

4. Identify All Potential Sites

Select potential harbor sites based on the basin area and depth requirements, and then comparatively evaluate them. You may select sites from aerial photographs, nautical charts, or other design references. The local community may also choose them. Typically, the site that requires the least amount of dredging, filling, excavating, or disruption of sensitive areas will have the greatest potential for harbor development. Areas with natural wind and wave protection, existing or easily developed uplands, and access to the local communities are most desirable.

- **Deep Water Limitations** **4.10**

- **Shallow Water Limitations** **4.20**

- **Upland Access** **4.30**

- **Land Ownership** **4.40**

- **Environmental Considerations** **4.50**

- **Archaeological or Historical Areas** **4.60**

4.10 Deep Water Limitations

There are economic limitations on harbor structures in deep water, especially in areas requiring fill, such as rubble breakwaters. Piles also have deep-water limitations due to structural load limits and associated costs. Floating breakwaters and float systems are most suited to deep-water applications, but are still limited by the cost and weight of the anchoring system.

Consider DEEP WATER LIMITATIONS when:

- 1) You are constructing the breakwater near the face of an alluvial fan with steep offshore slopes.
- 2) The natural beach slope is greater than about 1:20. Steeper slopes result in large volume rubble breakwaters or high dredging quantities; both increase the mooring basin cost per acre.
- 3) Material costs for breakwater construction exceed the cost of additional dredging (see Note 2).

Note 1. Consider the **cost per acre** for mooring basin when optimizing a breakwater configuration. It may be better, for example, to reduce the harbor capacity slightly than to force the breakwater into deep water.

Note 2. There is an economic balance between breakwater cost and dredging cost for a mooring basin constructed on a typical sloping beach. If you move a breakwater into deeper water, less dredging will offset its higher cost. You may need to consider funding sources.

Note 3. Rubblemound breakwaters may cause instabilities in steep offshore slopes of alluvial fans; floating breakwaters may not achieve adequate capacity to outboard anchor chains.

Note 4. Consider maintenance costs when siting the breakwater. In some instances, it may be advantageous to place the entrance in deeper water to minimize channel siltation due to littoral transport.

Note 5. A beach slope of 1:20 approximates the maximum slope for economic development of a harbor (DOT&PF).

REFERENCES:

1. ASCE Manual No. 50. Task Committee on Marinas 2000. 1892. *Planning and Design Guidelines for Small Craft Harbors*. New York.
2. Construction Industry Research and Information Association, Special Publication 83, 1991. *Manual on the Use of Rock in Coastal and Shoreline Engineering*. Vermont, A.A. Balkema Publishers.

4.20 Shallow Water Limitations

The primary limitations of shallow water are dredging costs, which can escalate if the bottom is rocky or the material is contaminated.

Consider SHALLOW WATER LIMITATIONS when:

- 1) There is a high probability of encountering bedrock.
 - 2) The soils are contaminated and require special treatment.
 - 3) Beach slope is steeper than about 20:1.
 - 4) There is a high percentage of boulders.
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Note 1. Consider the cost per acre for a mooring basin when developing the planform geometry. It may be better to reduce the fleet slightly than to excavate large quantities of bedrock.

Note 2. A beach slope of 1:20 approximates the maximum slope for economic development of a harbor (DOT&PF).

4.30 Upland Access

An adequate road system to accommodate a projected traffic demand should be available to safely service the harbor and the community (see Note 2). If possible, locate a new harbor site near a community. Consider geologic or environmental features, such as cliffs, wetlands, or faults, that would impede upland development. It is often beneficial to create uplands using dredged materials from the harbor basin.

For UPLAND ACCESS, consider the following:

- 1) Adequate parking for general visitors and auto-trailers if a launch ramp is available.
- 2) Land use objectives, such as fuel storage, winter storage for boats and gear, vessel repair facilities, waste disposal areas (both solid and liquid), restrooms, and Harbormaster office.
- 3) Geologic surveys may be necessary to understand the depth of bedrock, kind of materials in the area, and other features that may affect safe use of the harbor.
- 4) A detailed infrastructure analysis. Traffic patterns fluctuate based on seasonal use and weekend periods and time of day when peak usage occurs. Improper road design can further complicate congestion.

Note 1. The need for boat trailer parking is site- and community-specific. A general rule of thumb is **approximately 0.75 parking spaces per boat berth.**

Note 2. Smaller Alaskan communities may only need all terrain vehicle (e.g. four-wheelers) and pedestrian access.

REFERENCES:

1. ASCE Manual No. 50. Task Committee on Marinas 2000. 1892. *Planning and Design Guidelines for Small Craft Harbors*. New York. Pg. 27-28 & 59-60.
2. Tobiasson, B.O. & Kollmeyer, R.C. 1991. *Marinas and Small Craft Harbors*. New York: Van Nostrand Reinhold. Pg. 67-75.

4.40 Land Ownership

Landside and waterside property ownership often restricts development potential of a site. You may need to consult Federal, State, local, private, and native agencies during the site evaluation.

Research LAND OWNERSHIP rights when:

- 1) You have identified valid property ownership, past permits issued, or land encumbrances. You may find these through a title search.
 - 2) There are potential hazardous materials present. Consult the Department of Environmental Conservation (DEC).
 - 3) You need to check zoning restrictions, including aviation and rights-of-way, for conflict with selected sites.
 - 4) Historical or archaeological resources are located in the area (see Section 4.60).
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Note 1. You may need to obtain regulatory **permits** from various agencies.

Note 2. **Department of Natural Resources** may have jurisdiction in the proposed site.

REFERENCES:

1. ASCE Manual No. 50. Task Committee on Marinas 2000. 1982. *Planning and Design Guidelines for Small Craft Harbors*. New York. Pg. 15-20.
2. Tobiasson, B.O. & Kollmeyer, R.C. 1991. *Marinas and Small Craft Harbors*. New York: Van Nostrand Reinhold. Pg. 74-76.

4.50 Environmental Considerations

Environmental quality is a serious design issue. The site selection is dependent on several environmental factors. To avoid penalties, delays, or costly litigation, you must obtain regulatory approvals and permits before constructing coastal structures.

ENVIRONMENTAL considerations you may need to address:

- 1) **Water quality.**
- 2) Point and non-point source pollution.
- 3) Habitat loss:
 - A. **Wetland** surveys you may need:
 1. Description of the wetland
 2. Cataloging of the wetland's species
 3. Assessment of the wetland as an important ecological resource
 - B. **Wildlife** surveys you may need:
 1. Inventory of indigenous wildlife
 2. Identification of anadromous fish streams that may be impacted by coastal structures
 3. Bird, rookeries, or nesting site counts
 - C. **Biogeographical** survey that you may need:
 1. Assessment of bottom sediment biota (shellfish, plant species)
- 4) Hazardous waste containment.
- 5) Available municipal resources (water, electricity, etc.).
- 6) **Socioeconomic Factors.** Look at the community needs and preferences, as well as impacts including aesthetics.

Note 1. The checklist for **Permits and Approvals Appendix** of this manual lists permits or certifications that you may need.

REFERENCES:

1. ASCE Manual No. 50,. Task Committee on Marinas 2000. 1982. *Planning and Design Guidelines for Small Craft Harbors*. New York. Pg. 17-20.
2. Tobiasson, B.O. & Kollmeyer, R.C. 1991. *Marinas and Small Craft Harbors*. New York: Van Nostrand Reinhold. Pg. 74-76.
3. U.S. Army Corps of Engineers, Dept. Of the Army. 1984. *Shore Protection Manual*. Vol. 1 & 2. Pg. 5-73, 74, Chapter 8.

4.60 Archaeological or Historical Areas

Alaskan territories have a number of sensitive historical and archaeological regions. Detailed information is usually available through the State Historical Preservation Office, Division of Natural Resources.

Analyze HISTORICAL or archaeological site constraints if:

- 1) The proposed sites under consideration are near sensitive historical and archaeological areas.
 - 2) You find recognizable artifacts near a proposed site.
 - 3) Community comments include reference to historical uses or archaeological sites in the project area.
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Note 1. Protected areas may restrict the size, type, or nature of the development.

REFERENCES:

1. Tobiasson, B.O. & Kollmeyer, R.C. 1991. *Marinas and Small Craft Harbors*. New York: Van Nostrand Reinhold. Pg. 67-68.