MEMORANDUM

DATE February 8, 2019 **JOB NO.** 2015-0121-01

TO John Kelly
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FROM Leslie Fields
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CC Tom Daley
Nate Sears
Shauna Brogan

RE: Nauset Estuary Progress Report – November 2018 to January 2019

This memo summarizes the work completed by Woods Hole Group, Inc. for the Town of Orleans during the period November 2018 through January 2019.

Task 5: Field Data Collection
All work related to the water level measurements and the additional bathymetric surveys has been completed. The attached memo provides a summary of the data collection, analysis, and results.

Task 6: Pre-Application Meeting and Regulatory Scoping
A pre-application meeting with project stakeholders and the regulatory agencies was held on Friday January 11, 2019 from 1-3 PM. The meeting was held at the Department of Environmental Protection offices in Lakeville, MA. Woods Hole Group coordinated the meeting by inviting the stakeholders and regulatory agency staff, and preparing an agenda and Powerpoint Presentation that were emailed to the attendees in advance of the meeting. Copes of the agenda, Powerpoint Presentation, sign-in sheet and meeting minutes are attached to this memo.

Woods Hole Group received valuable feedback from the regulatory agencies as reflected in the meeting minutes. Key points included the following:

- The dredge zone concept would apply to the channel behind the barrier beach, but likely not to the other channels.
- Improvement dredging and disposal in Outstanding Resource Waters (ORWs; areas inside the Cape Cod National Seashore), must be designed to comply with MA Division of Water Pollution Control regulations (314 CMR 9.0).

- Consultation with the MA Natural Heritage & Endangered Species Program staff was recommended to help with the design of the dewatering/disposal alternatives on the barrier beach and in the vicinity of Nauset Beach.
- Shellfish surveys will be required by MA Division of Marine Fisheries.
- Disposal alternatives including subaqueous placement and salt marsh creation/enhancement would need additional field data collection to quantify the benthic environment that would be altered and impacts to hydrodynamics. Specific design details would also be needed for the marsh creation. Turbidity was mentioned as a negative impact for the subaqueous placement alternative.
- The frequency and cost of maintenance dredging was identified as an issue with the channel behind the barrier beach.
- A waiver from an EIR would not likely be granted for such a complex project; however, there might be an opportunity for a Single EIR. Coordinated review with MEPA, the Cape Cod National Seashore (NEPA) and the Cape Cod Commission could be handled through a request for a Special Review Procedure.
- An Essential Fish Habitat (EFH) study will be needed.
- A post construction monitoring plan will be needed.
- Shoaling problems in the estuary would not likely justify the issuance of emergency permits.

Information gathered during the pre-application meetings was used to help further evaluate the various alternatives for dredging and dredge material disposal. Specifically, feedback on additional data needs and the likelihood of success for permitting, two important parameters in the alternatives matrix, was updated to help with the selection of a preferred alternative. A summary of the alternatives assessment matrix is provided in the following Task 7 description.

Task 7: Analysis of Dredge Channel and Disposal Site Alternatives

The main goal of Task 7 was to combine all data collected during the 2016 Feasibility Assessment with new data collected during Tasks 5 and 6 to identify a suite of dredge channel and disposal site options that could be evaluated through an alternatives assessment to select a preferred channel/disposal design. The attached Task 7 memo describes the dredge channel and disposal site alternatives considered, as well as the methods used for the alternatives assessment. As part of the assessment, key factors associated with each alternative (i.e., environmental, engineering, economic) were scored and an overall ranking was developed. The resulting Draft Alternatives Assessment matrix with overall rankings is provided in the attached Task 7 memo.

At this point we recommend scheduling a joint meeting between the Towns of Orleans and Eastham, to review the Draft matrix. While Woods Hole Group has developed the Draft matrix, it is important to get feedback and comments from both towns so that the path towards a preferred alternative can be formulated by the stakeholders. Once a preferred alternative has been selected, we will be able to identify costs and timing associated with any additional data collection needed (i.e., shellfish survey, sediment sampling and testing).

Task 8: Develop Red Tide Pilot Project

A meeting was held on Dec. 17, 2018 with Woods Hole Group staff and research scientists from the Woods Hole Oceanographic Institution (WHOI). The objectives of the pilot project were defined, as well as the study approach, and details regarding the methods were also discussed. Prior to field sampling for the pilot project, it was decided that a round of preliminary sampling was necessary to identify current areas of the estuary with high concentrations of red tide cysts. This information would ensure that the pilot project sampling would collect sufficient concentrations of red tide cysts for a successful study.

The preliminary sampling was conducted on Jan. 28, 2019 with boat/captain support provided by the Town of Orleans Natural Resources Department. A total of six (6) cores were collected and cyst counts made. The results, which are summarized in the following Table, will be used to target the sampling locations for the pilot project.

Station	Lat (deg)	Lat (min)	Long (deg)	Long (min)	Cyst #/cc
NE1	41	71.518	69	95.4598	176
NE2	41	79.5429	69	94.4932	515
NE3	41	79.7001	69	94.8266	299
NE4	41	80.155	69	94.2696	125
NE5	41	79.783	69	97.2715	795
NE6	41	79.5025	69	98.1117	1967

At this point, a meeting is scheduled for Feb. 14, 2019 to finalize the details of the pilot project. It is expected that a summary memo of the pilot project objectives, study approach, methods, and data analysis will be available by the end of February. The summary memo will be provided to the Towns of Orleans and Eastham, and the Cape Cod National Seashore (CCNS). Costs to implement the pilot project will also be provided to the Towns at this time. A quick decision will be needed from the Towns on whether or not to proceed with the pilot project, since the sampling must be completed no later than the end of March to catch the natural germination period of the red tide cysts. The timeline for implementation of the pilot project will be made clear in the summary memo so the Towns will have a clear schedule for deciding on whether or not to proceed.

A Draft outline of the red tide pilot project summary memo is provided below.

Pilot Project Objectives:

One of the leading alternatives for beneficial reuse of sediment dredged from Nauset Estuary is for dune enhancement at local beaches. Due to the historical presence of red tide in the estuary, an analysis of the impacts of dredging on the distributions and potential for red tide germination were evaluated during the Woods Hole Group Feasibility Assessment (Feb. 2016). However, since completion of the Feasibility Study, concerns were raised over the potential for spreading/redistribution of red tide cysts at the dredge disposal/dune enhancement site at Nauset public beach. To address this concern, a Pilot Project is being proposed to evaluate the viability of red tide cysts in sediment dredged from Nauset Estuary and beneficially reused for dune enhancement.

Study Approach:

Determine effects of freezing, desiccation, and changes in salinity on viability of red tide cysts through a series of controlled laboratory experiments. Conduct field experiment on viability of red tide cysts buried in a natural dune environment.

Methods:

Sample Collection

Vessel equipped with wench
Sampling equipment – grab sampler, desired depth and volume of sample
Number of samples
Sample storage on boat – containers, ice (?), etc.
Sample locations – Town Cove based on recon sampling results
Sample dates – by end of February
Collection of water quality parameters – temp, salinity, etc. (?)

Laboratory Experiments – Exposure to freezing, desiccation, & changes in salinity

Number of replicate samples for each test
Volume of sub-sample

Collection of sub-sample from initial sample – homogenize and then collect sub-samples
Conduct cyst counts on sub-samples
Temperatures for freezing experiment – constant or variable, method for measuring temperature
Desiccation process – air dry or other means, method for measuring moisture content
Salinity – flush with fresh water, volume and frequency, method for measuring salt content of sample
Frequency and duration of laboratory sampling
Viability assessments – results in terms of % of initial cyst count (?)

Field Experiments – Simulate burial in natural dune

Selection of field site with dune – Nauset Beach
Number of samples in dune
Container to hold sample – size, type, etc.
Depth of burial in dune – top dress sample containers (?)
Initial cyst counts (??)
Method for sub-sampling – sampling device, volume, depth, etc.
Collection of dune/field parameters – moisture content, salinity; instrumentation required
Collection of weather conditions – temperature, rainfall, etc.; source of data
Frequency and duration of field sampling
Viability assessments

Data Analysis & Reporting:

Presentation of cyst viability in laboratory and field experiments
Extrapolation of pilot project results to indicate likely impacts during actual construction

Task 9: Prepare Engineering Plans

No work on Task 9 was performed during this period.

Encl: Task 5 Field Data Collection Memo
Task 6 Pre-application Agenda, Powerpoint presentation, Sign-in sheet and Minutes
Task 7 Analysis of Dredge Channel and Disposal Site Alternatives Draft Memo