

COASTAL **E**NGINEERING **C**OMPANY, INC.

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EXECUTIVE SUMMARY REPORT

Project No. C16678.02
Project: Allen Harbor Town Dredging and Disposal Project
Date: July 13, 2010
To: James Merriam, Town Administrator
Lincoln Hooper, DPW Director
Thomas Leach, Harbormaster
From: Roy E. Okurowski, P.E.
Re: Town of Harwich Allen Harbor Dredge and Disposal Permit Applications
cc: John A. Bologna, P.E.

At your request, the following is a project summary and status report for the Allen Harbor Dredging Project. This project involves the dredging and disposal of approximately 40,000 c.y. of dredge material from the Inner Harbor Basin. The material is composed of a variety of organic fines, silt, and sand that have naturally deposited in the historic harbor and channel. The source of the deposits is a combination of watershed geography and ecology which includes a significant marsh that serves as the primary sediment source. High-resolution aerial photographs clearly define a deep channel that overlays NOAA chart documented historic channels as shown on authorized navigation charts that correlate with the channel at the subject locus. This project converges with the outer channel that is dredged hydraulically due to the large amount of sand and coarse grain material. Sedimentation processes in both the inner harbor and channel are similar, except that sedimentation in the outer harbor is primarily due to the littoral sand transport that migrates through the failing jetty. The area is a clean environment that is very closely monitored by numerous town, county, and state agencies. The harbor has been historically dredged every 20 to 25 years by the state who no longer contributes to local dredging projects due to funding issues. The need for dredging has become critical to the point where vessel movement is restricted by tide.

Coastal Engineering Company, Inc. was contracted by the Town of Harwich to take the project through the necessary steps from feasibility through permitting. This process included an extended feasibility report and over fifty sediment samples to analyze the chemical properties of the sediments in the harbor. The report concluded that the project was feasible and could be done by several dredging and dewatering methods. However, the disposal of the material was going to be the driving factor from a cost perspective. If the material could not be disposed of on town property, the trucking and tipping fees could run as high as \$75 a cubic yard in addition to the cost of dredging and de-watering. Lincoln Hooper, DPW Director, suggested using the capped landfill as an area to construct earthen berms out of the material, as he has done with other projects in the town. This portion of the project will be done under an approval known as a Beneficial Use Determination (BUD) and is currently being pursued by Nate Weeks, of GDH, one of the town's other consultants.

The remainder of the seven (7) required local, state, and federal permits along with permits for all of the abutting property owners including the Allen Harbor Yacht Club and Allen Harbor Marine

Service has been obtained and the project is ready to begin. The permitting process took two years to complete and if the dredging does not begin within the next two years, new chemical sampling may have to be performed at a cost of approximately \$50,000. Based on this we recommend the project design plans and specifications be done and put out for bid this summer for construction starting next year.

DREDGING AND DE-WATERING

Due to the high concentration of fines the project may have some difficulties that need to be addressed for the dredging and dewatering processes. The two methods of dredging are hydraulic and bucket dredging. Hydraulic dredging is far less expensive; however it introduces water into the material that must be removed prior to transportation and disposal. Bucket dredging is more costly and it will complicate dewatering issues. The proposed use of the material requires that there be minimal water content to construct the berms. The options for de-watering include adding polymers to the material and de-watering utilizing gravity, geo-tubes, or mechanical de-watering. Space is also a consideration as some of these activities require a lot of area.

Based on these criteria it was determined that mechanical de-watering met all of the required criteria including being able to be completed utilizing the current parking area for the de-watering process. This was mainly based on the amount of fines which is not the best fit for geo-tubes. The use of geo-tubes also required that the material be pumped out of the harbor over to some of the town parking lots. The extra costs associated with this made mechanical de-watering the logical choice.

Mechanical de-watering is a process that involves the use of a complicated system of tanks, presses and conveyors that physically squeeze the water out of the dredged material. The system is composed of truck-mounted units and associated mixing tanks that run the material through the system as it is pumped from the hydraulic dredge. The water is treated and put back into the salt pond in one continuous process. The dredge material runs out on a conveyer directly into a truck where it is taken to a disposal location. The material would have to go through a pre-mixing tank where polymers are added to assist in the sediment dropping out of the water column. This process uses odor control chemicals and polymers. Polymers are ionic compounds that make the sediment coagulate and drop out of the water column. These agents are environmentally safe, have extensive testing done on them and have a good track record for this type of project.

The benefit of this type of operation is its short de-watering time and relatively clean method of operation. The disadvantages are the high cost of mobilization and running the press trucks. However, this cost is offset by the reduced cost of disposal due to reduced weight of materials that need to be transported, thereby reducing transportation costs. This process can all take place in the Allen Harbor parking lot, but will shut down the use of the ramp during dredging operations.

PROJECT COSTS

Coastal Engineering Company previously prepared a feasibility report for the town with extensive cost analysis data for all the different alternatives. We requested that our outside dredge consultant look at the cost of the job at today's rates and costs. They came down last month and took their own independent samples from the Inner Harbor basin. They also provided a full lab analysis in order to determine the most cost-effective means for dredging the harbor. It was determined that hydraulic dredging with mechanical dewatering were the most efficient and cost effective methods based on the criteria we gave them. The cost of dredging and de-watering not including trucking and construction of the berms by the town is as follows:

The total project value estimate is approximately \$3.3 million not including trucking and disposal of the material based on the following assumptions:

- 40,000 CY of material to be dredged over two dredge events
- Two complete mobilizations and demobilizations – potential savings of \$100 K if the equipment could winter over and restart in the spring
- Docks will need to be removed by owners
- No boat access to a section in channels and slips while working in each section
- Approximately 5 months for each dredge event including mobilization and demobilization
- Approximately, 28,000-30,000 tons of dewatered material would be generated for disposal. About 10% of this would be sand in the 65% t.s range and 90% would be dewatered cake in the low 30% t.s. range.
- The dewatered material will need to be removed daily from the process site by others. Figure up to 200 tons per day for trucking.
- The dredge material would be diluted from approximately 24% t.s. in-place to about 8% t.s. for pumping and dewatering
- Assuming that we will use bay water for dilution and fresh water from a local hydrant for polymer.
- Assuming that the press filtrate will be returned to the marina and contained with a silt curtain similar to other projects in Massachusetts.
- The residual solids will settle inside the silt curtain. We will periodically dredge and press these residual solids
- Cost estimated assuming Massachusetts Local 25 prevailing wages

The next step is to proceed with the environmental permitting for the BUD at the town landfill and to prepare final plans and specifications for project bid procurement to relocate actual cost of construction.