



August 29, 2013

Mr. Ernest Steinauer, Chairman
c/o Mr. Jeff Carlson
Nantucket Conservation Commission
2 Bathing Beach Road
Nantucket, MA 02554

**RE: Sconset Bluff Stabilization Application
Sconset Beach Preservation Fund
Nantucket, Massachusetts
MMI #2967-11-1**

Dear Chairman Steinauer and Members of the Conservation Commission:

Milone & MacBroom, Inc. (MMI) with the assistance of Roberge Associates Coastal Engineers has reviewed the revised application materials submitted by the applicant and others for the above-referenced project. Specifically, these include:

- Document entitled *Baxter Road and Sconset Bluff Storm Damage Prevention Project Notice of Intent (DEP File No. SE 048-2581) Responses to Questions from Nantucket Conservation Commission Asked at Public Hearing on August 8, 2013*
- Project plans entitled *Sconset Beach Preservation Fund Sconset Bluff Erosion Control Project Notice of Intent* Prepared by OCC/COWI dated June 28, 2013, revised August 14, 2013 and August 23, 2013
- Letter dated August 23, 2013 and attachments from Epsilon Associates, Inc. to Nantucket Conservation Commission regarding *Supplemental Submission for Baxter Road and Sconset Bluff Storm Damage Prevention Project Notice of Intent (DEP File No. SE 048-2581)*
- Letter dated August 23, 2013 from Micheal S. Bruno, Ph.D., P.E. of the Stevens Institute of Technology to Joshua Posner
- Letter dated August 26, 2013 from the Massachusetts Office of Coastal Zone Management to Dr. Ernest Steinauer and the Nantucket Conservation Commission regarding *Notice of Intent for Baxter Road and Sconset Bluff Storm Damage Prevention Project (DEP File No. SE 048-2581)*

With this additional information, the applicant has reduced the project length from 4,200 linear feet to approximately 3,300 feet. The south end of the project is not at 63 Baxter Road. In its August 23 letter, Epsilon Associates, Inc. provided responses to the comments in our August 2, 2013 letter as well as information requested by the public and the commission. We remain concerned about certain elements of constructability as discussed below. Following is our original comment and the current status of the comment based on the additional information that has been provided. Ongoing concerns are underlined.

1. The plans were developed based on survey from 2010 and do not reflect existing site conditions. The existing bank in some areas is much steeper than is reflected on the plans. The steepness of the slope would not affect the type of stabilization proposed although there may be areas where

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- the coastal bank is too steep to revegetate without regrading. It is not recommended that the finished revetment slope be any steeper than the proposed 1.5:1. **Status: The base mapping has been updated to reflect conditions as of July 15, 2013, and the design has been revised to reflect this updated information. The revised plans call for the revetment slope to be at 2:1 rather than 1.5:1, and we agree with this change. We also note that other reviewers have recommended a similar slope. We do remain concerned about the feasibility of stabilizing the upper bank without performing regrading.**
2. The plans presented are for permitting purposes only and are not intended to be suitable for construction. In our opinion, the construction documents should include cross sections of the revetment and slope improvements at 100-foot intervals to more fully detail the proposed activities. **Status: The applicant has added additional cross sections, which are very helpful in explaining the proposed work, and is suggesting 100-foot intervals for construction. We note that the revised plans call for cut and fill areas near 77, 79, and 81 Baxter Road. Cross section F-F shows the cut area and depicts cut from the top of the bank to the bottom, an extent that is not reflected on the plans. The applicant should provide a detailed plan view of this area that shows the proposed contours.**
 3. Rill erosion and gullies are forming on the bank as a result of stormwater runoff from the top of the bluff. This should be corrected as part of the improvements by diverting the stormwater to a controlled and managed discharge location. **Status: The applicant has stated that establishing vegetation on the upper bank will reduce the erosion from stormwater runoff. We agree that vegetation establishment is imperative for stabilizing the soils, but we also believe that preventing runoff onto the slope is fundamental to stabilization and believe this should be completed. The commission will need to determine if the applicant should address this issue, but we believe it should be addressed as part of the design.**
 4. The coastal bank plantings should be specified in detail, and the applicant should take steps to accelerate the rooting of the plantings. This may include installing larger plants and providing irrigation. Stability would be achieved more quickly by incorporating a geogrid-type system. The current design reduces potential environmental impact by not including such a stability system but, if the Conservation Commission were amenable, this additional reinforcement may prove beneficial to the project and increase its likelihood for success. **Status: The applicant is proposing jute matting with beach grasses planted within the matting. Other shrubs will be installed after the grass is rooted. We still question whether this is adequate and are concerned about whether the existing soils will support the proposed plantings. In addition, it is not clear how the matting and plantings will be installed on a slope that is too steep to safely walk. The commission will need to decide if the proposed approach is acceptable or whether additional information regarding the construction methodology for the plantings should be provided. In referencing a geogrid system, we were considering a product like PyraMat, which is less invasive than the geogrid system discussed in the applicant's response letter.**
 5. We would like the applicant to comment on the need to provide additional lateral stability on the coastal bank to minimize future sloughing. **Status: The applicant has indicated that the combination of jute and coastal grass has stabilized the nearby banks in the past when toe protection was in place. Based on our observation of the area, this is true. However, when**

the toe protection fails so does the jute and beach grass. While failure of the stone revetment is not planned, it seems possible it could occur and that making every effort to keep the upper bank stable following toe failure would be worthwhile. We do not believe this comment has been adequately addressed at this time.

6. The transition from the lower end of the vegetated coastal bluff to the top of the finished revetment stone is inherently an unstable boundary. Sand from the toe, even after vegetation is established, will migrate into the interstitial spaces between the armor stones. This will destabilize the toe of the slope. We would suggest providing a hard "curb" at the top of the revetment to lend stability to the coastal bank above. **Status: The applicant has declined to add this protection because it would require deeper excavation into the slope above the revetment. Based on the cross sections, we see that up to nine feet of excavation are proposed at the top of the revetment (see cross section A-A). We do not believe that the installation of a curb or similar structure would require excavation deeper than what is currently proposed. The applicant should address how loss of fill will be avoided without the curb.**
7. The total volume of sacrificial sand needed for the proposed construction should be provided and equated to truck trips. This information should be broken into Phases 1 and 2. **Status: Phases have been eliminated, so the full sand placement volume has been computed, and 2,040 truck trips will be required for the construction and annual nourishment. The applicant should comment about the impact of this volume of truck traffic on the local roads. This issue was brought up during the gabion and mattress application in 2010, but it should be addressed again. While we realize this is not an issue for the Conservation Commission, it is one that is in the town's interest to understand.**
8. As with past work in the area, sand will be brought to the top of the bluff and transported to the bottom using a conveyor system. Trucks on the beach will transport the material to the specific work location. The applicant should comment on the stability of the bluff at the access locations and its ability to support the delivery trucks. **Status: The applicant has provided information from Haley & Aldrich regarding the stability of the slope, and this comment is addressed at this time.**
9. The proposed plans call for a crest width at the top of the revetment of approximately 10 feet. The U.S. Army Corps of Engineers, Coastal Engineering Manual (CEM), EM 1110-2-1100, August 2008 (Change 2) provides design guidance for beach fills and suggests that a crest width greater than the proposed 10 feet may be more appropriate. In general, a more detailed assessment of the beach fill volume and geometry is strongly encouraged so as to maximize the potential for success of the proposed filling. **Status: Crest width of the revetment is currently proposed at approximately 10 feet wide, and the beach fill above the stone has been eliminated, which minimizes the concern.**
10. Sacrificial sand is proposed at a slope of 2H:1V to limit intrusion into the beach. A shallower slope would likely be more stable. As noted above, the CEM provides significant guidance for beach fill design. The optimum slope is dependent on the native beach sand gradation, the proposed fill material characteristics, beach morphology, and related environmental conditions. The applicant is proposing the relatively steep slope so as to minimize beach intrusion.

Appropriate optimization of the fill shape can be realized with the application of proper model simulation, SBEACH, BMAP, etc. **Status: The applicant has flattened the sand slope to 3:1 and has reduced its placement to along the revetment toe only. The applicant should clarify if any modeling of the fill slope and geometry has been performed. If so, a description of the methods and commentary on the results should be provided.**

11. We did not receive any information regarding the gradation of the existing beach or of the sacrificial sand. Is it the applicant's intent to match the existing beach gradation or use a coarser material? **Status: The applicant provided grain size distribution of source sand and existing conditions. The applicant should comment on the life expectancy and resiliency of the beach fill. We wonder if any design of the beach fill slope and geometry has been performed as noted above in Comment 10.**
12. The proposed revetment stone will range in size from 1.5 feet to 4.5 feet in diameter based on the significant wave design criteria and the proposed revetment geometry. This design makes no account for potential scour at the toe of the structure. Such scour will, effectively, increase the design water depth and subsequently the stone gradation. We recommend that the applicant consider the effects of scour as a part of the design approach. This will likely result in modifying the stone gradation to include a larger top-sized stone and increasing the size of the smaller stone elements. This would appear to be a relatively easy revision of the ACES revetment design module. **Status: The applicant has indicated they accounted for toe scour in their revised design as of August 15, 2013.**
13. The proposed design does not seem to address the potential for wave action and flanking at the terminal ends of the revetment structure. This potential exists around the isolated revetment sections following completion of Phase 1, as well as around the ends of the completed continuous structure following completion of the entire project. Since Phase 1 will consist of discontinuous armoring at the locations identified as being in imminent danger of failure, flanking may occur in a number of locations during the interim period between Phase 1 and Phase 2. The applicant should address both the interim condition and the final condition and provide details for how this condition will be prevented. **Status: Since the project phases have been eliminated, the Phase 1 issue has been eliminated, and concern now only exists for flanking at the ends of the project. The applicant has responded that the required information was discussed at the Conservation Commission hearings but, in our opinion, the ends of the revetment should be shown in details on the project plans. CZM suggested in their letter that the structure ends be tapered in slope and elevation, which is consistent with our request. The applicant should provide construction details for the revetment ends in plan, section, and profile view.**
14. Application materials indicate that the stone will be barged to the site. A temporary landing barge will be run ashore and grounded using spuds, and rock will be moved from transport barges, transferred to the landing barge, and then transported to the beach. As noted previously, sand will be trucked from the delivery location to the work area in question. The applicant should clarify what environmental impacts, if any, would result from this proposed truck movement on the beach. **Status: The applicant provided a construction sequence in the August 15, 2013 submittal. The commission may wish to decide if it wants more information about the impacts associated with site access, in particular, emergency response measures that clarify**

how equipment and material will be removed from the area in the event a coastal storm occurs during construction.

15. Failure of the bank during work seems to be a real possibility. The applicant should comment on this and explain how the existing bank will be stabilized during excavation for the toe of the revetment. **Status: The applicant has indicated that the contractor will be responsible for maintaining a safe work site. While we agree with that statement, we also believe the engineer needs to provide plans that can be constructed in a reasonably safe manner. The cross sections provided suggest that up to nine feet of excavation are proposed around elevation 30 on the slope. Based on the available information, it seems possible that the upper bank will slough during this excavation. Driving sheeting to stabilize the slope during construction calls into question whether vibration will affect the slope. We suggest that the applicant consider the potential ways in which temporary slope stabilization will be needed and address how it will be handled.**

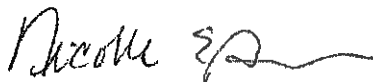
16. The applicant has stated that the town cannot stabilize Baxter Road within its right-of-way and that the armoring is needed not just for private property but for the public good as well. We also understand that the Board of Selectmen, in entering into the Memorandum of Understanding with the applicant, has made a determination that the stabilization of the bank is necessary to protect Baxter Road and the associated public infrastructure. While it is our opinion that if hard armoring is proposed the project as presented by the applicant is the best solution for protecting Baxter Road, there may be other alternatives for the stabilization of Baxter Road that should be evaluated. For example, driving steel sheeting along the edge of the right-of-way may be feasible for the short term (i.e., five to 10 years) of stability. **Status: The applicant has responded to this, and we agree with their opinion that this is only a method for providing temporary stabilization until an alternative roadway location is constructed. The point of our comment was simply that alternatives exist, and no additional discussion is needed at this time.**

Our August 2, 2013 letter had included five items that were needed for the application to be deemed complete. Much of that information has been provided but, in our opinion, stability of the coastal bank during construction remains a concern, and we hope the applicant will address this issue.

Please do not hesitate to contact me with any questions regarding these comments.

Very truly yours,

MILONE & MACBROOM, INC.



Nicolle E. Burnham, P.E., CFM
Principal

cc: C. Elizabeth Gibson, Town Manager

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