

7/29/13

To The Conservation Commission

I am writing in regard to the SBPF application for hard-armoring portions of the Sconset bluffs. I believe it would be a grave error to construct a seawall in this location. The damage caused by rock revetments to down-drift beaches is well documented. Revetments change the shape of the near-shore berm, typically making the underwater profile of the beach steeper, with deeper water closer to shore. This allows more and stronger wave energy, particularly in a storm, to impact the armored sections. The revetment hastens its own failure as the wall is undermined from below and washed out from behind. Even when the shape of the revetment is designed with an angle or overhang to deflect wave energy, restricting the ability of sand to move and eliminating the contribution of sand from the upland causes scouring. The complex turbulence set up at each end of the wall creates end-scour. Erosion is vastly increased in un-armored beaches within the littoral cell. Since 1972 even the Army Corps of Engineers has recognized that the best protection for an eroding upland is a healthy, fully mobile beach, and hard-armoring is discouraged in most instances.

As a member of your commission for seven years, as well as being a life-long observer of the island's beaches, I have had first-hand opportunity to view the results of many erosion control projects on Nantucket over time. Typically the property owner attempts to replace the natural contribution of sand from the upland to the littoral system by adding fill to cover the hard structure. In my experience the calculations have either erred on the side of too little and/or the application of sand fill was skimped or not maintained as required. Thus far it has always proved woefully inadequate to appease the hunger of the ocean. Although the materials differ, even the so-called "soft" structures such as nylon or jute bags act like revetments when the sand covering them disappears; the main difference is that they wash away faster, so that damage to the beach is limited by the disappearance of the structure. Needless to say, loose webbing and nylon bags become hazards to navigation as they circulate island waters. Over time several hundred thousands of dollars in damage have accrued to shipping, even knocking the car ferry Eagle out of commission for several days.

In the past projects have typically been conditioned to require removal of failed elements. In practice this is never completely accomplished. As a recent photo in The Inquirer and Mirror (attached) shows, it is difficult if not impossible to retrieve posts, piers, septic system vent pipes, tanks and the like from under the near-shore berm once the ocean has covered them with water and sand. I believe the "pilings" referred to in the newspaper are the remains of jute bag anchors from a project to protect a long-vanished house at the end of Madaket Road. Elements like these posts then re-appear periodically as hazards to swimmers, boaters, and the marine environment. Following last year's Nor'easter a line of jagged-ended four by four timbers was visible in the swash zone stretching east from Hoick's Hollow, the bases of snapped-off sand-drift fence posts from an abandoned SBPF line. The lesson is that anything added to the beach should be appropriate to the marine environment as it is in all probability going to be impossible to remove.

I believe the Commission should ponder all of SBPF's past projects on Sconset beach when evaluating this one. This is not only because it delineates their track-record for better or worse—every tactic so far attempted has "worked" somewhere else but ultimately failed in this location—but because

much good information about the resource area is contained in those decades of notices of intent which is not readily available elsewhere. The failed terracing project which went to sea in the Patriot's Day Storm gives a bit of a sample of the effect of hard armoring: it works great until it is actually needed and then fails spectacularly. In particular, the dredge-and-fill project which was finally withdrawn gives a good idea of the volume of sand needed to maintain the edge of the bluff in its current location; something like this volume would probably be required to adequately cover a revetment and keep it covered. Where could so much sand be found and how delivered? The logistics of this problem may be insurmountable. Moreover that nourishment project was only projected to have a lifetime of five years; to keep a permanent revetment covered would require continual—one might say perpetual—maintenance. The difficulty of accessing the beach in front of a failed or failing revetment, when vehicular access might only be possible in good weather on the lowest of astronomical low tides, i.e. a couple of times a year at best, would indicate that mitigation of the harmful effects of a revetment is not a realistic possibility. It is possible that SBPF proposes to access the wall for maintenance along the so-called "walking path" on top of the wall. This would still probably not be realistic due to end-scour. Also, I believe such a path would be more of an attractive nuisance than a useful access. It would give an illusion of safety which might temp people down to view the power of the ocean during storms when it would be unsafe. The Town should carefully evaluate its liability in such an instance.

The Conservation Commission should also evaluate the pattern of erosion in Sconset when comparing this project to others on the island. The North Shore is the most protected side, as the sound is generally not subject to the same degree of force as the South Shore. Even so, Westcliff lost 11 feet despite its rock revetment in the No-Name storm. The South Shore is exposed to the open ocean and has the highest over-all rate of erosion, but it experiences it seasonally and on a steadier basis and does not get the full force of a Northeast gale. Sconset is subject to the strongest storm forces, but at unpredictable intervals, so that evaluation of the effects of work can be difficult. The proposed revetment is designed to stand up to a 100 year (a one percent chance in any given year) storm. It is important to know how often such storms actually occur, and just how much energy is unleashed under various conditions. An analysis of alternatives should be performed and take into consideration the probable useful life of such a wall, as well as the permanent damage associated with it. As an example, the engineer for the first dewatering project claimed that storms would be wonderful as they would bring in more material. In practice the system was overwhelmed, twice. Sconset beaches have been repeatedly disturbed, coffer-dammed, fenced, dug up, and tunneled under. The natural beach, which would provide the best storm protection, has hardly had a chance to re-establish itself and will be eliminated if hard armoring is allowed.

Does this mean that nothing could or should be done to attempt to retard erosion on the eastern shore? Not necessarily. Although my personal preference and the most ecologically valuable alternative is for the natural beach I think SBPF could continue to add some beach nourishment and that timely, well-placed applications, particularly if they could be applied ahead of storm events, might reduce the speed with which the bluff is eroding, while causing less damage to the beach resource or neighboring properties. One point that struck me during my years on the commission was the nature of the glacial sediments which the erosion of Sconset Bluff contributes. Although the commission has

typically required nourishment to consist of medium to coarse-grained sand, the actual contribution of the bluff is a mix of sediment from fines through gravels to some quite sizeable boulders. If SBPF were to add some rock elements to their nourishment mix, the movement of these heavier units within the littoral zone might bleed off some of the wave energy which typically impacts the shore during winter storms, as long as the rocks were not connected to each other but able to move freely as does the sand. I don't think the fine clay component would be useful, largely because it would be impractical to try to mimic the compaction of mile thick ice-sheets on the site, and fines typically travel further off shore. One caution about nourishment material would be the calcium carbonate or shell component. Too much would change the specific gravity as well as the PH of the beach, and damage the habitat values of the resource area, which are considerable. Thus dredged material is probably inherently unsuitable for many reasons.

Sincerely,


Virginia F. Andrews



Photo by Jim Powers

PILING UP: Exposed pilings sticking out of the surf zone in Madaket are marked for safety reasons Tuesday afternoon. The town is warning swimmers in Madaket about the old wooden and cement pilings in the shore break at the popular west-end beach. Harbormaster Sheila Lucey said her lifeguards are attempting to keep beachgoers away from the pilings, which have been marked but are occasionally submerged in the surf. "We've known about them but they're far more exposed this year than they ever have been in the past due to the erosion," Lucey said.