconset Planned Retreat Project

Baxter Road Long-term Planning

Baxter Road Neighborhood Adaptation Plan

We got Baxter Roads back!

Baxter Road Long-term Planning

East coast planning

The Future is not "Sconset" in Stone

Baxter Road Park

Baxter Road CRP

Baxter road future proofing

PROJECT MISSION

The Baxter Road Feasibility Assessment will create a community-supported actionable roadmap to implementation of short and long-term solutions for the Baxter Rd area that lessen the loss from storm surges and help the community adapt to rising seas and eroding coastlines.

NOTES: Expand on the scope of the word adapt, that it includes protection, accommodation, retreat, and do nothing
Other comments were positive - we like the actionable roadmap for short and long term

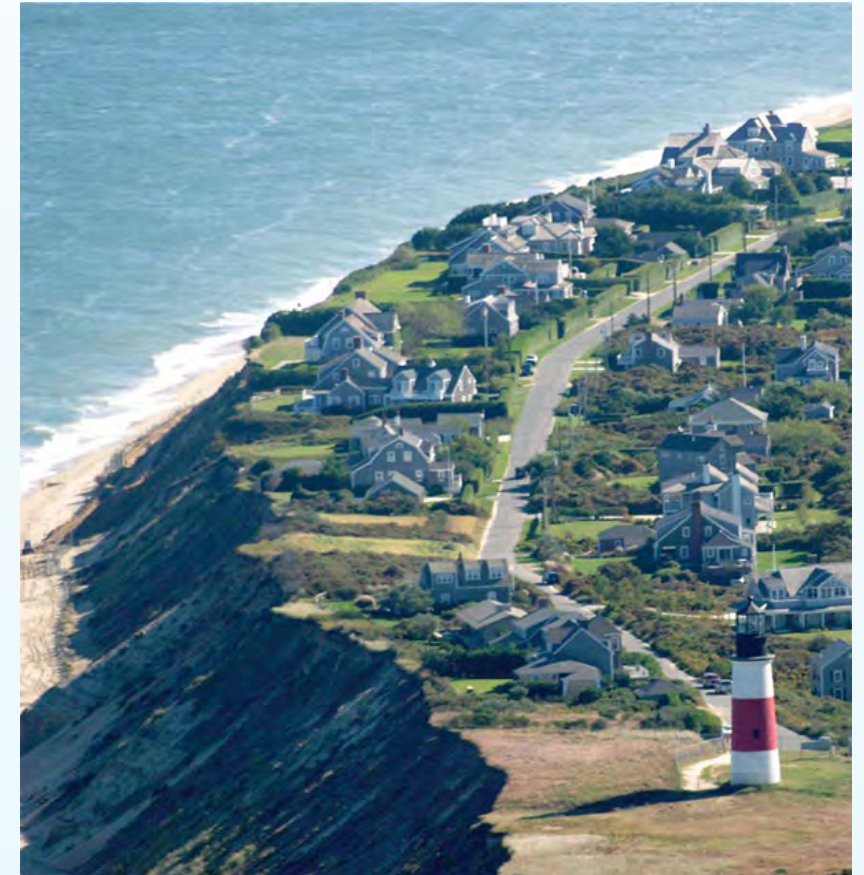
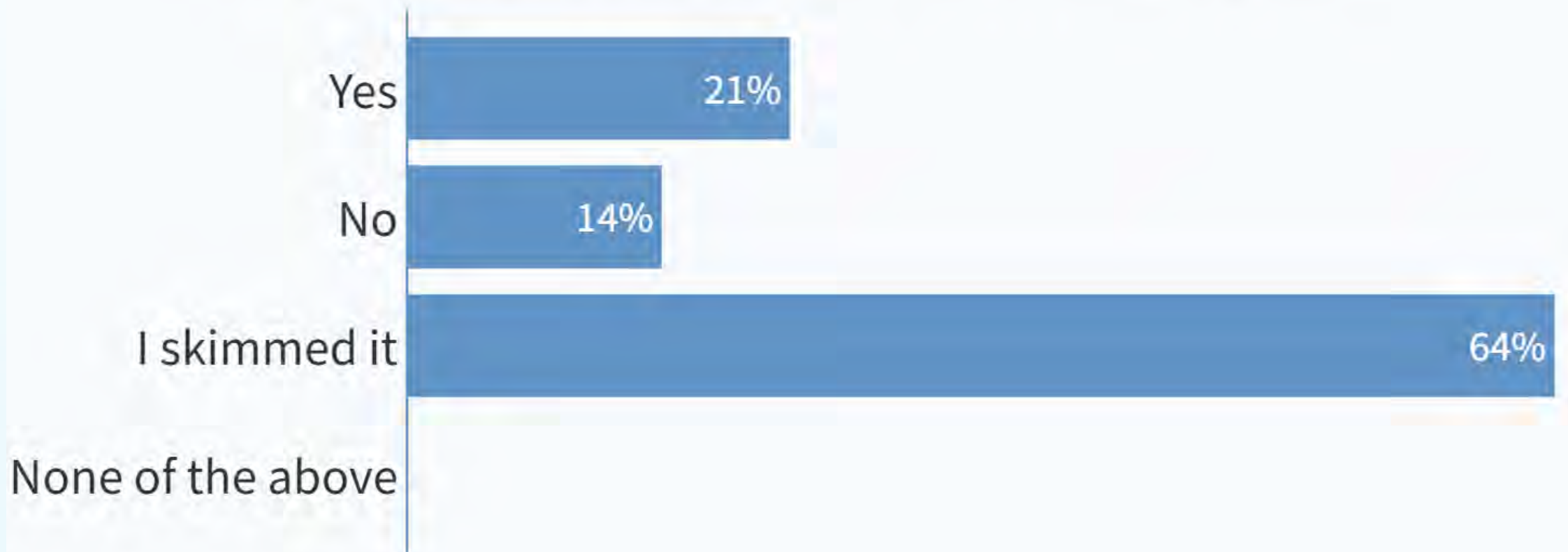


Photo: <https://nantuckettodayonline.com/archives/the-battle-for-the-bluff>

Have you reviewed the resource list that we sent?



Resources and Data List Review

(please send additional documents by 4/20)

Description - Short	Folder	Description - Long	Author	Author Abbreviated	Date	HyperLink
Report	SE48-3115 Extension of Geotube Project	Discussion and comments on mitigation and sediment dynamics associated with the SBPF application	Applied Coastal	Applied Coastal	10/26/2018	Click Here
Report	SE48-3115 Extension of Geotube Project	Response to Comments from the 11/5/2018 Hearing	Epsilon	Epsilon	11/16/2018	Click Here
Research Article	SE48-3115 Extension of Geotube Project	In Situ Ingestion of MicroFibres by Meiofauna from sandy Beaches	Research Journal	Other	4/8/2016	Click Here
Letter	SE48-3115 Extension of Geotube Project	Letter in opposition to geotube expansion	NCC	NCC	11/19/2018	Click Here

Addition Form			
Submitted by (Name): _____			
Submittal Date: _____			
Organization (If Applicable) _____			
What did we miss?	PLEASE FILL OUT ALL SECTIONS BELOW		
Description	Author	Date	Hyperlink

Adaptation Choices are Very Personal

- At the homeowner level and the community level
- Some concerns we have heard from you:
 - The need for an impartial analysis
 - Unintended consequences (environmental)
 - Where to prioritize the Town's efforts
 - Cultural preservation (history, lighthouse)
 - Affordable housing
 - Fairness/equity
 - Sand sources
 - Beach access
 - Budget
 - Nantucket's tax base

Goals for Beginning to Reach Consensus



Explore future risks and tradeoffs



Understand consequences of alternatives and consequences of inaction



Define technical feasibility of alternatives



Foster a culture of cooperation and preparedness

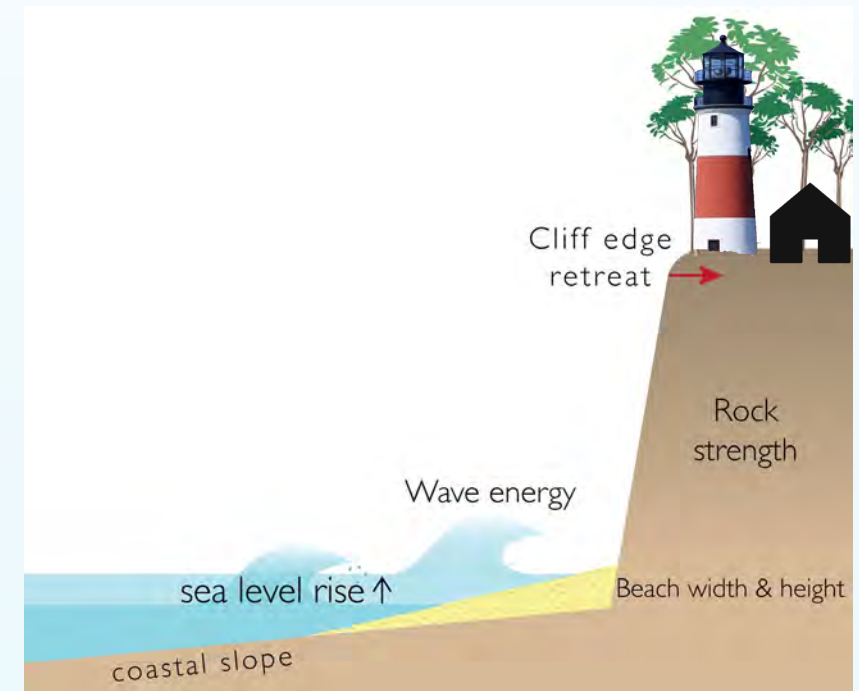
BAXTER ROAD: OVERVIEW AND VULNERABILITY





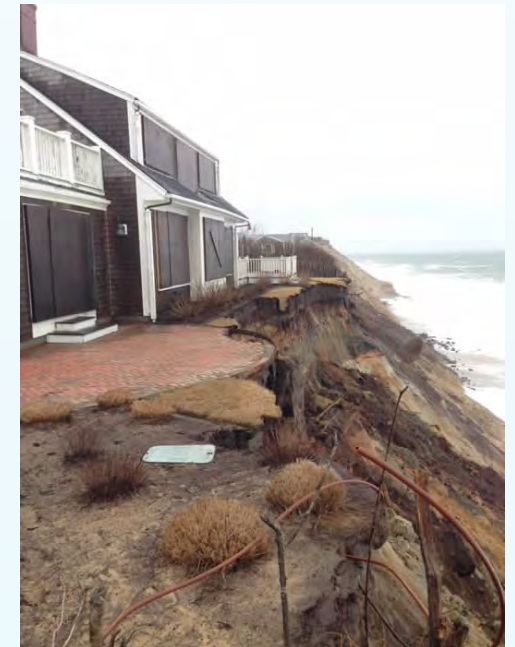
Erosion in Nantucket

- Shoreline is mainly sandy soils, highly susceptible to coastal erosion.
 - Revisiting bluff erosion factors
- Climate change impacts (SLR & extreme events) will increase other erosion factors
- Erosion timescales vary
 - Seasonal
 - Episodic
- Stormwater runoff impacts erosion



<https://www.usgs.gov/media/images/factors-can-affect-coastal-cliff-erosion>

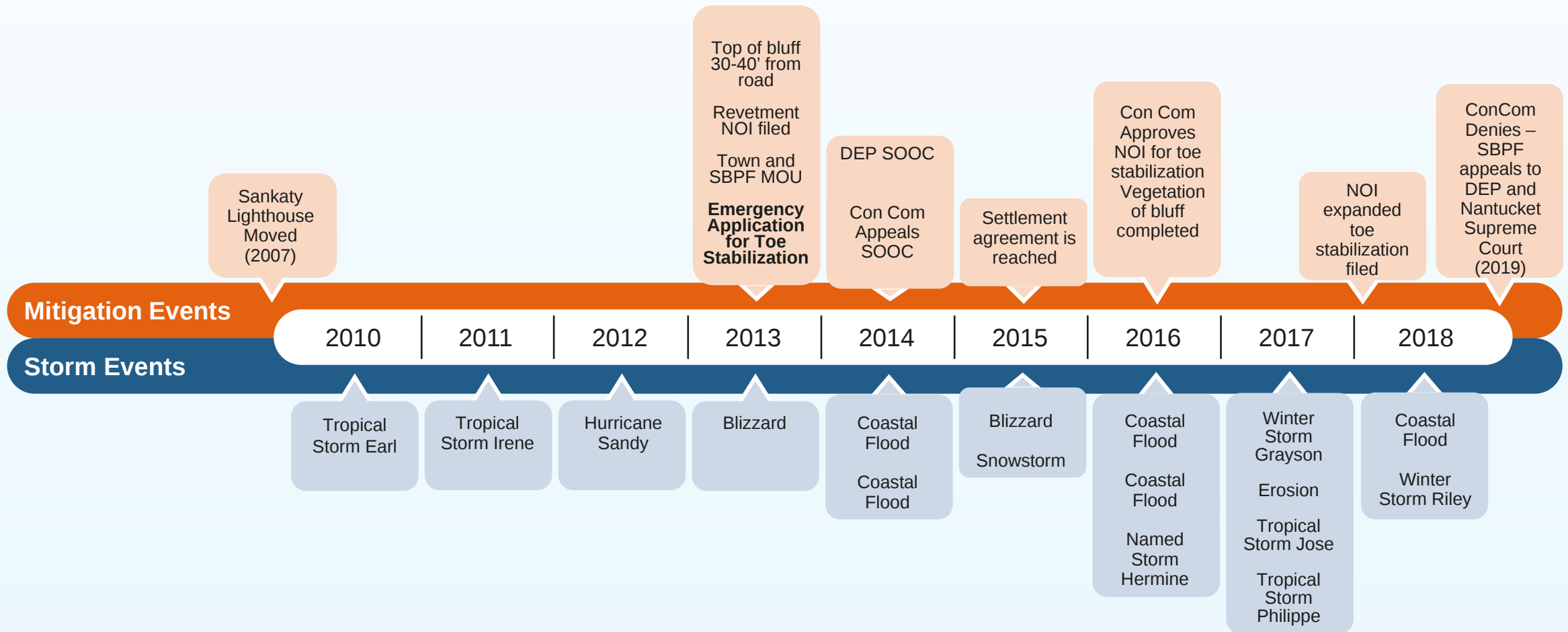
History of moving back from the edge of the bluff



March 7, 2013

Photos: <http://www.nantucketsummercamps.com/StormGallery030713.html>

Timeline of Recent Events



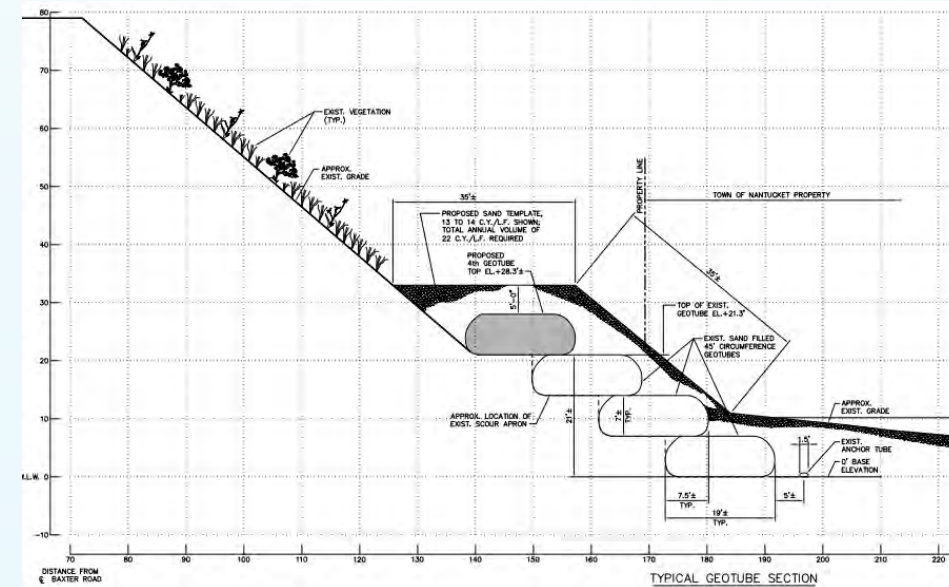
What are the Baxter Road Geotubes?

- Geotubes are a form of toe stabilization
- The Geotubes were designed/installed 2013 – 2015, providing protection to the road, infrastructure, vacant lots, and structures.
- SBPF¹ proposed to expand to 4000 ft in 2018
- SBPF pays to install and maintain the geotubes, but there is still a toll on the town



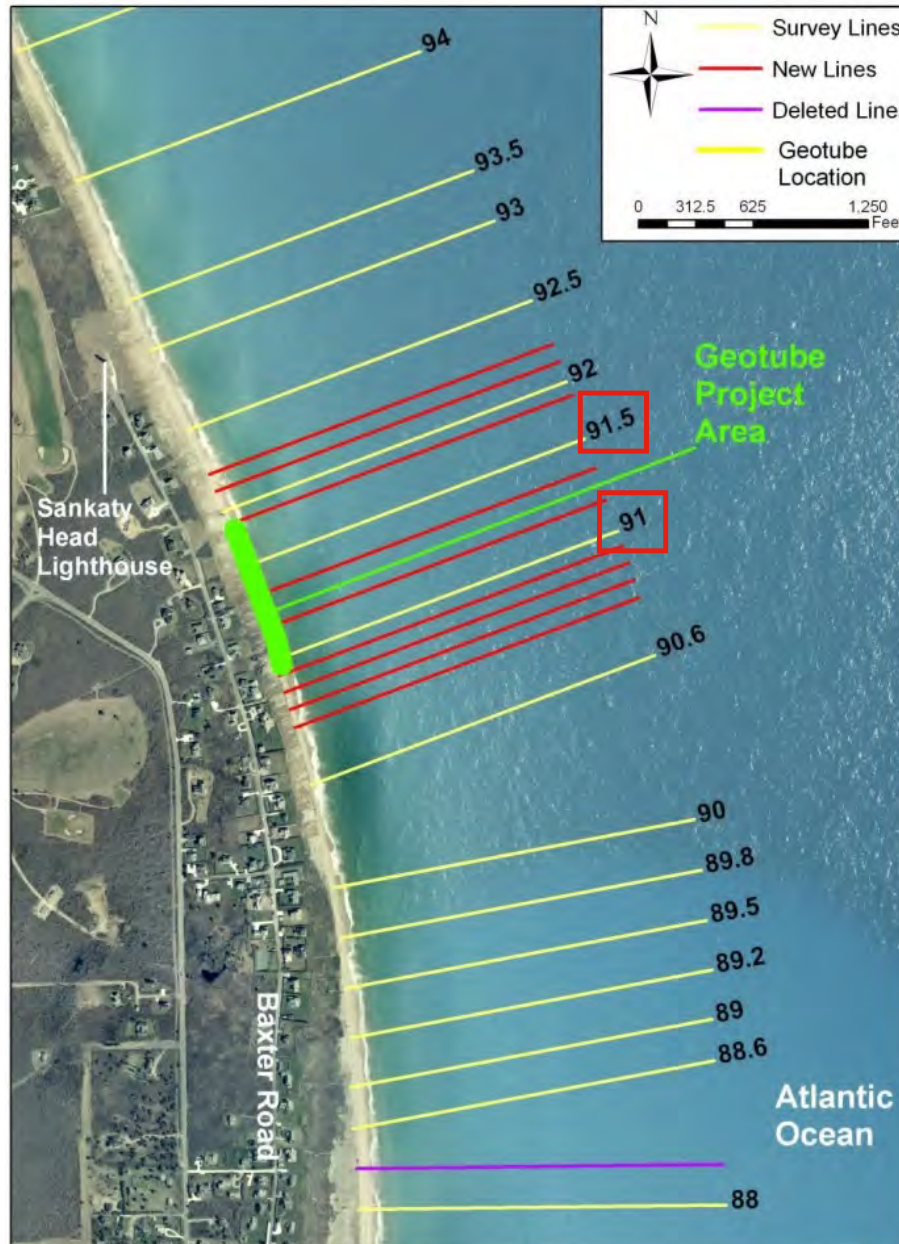
Notes:
1. SBPF: Siasconset Beach Preservation Fund

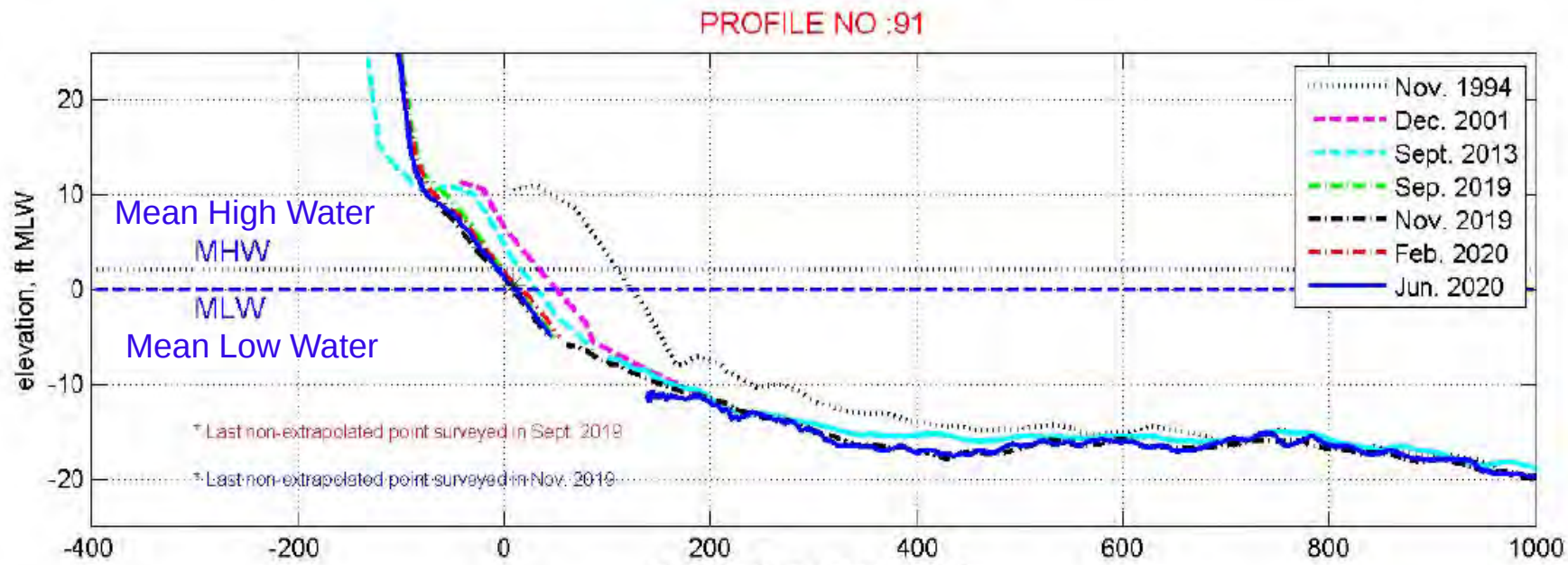
Source: Google Maps



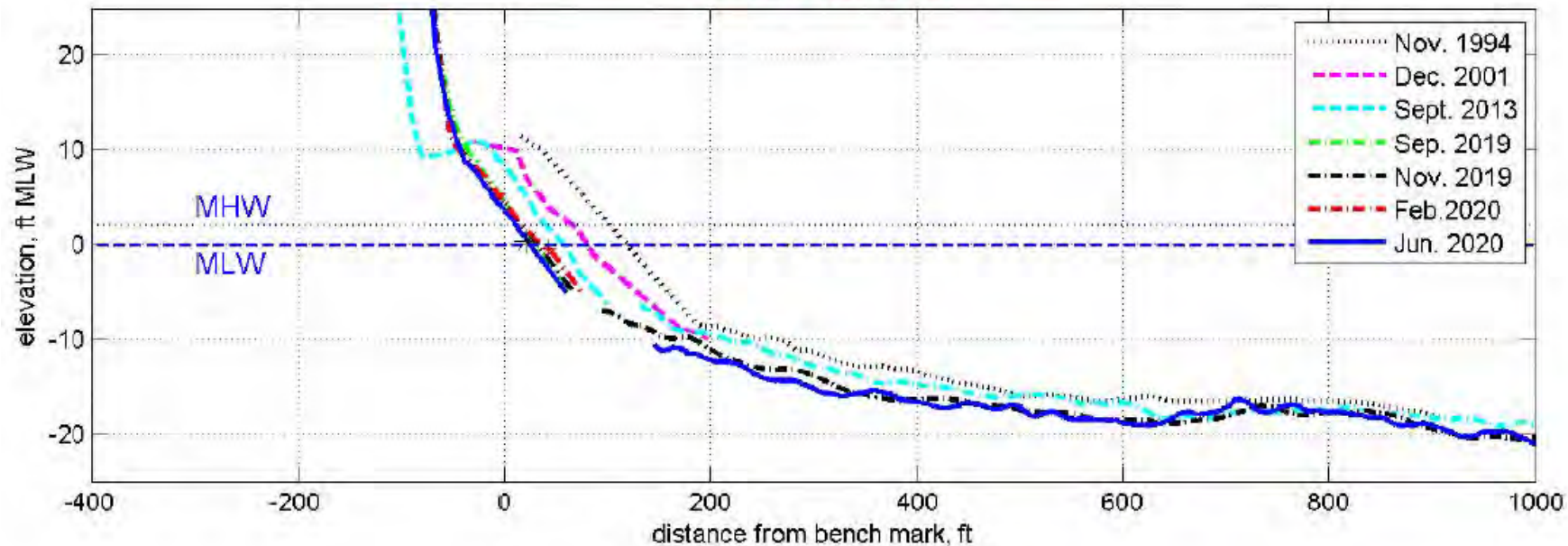
Source: Sconset Bluff Geotextile Tube Project (2015) p22 available at <https://records.nantucket-ma.gov/WebLink/ElectronicFile.aspx?docid=118439&dbid=0&repo=TownofNantucket>

Coastal Erosion Data before and after Geotube installation





SIASCONSET, NANTUCKET ISLAND, MA
PROFILE NO :91.5



Woods Hole Siasconset Beach and Bluff Surveys

FEMA Coastal Erosion Hazard Maps

Current and future coastal erosion hazard areas.



Note: the impacts of coastal protection like the Geotubes were not accounted for in this study. The next slide zooms to the area in the rectangle.

- 2030 Intermediate-High
- 2050 Intermediate-High
- 2100 Intermediate-High

- Projected Erosion Hazard Area in the Year 2030
- Projected Erosion Hazard Area in the Year 2050
- Projected Erosion Hazard Area in the Year 2100

Coastal Erosion Hazard Maps

Current and future coastal erosion hazard areas

97 Baxter Rd

93 Baxter Rd

Hazard Area Boundaries



Post Storm Surveys

The Geotubes have been exposed during extreme events.

Sand gets delivered to replenish and regrade the bluff.



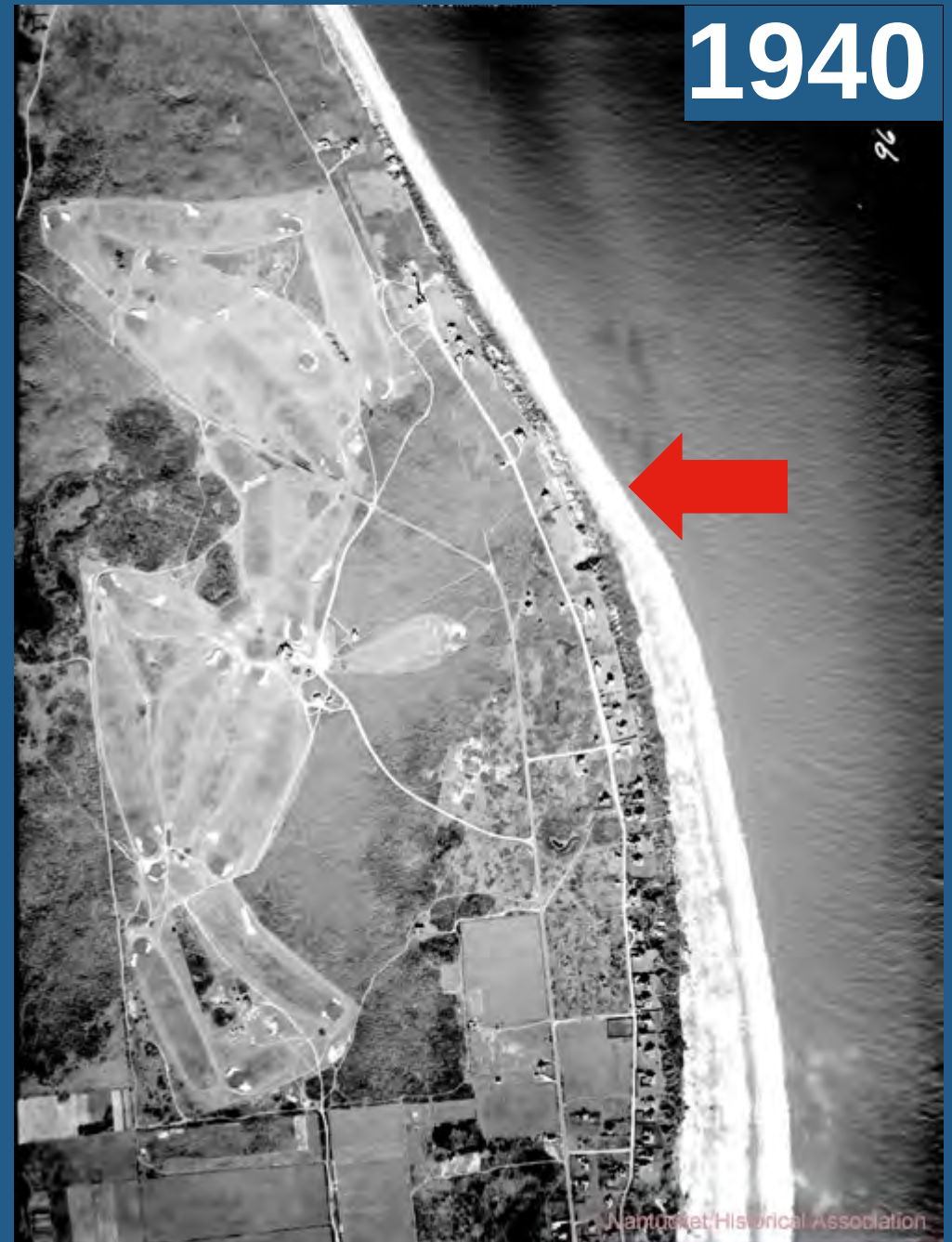
March 3 and 6, 2018

HISTORICAL AERIAL IMAGERY ALONG GEOTUBE LOCATION



2014, Boston Globe

<https://www.bostonglobe.com/metro/2014/09/28/battle-over-bluff-nantucket/L41admApMtz3ZGqsO8XITl/story.html>



3/1995

2018

97 Baxter Rd

93 Baxter Rd

1995

Image U.S. Geological Survey

12/2001



These
homes
were
demolished
/relocated
2001

7/2008



2008

Image USDA Farm Service Agency

5/2010

This home got
demolished/
relocated



2010

85 Baxter Road moved from Siasconset to Monomoy - June 1, 2010



<https://www.nantuckethistoricalassociation.net/>

3/2012



2012

6/2014

2013

These homes were
demolished/relocated
since 2013

Image © 2021 Maxar Technologies

2014

5/2016



2016

4/2017



2017

2/2018

2018
Most Recent

Historic high-water events – half are from 2018

1. 5.78 feet on 10/30/1991 - Perfect Storm
- 2. 5.27 feet on 01/04/2018 - Winter Storm Grayson**
3. 5.12 feet on 01/27/2015 - Winter Storm Juno
- 4. 4.69 feet on 03/03/2018 - Winter Storm Riley**
- 5. 4.61 feet on 03/03/2018 - Winter Storm Riley**
6. 4.58 feet on 12/12/1992 - nor'easter
- 7. 4.53 feet on 03/02/2018 - Winter Storm Riley**
8. 4.48 feet on 01/03/2014 - blizzard
9. 4.25 feet on 01/02/1987 - nor'easter
- 10. 4.25 feet on 01/30/2018 - blizzard**

**Fun fact, the word erosion appears
in the HMP 297 times!**

Source: Nantucket 2019 Hazard Mitigation Plan

<https://www.nantucket-ma.gov/DocumentCenter/View/24719/Town-of-Nantucket-2019-Hazard-Mitigation-Plan>

ASSESSING THE FEASIBILITY OF ALTERNATIVES FOR BAXTER RD

The team will consider up to four alternatives, which include:

1. Bluff stabilization (Bluff and toe as a system)
2. Nourishment – sand replacement, plantings
3. Retreat /Relocate road
4. No Action

***Each one would be paired with:*

Homeowner/Community Outreach on SOP (Standards of Practice)
& BMP (Best Management Practices)

Bluff stabilization

Stabilize the bluff system
(includes toe)

The slope, shape, and amount of vegetation covering a coastal bluff and the adjacent shoreline are directly related to the susceptibility of the bluff face to ongoing erosion.



Figure 12: Photograph by Van Lieu Photography (2010): An Uncovered sandbag at the bottom on Siasconset Bluff

Sand Nourishment and/or Vegetation Management

Nourishing the beach below the southern bluffs could provide short term benefits

In the long term, beach nourishment will become more expensive as sand sources are limited.



Dunes near Sesachacha Pond (FEMA, 2020)

Retreat Property and/or Relocate Road & Utilities



No Action



Leaving the natural shoreland undisturbed is often the least expensive option

Homeowner/Community Outreach on SOP (Standards of Practice) & BMP (Best Management Practices)

Best management practices (BMPs) for reducing bluff erosion include management of surface drainage as well as shallow subsurface groundwater drainage to the bluff edge and face to control local erosion and slope failure due to drainage.

**This option will be paired with the alternative that is selected*



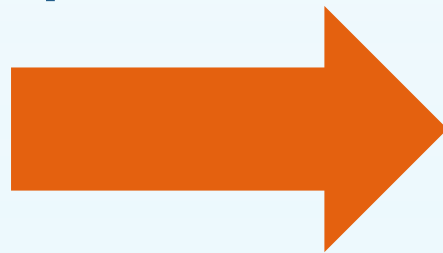
Beach Grass with Jute Mesh, Siaconset Bluff, Nantucket (WPI, 2014)

Criteria for Assessment of Alternatives

- **Definition of purpose** – what is the alternative intended to do?
- **Service life** – for what period of time would the alternative be effective in preventing significant bluff erosion.
- **Initial construction cost** – order of magnitude estimates for comparison between alternatives.
- **Operations and maintenance** – costs and other considerations; order of magnitude to compare between alternatives.
- **Constructability** – identify likely issues which could impact the ability to implement the alternative.
- **Other feasibility issues** – will vary with alternative but items may include supply (for sand); need for land acquisition; access; emergency services; adjacent impacts; etc.
 - **Environmental considerations** – Impacts to endangered species, vegetation, habitat, etc.

Instructions for Alternative Ranking Poll

Click each rectangle to
get arrows that you can
click to move that
alternative up/down



What do you think should happen at Baxter road in response to erosion? Rank these options from best to worst

Use the up and down arrows to move. Don't forget to submit

Retreat property and/or relocate road & utilities

Bluff stabilization

No Action

^

v

Sand nourishment and/or vegetation management

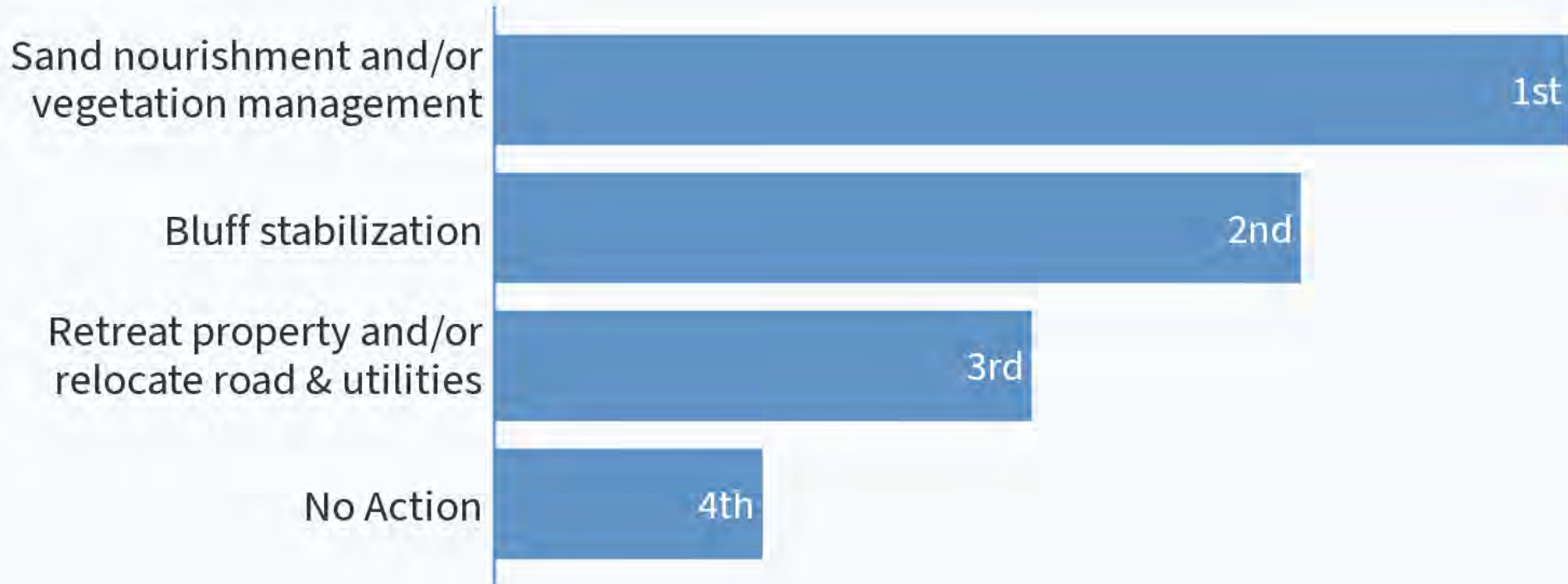
Submit response

13 April 2021

54

When poll is active, respond at pollev.com/kbolter833

Short term (till 2070), what should happen at Baxter road in response to erosion? Rank from best to worst



A dark blue triangle pointing to the right, located in the top-left corner of the slide.

What are your concerns about potential consequences for the alternative that you ranked as the worst?

- Make a note of the # for the alternative that you ranked as the worst and put this # before your poll response
 1. Bluff stabilization
 2. Sand nourishment and/or vegetation management
 3. Retreat property and/or relocate road & utilities
 4. No Action

What are your concerns about potential consequences for the alternative that you ranked as the worst? (give # first)

- Why are there no options involving off-shore structures, whether a wall, reef, or other measure?
- We'd be constantly fighting the ocean— not sustainable.
- first, we will lose the road. also interested in ending this ongoing problem for all in the community
- Fighting Mother Nature is a losing strategy.
- #4 leadership is taking action and making decisions for the greatest community benefit.
- 3 concerned about relocating structures to where? some are historic... where do they relocate to?
- Bluff stabilization. This could be done in a lot of ways so I'd hate to commit to that action.
- Loss of homes, utilities management, high risk to lives and properties
- 4. By doing nothing it does not address the issue of loss of homes and infrastructure in anyway leading to future problems
- 4. Town responsible. Loss of access and historic homes.
- 2 - not enough sand
- The road could collapse. The Town could be sued. Lives and/or property could be lost. Safety issues.
- Loss of infrastructure, homes, bluff walk and lighthouse
- 1- Safety

EXPLORING PERSPECTIVES

Revisiting Project Goals

To reach consensus on:

- **Acceptable risk**
 - In terms of economic, cultural, environmental, public safety, and more
- **Consequences** of alternatives and consequences of inaction
- The **path forward** based on technically feasible alternatives

Sea Level Rise is an Existential Threat

- This hasn't happened before in recorded history
- We need to shift from reacting to anticipating

“

We cannot solve our
problems with the same
thinking we used
when we created them.

”

- *Albert Einstein*

WRAP UP AND NEXT STEPS

THANK YOU

