



## MEMORANDUM

14 November 2014  
File No. 38638-100

TO: Town Committee on Squibnocket  
Attn: Jim Malkin, Chairman

FROM: Russell A. Schuck, P.G., (Haley & Aldrich, Inc.)  
Daniel Padien (Vanassee Hangen Brustlin, Inc.)

SUBJECT: Response to the Friends of Squibnocket (FOS) Documents regarding  
Squibnocket Road Improvements  
Chilmark, Massachusetts

CC: Lawrence Lasser

The purpose of this memorandum is to respond on behalf of the Squibnocket Farm Homeowners Association (SFHA) to documents that the Friends of Squibnocket (FOS) submitted to the Town Committee on Squibnocket on 28 October 2014. The documents submitted on that date included:

- *Letter from Friends of Squibnocket, LLC, dated 24 October 2014*
- *Memorandum from our environmental consultants: LEC Environmental, dated 28 October 2014*
- *Memorandum from our coastal engineer: John Ramsey, dated 9 September 2014*

In these most recent submissions, FOS has substantially reconfigured the Dune Alternative presented to the Committee in mid-September of this year and addressed in our memo to the Committee dated 13 October 2014. The basic change is that the roadway is realigned to run from a point higher up on Squibnocket Road, through the pond-fronting parcels owned by Orphanos (assessor's parcel 17-3) and Weldon (17-4), and then towards Money Hill. This "Pond Route" alternative was not presented to us for formal review until we received the documents listed above on 30 October. During our meeting with FOS technical team at LEC's offices in Plymouth on 6 October 2014, the Dune route option previously presented to the Committee was discussed in detail. Not until the closing of the meeting was the idea of a Pond route mentioned. In sum, the memo we submitted to the Committee on 13 October 2014 responded to the FOS proposal as we understood it at that time, and we accurately represented what the FOS team told us on 6 October 2014.

There are numerous communications and presentations regarding the proposed Pond Route that imply that this option for providing access to SFHA is simple, permittable and less costly than the elevated roadway alternative. Since we were initially engaged in 2012 we have evaluated numerous options for long term reliable access to SFHA. As we have explained in prior submissions, our mandate was always to find the most durable and most permittable solution that could be implemented at reasonable cost on land owned or controlled by SFHA. Below we explain why the Pond Route version of the Dune Alternative, like all prior versions, does not satisfy these criteria.

## **I. Roadway along the Pond Route**

The topography of the proposed alignment calls for a grade dropping 20+ feet over a short distance, resulting in very steep road grades with curves. Based on the drawing we were provided, we believe that this could result in a safety concern. For example, the 90° turn off of Squibnocket Road onto the proposed access road would appear to have very poor sight lines, as the access road quickly drops down 6 to 7 feet within the first 100 feet of roadway. Most cars are less than 6 feet in height and it would be difficult for cars traveling from Squibnocket towards Money Hill to see a car traveling in the opposite direction, and vice versa. These safety issues would be exacerbated in inclement weather. These issues could be resolved if the road bed were elevated to reduce the grades and improve the sight lines.

In the revised plans for the Dune Alternative, the roadbed along the edge of Squibnocket Pond is set at elevation 4 FT<sup>1</sup>. The road bisects a wetland area where wetlands- as delineated by the FOS team- exist as high as elevation 14 FT. The road, as designed, would prevent surface flows from these wetlands to the pond and would likely result in flooding conditions, especially during wet periods. If the road bed were to follow this alignment culverts would need to be installed to allow water to pass beneath the road. To eliminate the potential for flooding and to allow the installation of culverts, the road bed would need to be raised. Additionally, unless steps are taken to significantly raise the elevation of this section of the roadway, the adjacency of saturated wetlands at a higher elevation could result in a chronically saturated, muddy/soft roadbed that could limit access, especially for emergency and service vehicles. To avoid the safety, flooding and saturation problems, the road bed would have to be raised to a higher elevation, resulting in the filling of substantially more wetland resources than the ~ 4,300 square feet indicated in the late October submissions. In our view, solving these problems would easily require the filling of more than 5,000 SF. of Bordering Vegetated Wetlands.

In summary, to avoid the issues of safety, flooding, and to allow reliable access the road bed, in the proposed alignment should be elevated. This would involve placement of more fill into the wetland resources.

## **II. Dune**

FOS experts previously indicated that the proposed dune would be able to withstand major storms without overwash. During our meeting on 6 October 2014 we asked for clarification on the storm recurrence interval the dune was designed to withstand without overwash. During the meeting they could not provide a recurrence interval but indicated it could withstand a large storm without overwash. In the documents recently provided they explain how the dune is designed to withstand a 75-year recurrence interval storm. But the new documents also say that the dune proposal relies on routine overwash to accrete land into the wetlands and Squibnocket pond. The routine overwash would in theory provide an upland area on which to relocate the road and dune during future relocation events, avoiding or minimizing the regulatory problems discussed in our 13 October memo.

These two premises are contradictory. If the dune is large enough to withstand 75 years storms, then there will be very little overwash. The dune designs presented to date show a large monolith of sand. There are no low areas to promote overwash, and if there were, overwash events would damage the proposed roadway interrupting access. (This reveals the basic tension in the Dune Alternative: how to allow for overwash and natural accretion into the adjacent wetlands and eventually the Pond, yet maintain a serviceable roadway behind the dune.) FOS has contended that as the dune erodes over time more

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<sup>1</sup> All elevation referenced the NAVD88 datum.

overwash will occur. However, we believe this premise has the potential to cause severe road damage that may not be manageable in the interval before the new overwash-induced uplands are actually formed. For example, as the dune erodes without significant overwash the barrier beach that provides access is getting narrower and narrower resulting in a situation that is even more dire than when the dune was newly constructed. Specifically, once the dune has eroded back and begins to overwash, the roadway will be much closer to the shoreline and wave energy could result in overwash impacts that could inflict greater damage to the road, significantly impacting access. At that point in time new access along a relocated road may be required without sufficient “new” land on which to site the relocated road. The relocation would require artificial fills within Bordering Vegetated Wetlands, implicating the regulatory issues identified in our 13 October memo.

Relying on an irregular, unpredictable, natural process to provide sufficient land for an engineered footprint of a roadway seems to have a high likelihood for failure, especially where, as in this case, these natural processes would be constrained by an untenable dune design. In order to address this, additional filling in bordering vegetated wetlands would undoubtedly be needed to provide a sufficient roadbed to resume access, and possibly be needed solely for a working pad for reconstruction of the dune. At best this would prolong efforts to restore access, and at worst might make restoration efforts impossible. Even if a sufficient footprint of land accretes “naturally,” relocating the road onto that footprint will require the consent of whoever owns that land. We are informed by Association counsel that ownership of the newly accreted land may need to be determined through Land Court proceedings.

The dune is portrayed as the more environmentally sensitive option. We disagree on at least two levels. First, as we have explained in prior memos, Massachusetts environmental laws favor the elevated roadway because of its minimal fills and its non-interference with the natural migration and behavior of the adjacent landforms. Second, the construction and maintenance of the Dune Alternative will have adverse environmental and logistical “externalities.” We estimate that the dune as described would require approximately 9,000 cubic yards (CY) of sand to construct. A tractor trailer dump body holds approximately 20 CY. Therefore it would take 450 tractor trailer loads across the island to Squibnocket Beach. It is more likely 10-wheel dump trucks or smaller would be used on the island, resulting in many more loads. A 10 wheeler holds 12 CY, which correlates to 750 truck runs to deliver 9,000 CY. This would 1) take a very long time, 2) present a long term nuisance to the local residents and the island at large, 3) increase the risk of an accident occurring and 4) result in significant consumption of diesel fuel and emission of greenhouse gases. Following this initial and highly disruptive construction phase, the FOS proposal envisions dune maintenance annually and significant dune restoration and road relocation on a 10-year frequency that would have similar impacts from truck traffic.<sup>2</sup>

By contrast, the elevated roadway would require only several truck deliveries (e.g., piles and decking) to the site. The construction phase would be short and minimally intrusive both locally and island-wide. The elevated roadway then would require virtually no maintenance.

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<sup>2</sup> The volume of sand to be imported is extrapolated from the version of the Dune presented in the documents that FOS submitted to the Committee on 28 October 2014. In an undated document submitted to the Committee the week of 10 November 2014, FOS said that “[t]he height of the dune has been lowered by about a foot and a half, to 15’.” This would result in some minor reduction in the amount of sand imported to construct the dune and a correspondingly small reduction in truck trips and other external impacts. The slight design modification does not affect or mitigate any of the problems we identify in this memo. In fact, some problems are exacerbated; e.g., the redesign results in wetland fills of 4,975 s.f., just 25 s.f. under DEP’s limit, and this is before the added fills necessary to make the roadbed actually usable. It must be noted that FOS misrepresents the height and width of the proposed elevated causeway in its most recent submission.

In addition, the current dune configuration does not address accessibility to the beach. For the dune to be designed to permit accessibility (handicapped accessible slope 1:20) would require a ramp approximately 320 feet to transition from elevation 16 (top of the dune) to elevation 0 (beach level). Moreover any ramps or paths constructed on the front of the proposed “sacrificial” dune will be eroded in a short period of time. If the dune was constructed with a swale through the dune to provide access, the swale will readily allow overwash and erosion of the road on the back of the dune.

### III. Utilities

In the elevated roadway alternative, we have advanced a very simple and protective approach to delivering utility service to SFHA. The utilities would be run through conduits cast in the concrete deck segments of the elevated roadway.

FOS’s proposed utility solution is to bury the utilities under the pond. We agree this is technically feasible, but it is expensive, and much more complicated and difficult in maintenance terms than our very simple and straightforward approach. An under-pond utility corridor also would require a Chapter 91 license from the state because Squibnocket Pond has a natural size of greater than 10 acres and is classified as a Great Pond. The governing Massachusetts waterways regulations restrict licensable projects in Great Ponds to water-dependent uses. An under pond utility crossing could only be licensed if MassDEP were to determine that the crossing could not be reasonably located outside of the Great Pond. The Elevated Roadway is a reasonable alternative available that could be used to avoid locating utilities within the Great Pond. Therefore an under pond utility crossing would be determined to be non-water dependent under the regulations and we believe unlicensable in the great pond.

As with the roadway itself, FOS prefers a utility solution that is difficult to execute and is risky in regulatory terms. The dune roadway and under-pond utility concepts are counterintuitive from a construction logistics and environmental impact perspective and, not coincidentally, disfavored by the applicable environmental laws. These laws favor simple, implementable and nonintrusive approaches whenever available.

### IV. Ability to Obtain Permits

We articulated the permitting challenges in our 13 October 2014 memo that was conveyed to the committee. FOS consultants stated that our assertion that the future relocation events requiring filling and obtaining limited project status was “unsupported and without merit.” In our 13 October memo we stated that:

An access project qualifies as a “limited project” **only if there exists no “reasonable alternative”** means of access from a public way to an upland area of the same owner. Reasonable alternative means of access may include any previously or currently available alternatives such as realignment or reconfiguration of the project to conform with 310 CMR 10.54 through 310 CMR 10.58 or otherwise minimize adverse impacts on resource areas.

**The “reasonable alternative” in this case is the Elevated Roadway, which will require no placement of fill within BVW and allows for the natural movement of water and sand by wind and wave action.** The existence of the Elevated Roadway concept – and the desire of the

project proponents (SFHA) to build it – defeats any possibility that the Dune Alternative can be treated as a “limited project.”

Even if the Chilmark Conservation Commission were to find the Dune Alternative eligible for “limited project” status, we expect that MassDEP would intervene and strictly limit filling in BVW to 5,000 SF, and require replacement wetlands be constructed. In our experience, DEP is rigid in its enforcement of these rules and would not recognize “limited project status” when a lower impact solution exists such as the elevated causeway.

In summary, FOS has presented the dune remedy as a simple, permissible, low cost solution. In fact, this remedy is highly complex with high levels of uncertainty, presents significant permitting challenges and will have significant impacts on the community during initial construction and during maintenance.

## **V. Cost**

Although the Dune solution would initially be lower cost than the elevated causeway, the costs presented to the Committee reflect only a portion of the cost for the Dune Alternative. There is one communication that describes the cost of concrete sand from a local borrow source at \$17 per ton delivered. Based on 6,500 CY, FOS provides a total cost of \$144,000. Firstly, we would need to gain a better understanding of the FOS volume calculation as the geometry of the dune results in a volume of approximately 9,000 CY. Secondly, FOS’s estimate multiplies a unit cost in tons (\$17/ton) by a unit volume expressed in CY (6,500 CY). This apples and oranges approach to cost estimating is incorrect. A yard of sand is approximately 1.75 tons; therefore the FOS estimate of 6,500 CY would equal approximately 11,375 tons, resulting in a material cost of \$194,000. Thirdly, in the Committee’s meeting minutes from 16 September 2014, the total cost of the project was put forth at \$190,000. We believe that many line items are missing from this including: design, permitting, site preparation, transport and placement of the sand, roadway construction, dune planting, wetland mitigation, utility installation beneath the pond, revetment removal, and construction oversight as highlighted below. These are all items of direct project cost not including in the estimate. Certainly, the cost of the externalities mentioned above (e.g., the hundreds of truck trips and the impact that they will have on town roads) is not considered.

1. The unit cost of sand does not seem to cover transport and placement. Recently Jeff Reidenaur, the Chief of the Marine Minerals Branch of the Bureau of Ocean Energy Management (BOEM), presented a cost comparison for beach nourishment with upland sand in New England (see attached slides from his presentation) with the closest corollary to this project by volume of sand cost \$75/CY. On the islands there will likely be a premium on that cost. Regardless, using \$75/ CY and 9,000 CY results in a cost to build the dune at \$675,000.
2. Dune planting is anticipated at approximately \$50,000 for the initial construction and additional cost at some frequency during maintenance and relocation of the dune.
3. The costs do not include construction of the roadbed estimated at \$75,000. This would only be higher if, as mentioned earlier, the roadbed is elevated to mitigate safety, flooding and mud/saturation concerns.
4. The costs do not include the cost of wetland mitigation for filling in the wetlands estimated at \$75,000. Mitigation would be more expensive as fills are expanded to solve the roadbed concerns.

5. The cost does not include directional drilling beneath the pond for utility relocation, estimated at \$200,000.
6. The cost does not include revetment removal, if required, estimated at \$50,000.
7. The cost does not include design and permitting, estimated at \$100,000.
8. The costs do not account for annual maintenance work and relocation events. If annual maintenance consists of replacing 250 CY of material, we estimate the annual cost at \$18,750 per year (\$187,500 over 10 years); however we cannot predict the level of maintenance and road repairs that may be required. These costs will vary depending on how much overwash is allowed. (The more overwash, the higher the annual maintenance costs; the less overwash, the higher the cost of periodic relocation events.) At year 10, we assume that half the dune (4,500 CY) would need to be replaced, costing \$337,500 (using current unit costs) Additional costs for replanting the dune and additional wetland mitigation would also be incurred at each relocation event. Based on these factors, we think an optimistic budget would run to \$600,000 every 10 years between annual maintenance, dune reconstruction and mitigation efforts.

Considering all these factors, the FOS proposal will likely be greater than \$1 million for initial construction. Over a 40 year period the Dune will cost approximately the same amount as the elevated causeway. However, these costs assume that nature will behave in a predictable manner, which is unlikely. If that does not occur, then the relocation of the Dune/road system will face significant permitting challenges and may not be possible. In that event, it likely would be necessary to jettison the Dune concept in favor of an elevated roadway. If that future elevated roadway spans open water, however, or if there are regulatory changes in the meantime, then it may not be possible to pursue that approach either.

In summary, our opinion is that the Dune Alternative is very complex to permit and construct initially, has significant adverse off-site impacts, makes continued access to SFHA reliant on either a natural accretion process that will be fraught with uncertainty or a future permitting process that will be daunting or insurmountable, and over the long run is as or more expensive than the elevated causeway.

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# Marine Minerals Program



**Jeffrey Reidenauer, PhD**  
**Chief, Marine Minerals Branch**

***EBC Ocean and Coastal Resources Program***

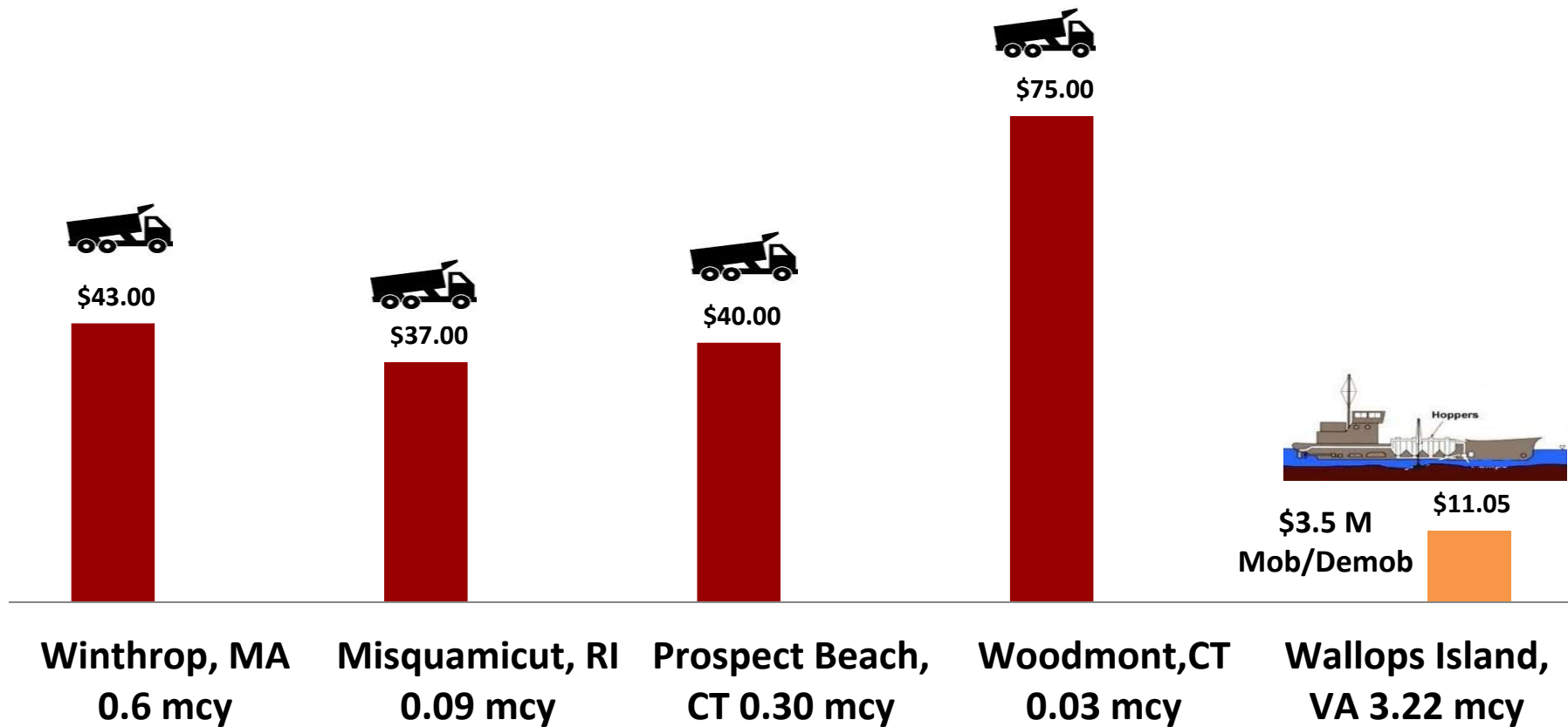
***Shoreline Resiliency – Sand & Gravel Mining***

***October 31, 2014***



## Costs - Upland vs. Offshore

### Sand Material Cost (\$ per cubic yard)



Cost figures courtesy USACE New England District and USACE Norfolk District

