ENGINEERING CONSIDERATIONS

DESIGN AND CONSTRUCTION

DREDGING equipment used to deepen or widen a channel is determined by site characteristics, such as the type and location of sediments along a channel bottom. Dredging is simply the removal and disposal of materials necessary to provide the authorized depths and widths within a project footprint. Geotechnical surveys, additional field measurements such as bathymetric surveys and modeling are critical components of the project design and analysis.

GEOTECHNICAL CONSIDERATIONS AND DATA GATHERING

1) HYDROGRAPHIC SURVEYS provide information about the characteristics of the channel bottom and allow for a volumetric computation of the material to be removed.

2) CORE BORINGS provide information about the composition of channel sediments, including rock. Rock strength greater than 3,000 may require pre-treatment. Previous testing indicated unconfined compressive strength values may exceed 10,000 psi at some locations within the Turning Basin, Entrance Channel, and South Access Channel.

3) SHIP SIMULATORS are used to:
   - Evaluate proposed modifications for improvements to navigation such as deepening and widening
   - Perforate currents, wind, and wave conditions, shallow-water effects, bank forces, ship handling, ship-to-ship interaction and hog resistance
   - Bridge control and display mirror actual ship controls and visual scene from the harbor being tested

ENVIRONMENTALLY-FRIENDLY BULKHEAD (EBF)

The left is a typical cross section of a re-engineered bulkhead with a permeable cap to allow for tidal exchange and habitat enhancement.

The general locations of the EBF are illustrated in the project map.

DREDGING METHODOLOGIES

Various dredging methodologies can be employed to remove material based on its particular characteristics. Ultimately, the contractor will determine the combination of plant and equipment that will be used to accomplish the construction in the most efficient manner, and in accordance with environmental guidance.

PRETREATMENT OF ROCK

Rock pretreatment is necessary in order to remove rock with unconfined compressive strength greater than 5000 psf. Methodologies include:

- Mechanical Dredging
  - Mechanical Dredging 1
  - Mechanical Dredging 2

CONFINED BLASTING

The blasting the hole in which the explosive material is placed is covered with an inert material, such as sand, gravel or soil. Shovel can either be stirred or injected into the hole. The delayed blasting is a mixture of explosive and explosive binding agent, which is used to form the charge. The charge is then placed in the hole and covered with an inert material to prevent accidental ignition. The explosive is then ignited, which causes the charge to release energy, causing the material to be displaced. The displaced material is then removed, and the hole is filled with the inert material.