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April 5, 2019

Mr. John Kelly
Town of Orleans
19 School Street
Orleans, MA 02653

Re: Proposal for Town of Orleans Dredge Purchase Feasibility Study

Dear Mr. Kelly:

The following is a proposal to assess the feasibility of purchasing and operating a dredge and associated equipment within the Town of Orleans, MA. We understand the importance of maintaining safe and navigable entrance and internal navigation channels to support a vibrant commercial fishing and recreational boating community. Additionally, public and private mooring fields and marinas depend on dredging to maintain safe depths at their docks and moorings. The Town of Orleans also has a need for clean, beach compatible material for ongoing beach and dune nourishment projects. We understand that the Town is interested in learning more about alternatives for beneficial reuse of dredged material and options for disposal within Town to offset the cost of importing upland sand.

The Woods Hole Group has experience working with communities in Southern Maine and on the North Shore of Massachusetts interested in pursuing a similar dredge purchase. Through our work in Maine and on the North Shore, we developed expertise researching historic dredging events, evaluating sediment characteristics within historic dredge channels, and synthesizing the available data to analyze the costs and benefits of a regional dredge purchase. We also learned the importance of evaluating alternatives for cost-effective, beneficial reuse of dredged material (beach nourishment, dewatering and stockpiling, thin layer deposition, etc.), as a critical component of any dredge purchase feasibility study. Both of these projects also included the development of comprehensive recommendations and next steps for municipal project partners.

Woods Hole Group Coastal Scientists and Coastal Geologists also have extensive experience working with the Barnstable County Regional Dredge Program and the Edgartown Municipal Dredge Program on the Cape and Islands, designing municipal dredging projects, identifying locations for the beneficial reuse of dredged material, and developing resilient designs for large-scale beach nourishment and dune enhancement projects using dredged material.

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A summary of relevant projects includes:

- Merrimack Valley Planning Commission: North Shore Dredge Purchase Feasibility Study (Essex, MA).
- Southern Maine Planning and Development Commission: Examining the Feasibility of Purchasing and Operating Hydraulic Dredging Equipment in Southern Maine (Saco, ME).
- Nauset Estuary and Pleasant Bay Dredging Projects (Orleans, MA).
- Cow Bay Beach Nourishment and Dune Enhancement Project (Edgartown, MA).
- Popponesset Spit Beach Nourishment and Dune Enhancement Project (Mashpee, MA).
- Thin Layer Deposition Pilot Project (Ninigret Marsh, RI).
- Dewatering and Upland Disposal of Fine-Grained Sediment from Centerville River (Centerville, MA).
- Long Island Dredge Material Management and Disposal Study (Long Island, NY).

It is our understanding that the Town of Orleans is interested in pursuing this feasibility study because many of the shallow-draft boat harbors and navigation channels within Town have not been maintained, posing a significant risk to public safety and navigability, prompting the Town to investigate opportunities to manage their own waterways. To address this question, Woods Hole Group proposes the following Tasks:

Task 1. Meetings and Stakeholder Engagement

This Task includes a kick-off meeting with Town of Orleans Dredge Advisory Committee (DAC) and municipal stakeholders to review the geographic scope of the project, review the proposed scope of work, and develop an understanding of stakeholder goals and objectives. It is anticipated that this meeting will take place at Orleans Town Hall.

Following the kick-off meeting, the Woods Hole Group will meet with DAC three (3) times over the course of the project. Meeting objectives are defined below:

- Meeting 1 – To include municipal harbor personnel, members of municipal waterways advisory boards, and members of municipal shellfish advisory boards to identify site-specific goals and objectives.

- Meeting 2 – Update the DAC on project deliverables, tour Barnstable County Regional Dredging and/or Edgartown Municipal Dredging equipment and meet with Barnstable County Dredge personnel and/or members of the Edgartown Dredge Advisory Board[1].

[1] Costs for stakeholder participation in this meeting, should they be required, have not been included in this proposal.

- Meeting 3 – Wrap-up meeting with DAC to review findings, recommendations, and next steps.

Task 2. Compile Information on Dredging Projects

Based on previous work in the Town of Orleans, Woods Hole Group has a wealth of information on past dredging projects, sediment characteristics, and historical permits for many of the waterways. However, it is anticipated that local stakeholders may provide additional information from their records regarding: historic permits obtained, exiting permits, historic quantities dredged, historic dredging location(s), historic dredged sediment types, historic disposal locations, etc. Once received, the data will be compiled. Impediments to dredging within designated Areas of Critical Environmental Concern (ACEC), National Park Service boundaries, Time of Year (TOY) Restrictions, etc. will also be identified and summarized.

Woods Hole Group will compile and amend data received from local stakeholders. From these data, the Woods Hole Group will identify and characterize grain size, type of material, potential future dredge volume(s), and expected dredge frequency. These data will be used to forecast the quantity of material that a municipal dredge may be expected to dredge in a given year. In conjunction with members of the DAC, the Woods Hole Group will research and identify suitable disposal sites (offshore, nearshore, beach nourishment, TLD, etc.) based on the characteristics of the material to be dredged. This Task also includes the development of GIS imagery to accompany these data. GIS imagery will be incorporated into the Final Report (Task 6).

Task 3. Identification of Suitable Equipment

Once the sediment characteristics and historic dredging events have been analyzed, Woods Hole Group will research and identify the most suitable dredging equipment for maintaining navigation channels within the specified region, and beneficially reusing and/or disposing of dredged material. The data collected for this Task will include, but not be limited to, initial costs for the purchase of recommended equipment (dredge superstructure (hydraulic dredge, hopper, etc.), support boats, pipe, booster pump, etc.) labor costs, fuel costs, pumping rates, maintenance costs, etc.

Task 4. Operational Cost Forecast

The data collected in Tasks 3 will be compiled and used to estimate costs associated with annual dredge operation and ownership. Task 4 will also include a cost-benefit analysis of dredge ownership vs. using the Barnstable County Dredge vs. using a commercial dredge contractor to complete municipal dredging projects.

Task 5. Feasibility Assessment

The data obtained in Tasks 1 through 4 will be used to develop a regional sediment budget for dredge material (the amount of material that could be expected to be dredged on an annual basis) for waterways in the specified region. The sediment budget will be factored against the operational cost forecast for owning and operating regional dredging equipment within the specified region, generating a cost per cubic yard of material dredged. This unit cost will help to determine the capital outlay that will be required to obtain the dredge and how quickly the initial investment can be recovered. Additionally, a return on investment curve will be developed to show revenue generated by the dredge balanced against initial investment cost; annual operating costs; and maintenance and repair costs.

Task 6. Final Report

A report will be generated that documents the data obtained in Tasks 1 through 5. The final report will provide an outline of the assumptions that were made in generating the data and will provide a comprehensive list of recommendations and next steps for future work.

Task 7. Project Management

This Task provides time for the Woods Hole Group project team to communicate with the DAC and project stakeholders. This task will help the Woods Hole Group keep the project team up-to-date on the project and to complete administrative tasks.

Estimated Costs

The following are the estimated costs to complete this project:

Task	Estimated Cost
Task 1: Meetings and Stakeholder Engagement	$7,460
Task 2: Compile Information on Dredging Projects	$4,650
Task 3: Identification of Suitable Equipment	$1,200
Task 4: Operational Cost Forecast	$2,965
Task 5: Feasibility Assessment	$1,840
Task 6: Final Report	$5,670
Task 7: Project Management	$1,200
Total:	**$24,985**

Acceptance and Authorization to Proceed

This proposal was assembled under the guidelines for a "time and materials not to exceed" contract. Based on the preceding scope of work, the total charge for Woods Hole Group services will not exceed $24,985 without written authorization from you. Our services will be invoiced based on the amount of time it takes to complete all contracted Tasks. Materials and other direct costs will be invoiced at cost plus our standard markup. Prior to the work being started, Woods Hole Group requires receipt of the signed and dated "Acceptance and Authorization to Proceed" form at the end of this proposal. Invoices for services rendered will be submitted monthly based upon percent complete. Unless otherwise agreed to in writing, payment is due within 30 days following the date of our invoice. In the event of payments that are significantly or routinely late, Woods Hole Group retains the right to stop work until payment issues are redressed. In case of refusal to address payment issues, Woods Hole Group retains the right to use legal measures to obtain rightful payment.

Respectfully Submitted,

Adam Finkle, M.S.; PWS; CERP
Coastal Scientist

Acceptance and Authorization to Proceed:

"I authorize Woods Hole Group, Inc. to proceed with the above scope of work and budget of **$24,985** for Tasks 1-7."

Client Name	**Date**
Woods Hole Group Representative	**Date**