



**THE COMMONWEALTH OF MASSACHUSETTS**

EXECUTIVE OFFICE OF ENERGY AND ENVIRONMENTAL AFFAIRS

OFFICE OF COASTAL ZONE MANAGEMENT

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August 26, 2013

Dr. Ernest Steinauer, Chairman  
Nantucket Conservation Commission  
2 Bathing Beach Road  
Nantucket, MA 02554

Re: Notice of Intent for Baxter Road and Siasconset Bluff Storm Damage Prevention Project;  
DEP File # SE 048-2581

Dr. Steinauer,

At the request of the Nantucket Conservation Commission ("Commission") for technical assistance from the Office of Coastal Zone Management (CZM) concerning the Notice of Intent and supporting information submitted to the Commission for the Baxter Road and Siasconset ("Sconset") bluff storm damage prevention, CZM is providing the following feedback. CZM's comments on the proposal are based on information submitted to the Commission through August 15, 2013, including the Notice of Intent, Sconset Bluff Erosion Control Alternatives and Recommendations report by the Siasconset Beach Preservation Fund (SBPF), and revised plans prepared by Ocean and Coastal Consultants (dated August 14, 2013). As you are aware, regulatory decisions regarding the project under the Wetlands Protection Act are the authority of the Commission and the Massachusetts Department of Environmental Protection (MassDEP).

CZM recognizes the erosion hazard impacts and implications for both private property and public infrastructure and resources, but we also have concerns about the potential adverse impacts that could result from construction of a new revetment at this site. Provided the Commission and/or MassDEP find that the proposed revetment will prevent storm damage to buildings constructed prior 1978 and the applicant has demonstrated that no method of protecting the buildings other than the proposed revetment is feasible, CZM would recommend the evaluation of the design considerations provided below in order to minimize and mitigate the potential adverse impacts of the proposed project on the eroding coastal bank, dunes, and beach.

- 1) Locate the revetment as far landward as possible, overlapping onto the fronting coastal beach only to the extent necessary to achieve structural stability and the desired slope, to minimize reflection of waves onto the beach and adjacent resources and accommodate rising sea levels. Another consideration for the location of the structure is how uniform it is along the shoreline. If some sections of the structure stick out seaward of other sections (e.g., revetment section seaward of 77-



81 Baxter Road), storm waves will likely focus on the sections of the structure sticking out causing increased erosion of the beaches fronting these areas.

- 2) Terminate the revetment at least 15-20' from neighboring property lines to reduce end effects of the structure on adjacent unarmored properties. This buffer will focus end effects primarily on the applicant's property. On the plans dated 8/14/13, the revetment extends approximately 40' south of the property line for 63 Baxter Road and over 180' north of the property line for 115 Baxter Road. There is an existing house on the lot just south of 63 Baxter Road that could receive significant adverse effects as a result of the proposed location of the structure.
- 3) Taper the ends of the revetment in elevation and slope to reduce the reflection of wave energy onto adjacent properties and resource areas.
- 4) Since rough-faced revetments dissipate more wave energy than smooth-faced structures, avoid the use of grout or other material in between rocks of the revetment to improve wave energy dissipation and minimize the potential for reflected wave energy.
- 5) To mitigate for the armoring of the bank and effectively eliminating a sediment source for the beach, compatible sediment needs to be added to the beach on a regular basis to ensure that the form and volume of the beach are not reduced as a result of the project. The minimum nourishment volume required is typically based on available information regarding the erosion history at the site. To determine the appropriate volume of sediment needed for mitigation, CZM recommends using all available information about historic shoreline erosion rates, including the Massachusetts Shoreline Change Project data available on CZM's website ([www.mass.gov/eea/agencies/czm/program-areas/stormsmart-coasts/shoreline-change](http://www.mass.gov/eea/agencies/czm/program-areas/stormsmart-coasts/shoreline-change)), and the quarterly beach profiles conducted for the SBPF. Both the long- and short-term rates of change need to be considered in light of the current shoreline conditions, the effects of recent storms, and whether the shoreline has fluctuated between erosion and accretion. The shoreline change project webpage has more information about interpreting the shoreline change rates. Based on the information submitted by the applicant, the Massachusetts Shoreline Change Project data, and an article by Wesley Tiffney, Jr. and Clifton Andrews<sup>1</sup>, the cycle of erosion in the project area began in the mid-1970s. Therefore, it is most appropriate to use short-term shoreline change rates, which represent the rate of change from 1978 through 2009, rather than long-term shoreline change rates, which represent the change from 1846 through 2009. The proposed mitigation volume of 9.3 cubic yards per linear foot of beach per year seems low compared to the short term shoreline change rates, which range from 6–10' per year along the project area, which is approximately equivalent to 15–26 cubic yards per linear foot of beach per year.

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<sup>1</sup> Tiffney, W.N., Jr., and Andrews, C., 1990. Sesachacha & Sankaty: Pond opening and erosion on Nantucket's eastern shore, *Historic Nantucket*, V. 38, No. 1, p 4-6. Available online at [www.nha.org/history/hn/HN-tiffney-sechacha.htm](http://www.nha.org/history/hn/HN-tiffney-sechacha.htm).

- 6) The volume of sediment required to mitigate for armoring the bank would be in addition to that necessary to mitigate for increased erosion of the fronting and adjacent beaches and banks. CZM recommends that the Commission consider the increased erosion of the fronting beach and adjacent banks observed with the various erosion control projects along this site to inform your decision about a minimum amount of pro-active nourishment to mitigate for these impacts. It is very likely the volume will need to be modified based on beach profile monitoring, but it is important to recognize the need for including this as part of the project.
- 7) Given the limited supply of on-island sediment for nourishment, the logistical complexities associated with placing sediment on the beach, and the additional complications in placing sediment on the beach as it narrows seaward of the revetment, CZM recommends that all the components of mitigation be factored into the Commission's review of the project.
- 8) The applicant submitted a chart summarizing grain size data for 24 sediment samples taken along eight shore-perpendicular transects within the project area. CZM recommends that the grain size data for each sediment sample be provided to the Commission to inform determination of the appropriate grain size for beach nourishment.
- 9) Additional beach profiles may be needed at the ends of the proposed structures to fully assess the impacts associated with the Phase one revetments as well as the longer Phase two project. Because of the complex sediment transport patterns in this area, it has been difficult to differentiate the impacts of various shore protection projects along the Sconset shoreline from the natural changes in the system based on beach profiling conducted for the SBPF. CZM recommends that the Town and the applicant consider using an independent third party to conduct the monitoring, analyze the data, and provide recommendations for mitigation volumes based on that analysis. CZM also recommends that clear thresholds be established to determine when additional mitigation will be needed.
- 10) Due to the exposed nature of the project site and relatively narrow dry beach, there have been significant logistical challenges with the installation and maintenance of various shore protection projects along the project area in the past. These challenging conditions have resulted in unanticipated impacts during construction. For example, when components of the beach dewatering system were being installed in 1994, large sand-filled tubes were needed to provide a buffer from daily tides and waves so the beach dewatering system could be installed. In 2005, when the beach had narrowed even further, steel sheathing was needed to establish dry workspace for installation of the upgraded beach dewatering system. The interaction of the waves with the steel sheathing eroded the beach in front of the sheathing and there was additional erosion of the beach created by runoff from dewatering the work space (photographs available). Although the information submitted by the applicant to date contains some information on the construction methodology, CZM recommends that additional detail be provided to facilitate the Commission's review of the potential adverse impacts that may occur during construction and any mitigation that might be necessary for the short-term impacts.

In summary, CZM recommends that the above design considerations be carefully evaluated and additional information be provided to facilitate the Commission's review of the potential impacts associated with the proposed project. If you have any follow up questions regarding coastal processes, please contact me at (617) 626-1228.

Sincerely,



Rebecca Haney  
Coastal Geologist

Cc: Stephen McKenna, CZM Cape Cod and Islands Regional Coordinator  
Elizabeth Kouloheras and Jim Mahala, DEP Southeast Regional Office  
Lealdon Langley, DEP Boston Office