DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, ALASKA
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DRAFT FEASIBILITY REPORT
AND ENVIRONMENTAL ASSESSMENT
NAVIGATION IMPROVEMENTS – HAINES, ALASKA

July 2002

SUMMARY

This report examines the need for improving navigation at Haines, Alaska, and determines the feasibility of Federal participation in potential improvements. The City of Haines is in Southeast Alaska, approximately 129 air kilometers northwest of Juneau. Haines has developed as a marine, land, and air transportation hub for the northern part of Southeast Alaska.

The existing harbor is inadequate in terms of size and design to accommodate the needs of the existing demands of resident and transient users. During the summer season, extending from June through September, the harbor is overcrowded and numerous vessels are either turned away or simply avoid the harbor because vessel captains know that the harbor is full beyond its design capacity. The current harbor configuration is exposed to southeast winds, causing reduced maneuverability and damage to vessels and harbor facilities. Overcrowded conditions in the harbor result in (1) delays in entering and maneuvering in the harbor; (2) hot-berthing where transient vessels are moored in stalls of resident vessels left vacant; (3) rafting of transient vessels; and (4) damages to vessels and harbor facilities. Additional moorage is also needed to improve or provide services such as oil spill response, water taxi service, and to reduce costs associated with subsistence harvesting.

Initial arrays of conceptual plans were preliminarily analyzed to provide the four harbor design alternatives that were more fully evaluated. The Draft Feasibility Report tentatively designates alternative 4 as the National Economic Development (NED) Plan.. This is supported by the City of Haines and therefore, alternative 4 is tentatively designated as the RECOMMENDED PLAN. The RECOMMENDED PLAN provides additional protection to the existing 2.25-hectare mooring and maneuvering basin and adds a new adjacent 6.60-hectare basin with an additional entrance channel. It would provide protected moorage for a total of 279 permanent stalls and 1,094 linear meters of transient floats for vessels ranging in length from 5.5 meters to 42.7 meters. The plan would replace the existing floats and provide properly sized slips for the smaller vessels in the existing fleet, and the larger existing and additional vessels needing moorage would use the new basin.

The Commercial Navigation and Recreational features of the RECOMMENDED PLAN that contribute to the NED plan have a construction cost of $18,086,000 (October 2002 price level) excluding navigation aids and betterments, an annual NED investment cost of $1,298,000, and annual benefits of $1,717,000. The project's benefit-to-cost-ratio is 1.3 with annual net benefits of $419,000.

As local sponsor, the City of Haines would be required to pay the non-federal share of the costs of construction of general navigation features as specified by Section 101 of the Water Resources Development Act of 1986 (Public Law 99-662). This amount is currently estimated at $2,335,000. The sponsor must also pay the entire cost of some local NED features (including the mooring basin and float system) and other local features discussed in this report. The current estimate of the total non-federal share of all costs of the project is $13,528,000. The Federal share of the project is $8,860,000 excluding $12,000 for navigational aids. The U.S. Coast Guard would provide these navigation aids.

The fully funded cost of the RECOMMENDED PLAN (Alternative 4) escalated to the mid-point of construction is estimated as $24,460,000 and includes locally funded betterments for a breakwater causeway and intertidal fill the sponsor plans to develop.

PERTINENT DATA

Recommended Plan (Alternative 4)

Basin		Breakwaters	
New Area	6.60 ha	Design wave	2.3 m
New Basin depth	-4.3, -4.9 m MLLW	Length, total	704 m
Entrance channel depth	-5.5 m MLLW	Crest elevation	7.8 m MLLW
Dredging volume		Crest width	2.44 m and 13.80 m
South Entrance channel	8.600 m^3	Rock volume	
North Entrance channel	0 m^3	Primary armor	38,500 m^3
Maneuvering basin	0 m^3	Secondary (B) rock	39,100 m^3
Mooring basin	156,500 m^3	Core rock	191,100 m^3
Total	165,100 m^3		

Project Cost[a]

Item	Federal ($)	Non-federal ($)	Total ($)
General Navigation Features[b]	8,860,000	2,335,000	11,195,000
Associated costs[c]	0	5,598,000	5,598,000
LERR (GNF)	0	0	0
Recreation Features[d]	0	1,293,000	1,293,000
Navigation aids - U.S. Coast Guard	12,000	0	12,000
NED Project Cost	8,872,000	9,226,000	18,098,000
TOTAL COST (Commercial Navigation and Recreation)			**18,098,000**
Betterments[e]	0	4,302,000	4,302,000
TOTAL COST INCLUDING BETTERMENTS	**8,872,000**	**13,528,000**	**22,400,000**

	Commercial Navigation	Recreation	Total
NED investment cost (includes interest during construction)	17,812,000	1,372,000	**19,198,000**
Annualized initial cost plus interest duing construction	1,150,000	89,000	1,238,000
Annual NED maintenance cost	47,000	12,000	59,000
Total average annual NED cost	1,197,000	101,000	**1,298,000**
Average annual NED benefits	1,430,822	285,972	**1,716,794**
Net annual NED benefits	233,822	184,972	**418,794**
Benefit/cost ratio	1.2	2.8	**1.3**

[a] Basic assumptions: (1) October 2002 price levels; (2) 50-year project life; (3) 6-1/8% interest

[b] Cost sharing reflects provisions of the Water Resources Development Act of 1986 – non-Federal initial share 10% of GNF plus reimbursement of 10% GNF minus LERR credit

[c] NED = National Economic Development

[d] Recreation features are moorage Local Service Facilities at 100% cost to locals.

[e] Betterments includes expansion of the north breakwater to a causeway, and intertidal fill for uplands.

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CONVERSION TABLE FOR SI (METRIC) UNITS

Units of measurement used in this report can be converted to SI (metric) units as follows:

Multiply	By	To obtain
cubic yards	0.7646	cubic meters
acre	0.4049	hectare
Fahrenheit degrees	*	Celsius degrees
feet	0.3048	meters
feet per second	0.3048	meters per second
inches	2.5400	centimeters
knots (international)	0.5144	meters per second
miles (U.S. statute)	1.6093	kilometers
miles (nautical)	1.8520	kilometers
miles per hour	1.6093	kilometers per hour
pounds (mass)	0.4536	kilograms

To obtain Celsius (C) temperature readings from Fahrenheit (F) readings, use the following formula: C = (5/9)(F - 32).

GLOSSARY

ADF&G = Alaska Department of Fish and Game

ADOT&PF = Alaska Department of Transportation and Public Facilities

BCR = benefit/cost ratio

CDQ = community development quota

CERC = Coastal Engineering Research Center; part of WES

Continuing Authority = A program that permits the Corps to study, construct, and maintain projects for certain purposes without specific congressional authorization. Federal cost limits applies.

DPR = Detailed Project Report

ER = Engineering Regulation

GI = General Investigations. This is the type of Corps' study specifically authorized by Congress. (See Continuing Authority.)

gal = gallon

General Navigation Features = Features of a project, which can be paid for in part by the Federal Government through the Corps of Engineers. A breakwater is a general navigation feature.

H = horizontal

h = hour

ha = hectare (10,000 m^2)

kg = kilogram

km = kilometer

LERR = lands, easements, rights-of-way, relocation

LOA = Length Overall (said of a vessel)

lm = lineal meter

m = meter

MLLW = mean lower low water

m/s = meters per second

NED = National Economic Development. NED features of a project are those that increase the net value of goods and services provided to the economy of the United States as a whole.

NEPA = National Environmental Policy Act

NMFS = National Marine Fisheries Service

NOAA = National Oceanic and Atmospheric Administration

NOS = National Ocean Service

NPFMC = North Pacific Fishery Management Council

NRC = Natural Resources Consultants, Inc.

O&M = Operation and maintenance

OMRRR = Operation, maintenance, repair, replacement, and rehabilitation

PL = Public Law

SPM = Shore Protection Manual

USACE = U.S. Army Corps of Engineers

USCG = U.S. Coast Guard

USFWS = U.S. Fish and Wildlife Service

V = vertical

1.0 INTRODUCTION

1.1 Study Authority

This feasibility study was recommended in the September 1999 Initial Evaluation Report prepared by the Alaska District, U.S. Army Corps of Engineers, entitled "Haines Navigation Improvements, Haines, Alaska." The study was initially authorized under the Continuing Authorities Program (CAP) for navigation as specified in Section 107, Rivers and Harbors Act of 1960 (PL 86-645), as amended. The study was then converted to a General Investigations study and is authorized in partial response to the Rivers and Harbors in Alaska study resolution, adopted by the U.S. House of Representatives, Committee on Public Works, on December 2, 1970. The resolution states in part:

> *Resolved by the Committee on Public Works of the House of Representatives, United States, that the Board of Engineers for Rivers and Harbors is hereby requested to review the reports of the Chief of Engineers on Rivers and Harbors in Alaska, published as House Document Numbered 414, 83rd Congress, 2nd Session…and other pertinent reports, with a view to determine whether any modifications of the recommendations contained therein are advisable at the present time.*

The study was requested by the city of Haines to investigate navigation improvements at Haines, Alaska.

1.2 Scope of Study

This study investigates the feasibility of navigation improvements at Haines, Alaska, which has developed as a marine, land and air transportation hub for the northern part of Southeast Alaska. The primary areas of opportunity are fish resources and related fishing industries. Additional areas of opportunity include increased capability for subsistence fishing. The study was conducted and the report prepared in accordance with goals and procedures for water resources planning as contained in Engineer Regulation (ER) 1105-2-100. Alternatives were examined for their feasibility, considering engineering, economic, environmental, and other criteria. A determination of Federal interest, in accordance with present laws and policies, is also included.

1.3 Study Participation

The Alaska District, Corps of Engineers, has primary responsibility for this study. The report was prepared with assistance from many individuals and agencies, especially the city of Haines, and the Alaska Department of Transportation and Public Utilities (ADOT&PF).

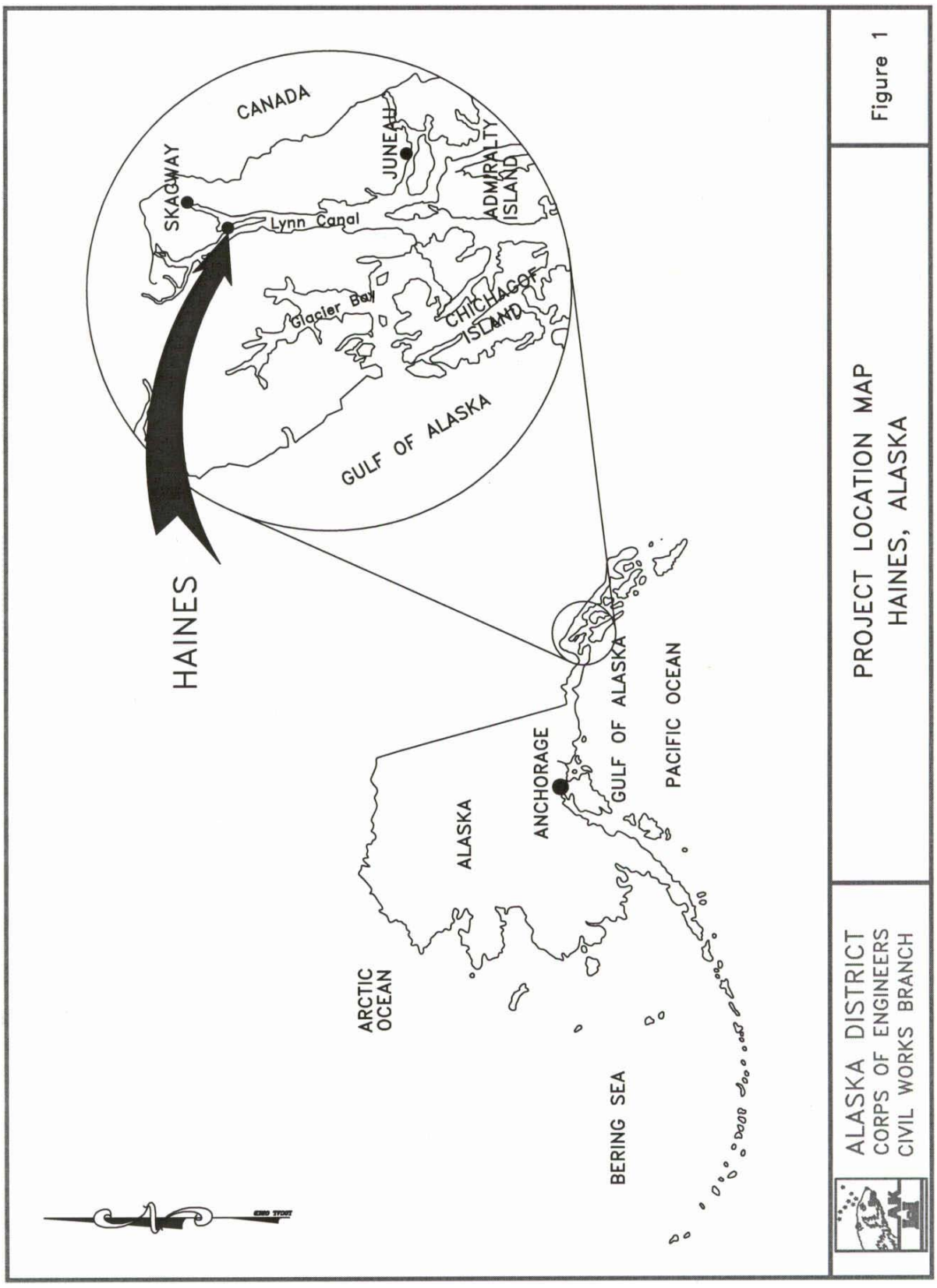

Figure 1. Project Location Map

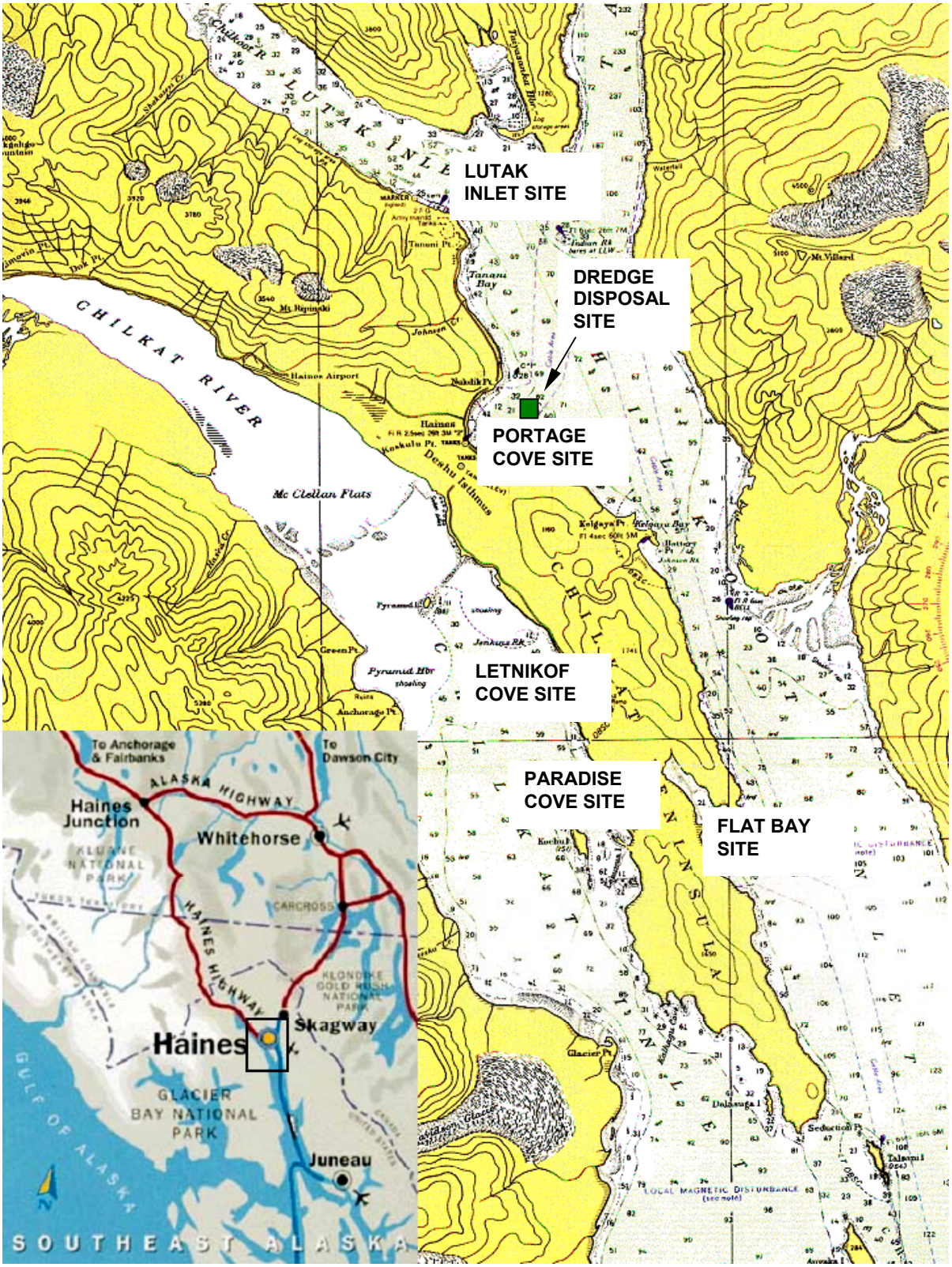

Figure 2. Vicinity and Alternate Sites Map

1.4 Related Reports and Studies

The following studies have examined navigation improvements at Haines.

"Southeast Alaska Harbors Interim Feasibility Report," April 1992. Prepared by the Department of the Army, U.S. Army Corps of Engineers, Alaska District, Anchorage, Alaska. The study investigated various southeast Alaskan communities navigation needs identified in the previous studies. Preliminary analysis identified the need for additional moorage but did not find a feasible project. The report did recommend further study could be pursued if the city of Haines wished to further investigate the potential for a feasible solution to the navigation improvements needed at Haines.

"Harbors of Refuse Survey, Various Locations, Alaska," July 1986. Prepared by the URS Corporation for the Department of the Army, U.S. Army Corps of Engineers, Alaska District, Anchorage, Alaska. The report noted Haines desperately needs additional stall and float space for summer transients. The study concluded Haines had a great need for expansion.

"Rivers and Harbors in Alaska Water Resources Comprehensive Study," September 1983. Prepared by the Department of the Army, U.S. Army Corps of Engineers, Alaska District, Anchorage, Alaska. The study performed a comprehensive statewide review of Alaska's water resources development needs. No specific recommendation was cited for Haines. The report noted existing improvements that had recently occurred throughout the state and the overcrowded conditions of southeast harbors.

"Detailed Project Report on Haines Harbor, Haines, Alaska," August 1974. Prepared by the Department of the Army, U.S. Army Corps of Engineers, Alaska District, Anchorage, Alaska. The study recommended Federal participation in the expansion of the existing non-federal harbor. The final construction for this action was completed in December 1976.

"Harbors and Rivers in Alaska, Survey Report, Interim Report No.1, Southeastern, Alaska," February 1952. Prepared by the Corps of Engineers, North Pacific Division, Portland, Oregon. This study investigated various sites in the southeast of Alaska to determine the need for improvements in connection with immediate and foreseeable problems of navigation and other related water uses. An improvement to a harbor at Haines was not found justified at that time.

2.0 REGIONAL DESCRIPTION

2.1 Project Area Description

2.1.1 Location

The City of Haines is located in the northern portion of Southeast Alaska, the region of the state commonly referred to as "the panhandle" (see figure 1). City boundaries straddle a peninsula that separates the Chilkat River Valley from Chilkoot Inlet, an embayment near the northern end of Lynn Canal. The community is situated roughly between the Coast Range, on the eastern shore of Lynn Canal, and Chilkat Range, a southeasterly extension of the Wrangell St. Elias Mountains. The area is virtually surrounded by mountains, glaciers, inlets, fjords and rugged terrain.

Haines is approximately 129 air kilometers northwest of Juneau and has developed as a marine, land and air transportation hub for the northern part of Southeast Alaska. This is due in part to its deep-water harbor as a terminus of the Alaska Marine Highway Ferry System, and its link to both Canada and the interior of Alaska as the southern terminus of the Haines Highway (see figure 2).

2.1.2 Infrastructure

The characteristics of the Haines infrastructure include a port, and public, and local facilities. The marine network is oriented towards commercial fishing and tourism. Haines is a first-class city incorporated in 1910 with a mayor/council form of government. It is included in the Haines third-class Borough, formed in 1968, which operates the school district. The City has full powers of taxation, police and fire protection, road maintenance, waters and harbors, planning and zoning, coastal zone management, and water and sewer service. The Borough has the power to tax for educational purposes. The Borough also has planning and zoning and fire protection on a service area basis. A detailed description of the infrastructure of Haines can be found in section 1.7 of the Economic Appendix of this report.

2.1.3 Climate

Haines, like all of southeastern Alaska, experiences maritime weather conditions with annually moderate temperatures and high precipitation. However, because of its distance from the exposed coast, more northerly latitude, proximity to interior regions, and local mountains, Haines enjoys a climate which is characteristically drier than most of the southeast throughout the year—slightly cooler in winter and just as warm or warmer in the summer. Temperatures range from 10 to 21 °C in the summer and -12 to 2 °C in winter.

The prevailing winds over Lynn Canal are northerly throughout much of the year except during the summer months when they are southeasterly, weaker and more variable. Throughout the year the prevailing winds bring relatively warm, nearly saturated air into Southeast Alaska. In winter, a high-pressure area will frequently develop over northern British Columbia and the Yukon Territory while a strong low-pressure area is centered over the western Gulf of Alaska. The resulting large pressure gradient generates extremely strong winds that blow through the mountain passes and down Lynn Canal. The funneling effect of the mountains that surround Lynn Canal causes winds to be channeled in a northerly or

southerly direction. Occasionally during the winter, extremely strong down slope winds occur. These winds may blow steadily at 32 to 48 kilometers per hour with gusts occasionally over 80 kilometers per hour.

Mean annual precipitation in Haines is 152 cm. Mean annual snowfall for Haines is 336.8 cm.

2.1.4 Tides and Currents

The mean tide range at Haines is 4.33 meters and the diurnal range is 8.02 meters. The tides are generally diurnal with two highs and two lows occurring daily. Tide levels at Haines are indicated in table 1. Extreme high water levels result from the combination of astronomic tides and rises in local water levels due to atmospheric and wave conditions. Water surface elevations have been recorded as high as +6.9 meters and as low as –1.83 meters at Haines under combinations of extreme high or low pressure systems and tides.

Table 1. Tide Levels at Haines, Alaska

Tide	Level, m (MLLW)
Highest Tide (predicted)	+6.49
Mean Higher High Water (MHHW)	+5.12
Mean High Water (MHW)	+4.82
Mean Low Water (MLW)	+0.49
Mean Lower Low Water (MLLW)	0.0
Lowest Tide (predicted)	-1.52

Source: NOAA National Ocean Service

The regional currents in Portage Cove and Chilkat Inlet are driven primarily by tides and only partially by wind. Discharge from the Chilkat River also affects currents in Chilkat Inlet near the mouth of the river during high flows. In general, current velocities average 5.1 to 25.7 cm/sec along the western shores of Portage Cove and eastern shores of Chilkat Inlet. The wind driven component of the currents in the project vicinity is variable and depends on wind velocity. A maximum flood current velocity of 25.7 cm/sec and a maximum ebb current velocity of 41.1 cm/sec are predicted in *Tides & Currents* 1997 for Haines area.

2.1.5 Ice Conditions

Sea ice is absent in Portage Cove Bay during the summer and winter months. In general, the waters of Southeast Alaska's Inside Passage are ice-free year round. Some local icing conditions along the shoreline can occur during extreme cold temperatures where fresh water enters Portage Cove at the creek mouths. Strong low-pressure systems, associated with storms in winter, generally bring warmer temperatures that prevent the formation of significant quantities of ice. Some ice has been reported in the existing harbor area from local minor freshwater sources, but it is relatively short lived. Ice can form in protected bodies of water, such as harbors, if freshwater enters the harbor, and wind and wave action do not disperse it.

Letnikof Cove can experience significant icing during northerly winds and under certain conditions in the Chilkat River. Extreme cold conditions during the winter months have caused severe icing problems at the existing float system. Ice destroyed several floats during

the winter of 1998. Extensive repairs were required to restore the harbor to service. At present, the harbor at Letnikof Cove is only used during the summer months.

2.2 Biological Resources

The natural resources of the Haines area are vital to the well being of the community. Commercial fishing is a significant part of the local economy. Subsistence fishing is an important food source for residents of the Haines Borough and expenditures by visiting and local sport fishermen are important to local businesses in the retail and trade sector. Fish harvesting, particularly a local gillnet fleet, has always been an important contributor to the Haines economy. Salmon is dominant in the area. Five species of Alaskan salmon are available in the area: chinook, chum, coho, pink, and sockeye. Although the commercial shellfish and halibut fishery in Lynn Canal is limited, both fisheries contribute to the economy.

2.3 Economic Base

In recent history the Haines economy has been based on commercial fishing, timber, government, tourism and construction. A detailed description of the economic base for Haines is provided in section 1.6 of the Economic Appendix of this report.

2.4 Problem Description

The existing harbor is inadequate in terms of size and design to accommodate the existing demands of resident and transient users. During the summer season, extending from June through September, the harbor is overcrowded and numerous vessels are either turned away or simply avoid the harbor because vessel captains know that the harbor is full, beyond its design capacity. Overcrowded conditions in the harbor result (1) in delays in entering and maneuvering in the harbor; (2) in hot-berthing where transient vessels are moored in stalls of resident vessels left vacant; (3) in rafting of transient vessels; and (4) in damages to vessels and harbor facilities.

Sixty percent of the vessels permanently moored in the existing harbor exceed the design length of the slips they occupy. Larger vessels requesting moorage at Haines have to use alternate facilities, adding to the cost of their operations or have postponed expansion needed to meet the operational demand. Additional moorage is also needed to improve or provide services such as oil spill response, water taxi service, and to reduce costs associated with subsistence harvesting. The current harbor configuration is exposed to southeast winds, causing reduced maneuverability for vessels, and damage to vessels and harbor facilities.

3.0 PLAN FORMULATION

3.1 Planning Criteria

3.1.1 National Economic Development Objective

The objective of Federal water and land resources planning is to contribute to the National Economic Development (NED) in a way that protects the Nation's environment. NED features are those that increase the net value of goods and services provided to the economy of the United States as a whole. Only benefits contributing to the NED may be claimed for economic justification of the project.

Commercial navigation improvements at Haines represent a high priority under the current administration guidelines. Resource planning must be consistent with the NED objective and consider economic, social, and environmental as well as engineering factors. The following objectives and criteria are guidelines for developing alternative plans and are used to evaluate those plans.

3.1.2 Planning Objectives For Haines Harbor

- To reduce damages to vessels incurred from the overcrowded conditions in the existing harbor.
- To reduce travel costs incurred from the overcrowded conditions in the existing harbor.
- To reduce float maintenance costs incurred by the current lack of protection in the existing harbor.
- To help the development of the tourism industry, and to increase recreation benefits.

3.1.3 Engineering Criteria

The plans should be adequately sized to accommodate user needs and provide for development of harbor-related facilities. They should protect against wind-generated waves and boat wakes. Adequate depths and entry are required for safe navigation. The plans must also be feasible from an engineering standpoint and capable of being economically constructed.

The State of Alaska's recommended engineering guidelines include the following for harbor construction:

- The ratio of upland area to mooring basin area should be at least 0.2 for basic parking and minimal support facilities. If there will be dry storage for boats, boat ramps, and/or public green areas, this could be increased to about 1.0.
- The maximum distance from nearest parking to farthest berth should be no more than 183 meters.
- The maximum distance from farthest parking to farthest berth should be no more than 305 meters.

- Average spatial values greater than 0.30 will provide for acceptable harbor basin flushing. It is also recommended that no more than 5 percent of the basin have values less than 0.15. Another criterion for water quality and circulation is the aspect ratio of the basin. Generally, aspect ratios of greater than 0.3 and less than 3.0 are desirable.

3.1.4 Economic Criteria

Principles and guidelines for Federal water resources planning require a plan to be identified that produces the greatest contribution to the NED plan. The NED plan is defined as the plan providing the greatest net benefits as determined by subtracting annual costs from annual benefits. The Corps of Engineers' policy requires recommendation of the NED plan unless there is adequate justification to do otherwise.

All alternatives considered to meet project needs should be presented in quantitative terms where possible. Benefits attributed to a plan must be expressed in terms of a time value of money and must exceed equivalent economic costs for the project. To be economically feasible each separate portion or purpose of the plan must provide benefits at least equal to the cost of that unit. The scope of development must be such that benefits exceed project costs to the maximum extent possible. The economic evaluation of alternative plans is on a common basis of October 2002 prices, a project life of 50 years, and an interest rate of 6-1/8 percent.

3.1.5 Environmental Criteria

Environmental considerations include (1) identifying forms of aquatic life and wildlife that might be impacted by a plan's implementation, (2) minimizing disruption of the area's natural resources, (3) maintaining consistency with the Alaska Coastal Management Program, and (4) using measures to protect or enhance existing environmental values.

3.1.6 Social Criteria

Plans considered must minimize adverse social impacts and must be consistent with state, regional, and local land use and development plans, both public and private. The selected plan must be acceptable to the non-federal sponsor.

3.2 Description of Alternative Plans

3.2.1 Design Fleet

A design fleet is indicated in table 2 and was used for the development of designs during the site and alternative plan selection process. The design fleet is based on information from the moorage demand analysis. The design vessel is 36 meters long with a beam of 9.8 meters and a draft of 3.0 meters. From this information basin and channel size and depths were calculated. The various sites were then evaluated for their ability to efficiently provide adequate moorage.

Table 2. Preliminary Design Fleet Vessel Summary

Float size (m)	7.3	9.1	12.2	15.2	21.3	24.4	27.4	36.6	42.7	No. Vessels	Ln. m. of Float
Vessel size (m)	<7.6	7.6-9.1	9.4-12.2	12.5-15.2	15.5-21.3	21.6-24.4	24.7-27.4	30.5-36.6	36.6-42.7		
Commercial Fishing Vessels											
w/moorage	0	2	50	8	1	0	0	1	0	62	
w/o moorage	0	3	19	20	13	3	1	1	1	61	
transient										31	731.5
									Subtotal	154	
Charter Vessels											
w/moorage	0	2	6	0	0	0	0	0	0	8	
w/o moorage	0	0	1	5	0	2	0	0	0	8	
									Subtotal	16	
Other Commercial Vessels											
w/moorage	0	3	0	1	0	0	0	0	0	4	
w/o moorage	0	0	1	1	3	1	0	1	0	7	
transient										2	134.1
									Subtotal	13	
Subsistance/Recreational											
w/moorage	38	10	16	4	0	0	0	0	0	68	
w/o moorage	25	26	5	3	1	1	0	0	0	61	
transient										15	228.6
									Subtotal	144	
Total Moorage Demand 1/	63	46	98	42	18	7	1	3	1	279	
w/transient vessels	0	31	1	3	8	5	0	0	0	327	
Existing Slips	55	72	13	1	1	0	1	0	0	143	

1/ Total moorage does not equal “total fleet” because of adjustments to account for currently vacant slips.

3.2.2 No Action

If no Federal action is taken, commercial and recreational vessels will continue to incur significant annual operating and maintenance expenses associated with overcrowded conditions. These same over-crowded conditions will continue to cause increased operating and maintenance costs for the existing harbor. Vessels will continue to be turned away, incurring significant expenses associated with travel to alternate harbors. Damage to the boats and exiting floats will continue to occur without providing adequate protection from wave exposure from the south. The tourism industry will continue to under realize it’s potential, by not having space available for the popular day cruise vessels.

3.2.3 Nonstructural Alternatives

There are two main alternatives for operators of commercial and recreational vessels unable to secure moorage space:

A. Remove the vessel from the water – Dry storage can potentially damage vessels and is a costly expense. These vessels would have to be hauled and stored at sites other

than near the harbor because of lack of existing upland space for this purpose. In addition, the vessels are not readily available for use.

B. Seek shelter in other harbors – Other harbors in the southeast portion of Alaska also experience the same overcrowded conditions with long wait lists. The cost of traveling is high, and the vessels cannot be readily available.

3.2.4 Structural Alternatives.

Consideration was given to the different methods for wave attenuation for the new and existing basin. One method considered was the construction of vertical walls referred to as wave barriers. Due to the high winds, apparent depths, and tidal range where these structures would be placed, it was determined they would not be cost effective. Though these structures take up a smaller footprint, they create barriers that are not preferred for marine habitat. A floating breakwater has the status of being preferred with regard to marine habitat but is not suited for the wave conditions experienced at Haines. A rubblemound structure is presently in place at the Portage Cove site, and materials for additional construction of this kind of structure are available nearby. The current structure has performed quite well with no major maintenance required over 25 years. As the design effort progresses further evaluation of these different methods will be done and documented in the HH appendix. For now all designs incorporate rubblemound structures for comparison.

3.2.5 Preliminary Alternatives Screening

The development of structural alternatives began with a site identification and screening process. Five sites were identified for consideration. They are: Flat Bay, Paradise Cove, Lutak Inlet, Portage Cove, and Letnikof Cove. All possible sites were evaluated based upon the criteria for completeness, effectiveness, efficiency, and acceptability established by the project study team considering engineering, economic, environmental, and social impacts as they relate to the sites ability to alleviate the specified problems and achieve the specified opportunities. Figure 2 shows the location of the sites considered.

The results of the preliminary analysis indicated that Flat Bay, Paradise Cove, and Lutak Inlet did not meet the above outlined criteria and would not produce feasible sites to satisfy the identified navigation problem. Therefore, they could be eliminated from consideration. The following is a description of the three sites eliminated and the reasons why they were removed from further consideration.

Figure 3. Flat Bay

Flat Bay – Flat Bay is located on the east side of the Chilkat Peninsula, approximately 16 kilometers south of the City of Haines. The site was selected from aerial photographs and the nautical chart because it has natural protection from the waves coming directly up Chilkoot Inlet. The proposed site is protected from the south by a portion of natural breakwaters. The location of the site is far from the population center and not within walking distance. The location of the site also may require the installation of utilities and other harbor infrastructure. There is also no natural wind protection. The site is directly exposed to the prevailing southeast wind. This wind and wave climate would require more costly structures for harbor protection. With significant amounts of freshwater running in to the bay, the site would have a tendency to ice up during the winter months, which has the potential to eliminate the use of the harbor during the winter months. The adjacent land is all privately owned with the primary use being residential. This would require extensive costs for land acquisitions. It is anticipation that there would be social resistance to any development in this area. The soils at the site are made up of a mix of boulders and silty, loose soils, not suitable for upland development. Fill for uplands would have to be brought in to provide a base for development. The silty loose soil also poses a stability risk, especially during a seismic event. Figure 3 shows a view of Flat Bay.

The site was eliminated because of the lack of efficiency for solving the identified problem at Haines. As shown in table 3 additional costs would be associated with bringing utilities and access to the site. Further costs would be the need for additional harbor personnel, offices and vehicles. Public and agency opposition to development in this area reduce the acceptability of the site making implementation of a plan more difficult and thus requiring additional resources to create acceptable alternatives at this site.

Figure 4. Paradise Cove

Paradise Cove – Paradise Cove is located on the west side of the Chilkat Peninsula, approximately 13 kilometers south of the City of Haines. The location of the site is far from the population center and not within walking distance. The existing road accessing the site would need to be improved from its current condition. The location of the site also would require the installation of utilities and other harbor infrastructure. Although the site is a naturally protected cove, the cove has a limited amount of protected area. Harbor design would be limited on expansion capability. The adjacent land is all privately owned with the primary use being residential. The site material is characterized by rock and boulders, which may require extensive blasting. The steep drop off shore, may make construction more costly. Figure 4 shows a view of Paradise Cove.

Like Flat Bay this site was eliminated because of the lack of efficiency for solving the identified problem at Haines. As shown in table 3 additional costs would be associated with bringing utilities and access to the site. Further costs would be the need for additional harbor personnel, offices and vehicles. Public and agency opposition to development in this area reduce the acceptability of the site making implementation of a plan more difficult and thus requiring additional resources to create acceptable alternatives at this site.

Figure 5. View of Lutak Inlet with proposed site in the background.

Lutak Inlet – The existing ferry terminal is located on the edge of the Lutak Inlet. This site is also far from the population center. The lack of a harbormaster's office would create a security concern, or the cost of more personnel with the construction of additional harbor master facilities. Because of the mountainous terrain, there is limited area for upland development. The water in this area is deep, making the construction of a rubblemound breakwater too expensive. High wave exposure eliminates the use of a floating breakwater. Construction in the area would impact ferry operations and possible impact the military tank farm site. Figure 5 shows a view of the Lutak Inlet site.

This site was eliminated because of the inability to provide an acceptable alternative at this site. A feasible solution to provide protected moorage is not seen as possible due to the depths nor could alternative wave attenuation structures effectively create a protected moorage basin.

This exercise left two potential project sites, Letnikof Cove, shown in figure 6, and Portage Cove, shown in figure 7. A more detailed screening was conducted of the potential sites. The criteria for evaluating potential harbor sites to satisfy the harbor demand were identified and compiled into a matrix with the cooperation of coastal engineers at the Alaska Department of Transportation and Public Facilities (ADOT&PF). The matrix is composed of three main categories (physical characteristics, harbor uplands, environmental compatibility) with relative weights assigned to the items under each category. Table 3 shows the matrix evaluation.

Figure 6. Letnikof Cove

Figure 7. Portage Cove

Table 3. Site Selection Criteria For Haines Navigation Improvements At Potential Sites

	Wght	Portage Cove		Letnikof Bay		Paradise Cove		Flat Bay		Lutak Inlet	
	(1–10)	Rank[1]	Tot.	Rank	Tot.	Rank	Tot.	Rank	Tot.	Rank	Tot.
Basin area	7	5	35	5	35	5	35	5	35	5	35
Basin/Channel depth	7	3	21	5	35	5	35	4	28	5	35
Ease of Navigation (reefs, hazards, obstructions, etc.)	3	5	15	5	15	5	15	3	9	5	15
Expandability (during study)	3	5	15	4	12	2	6	3	9	5	15
Swell and surge	0	5	0	5	0	5	0	5	0	5	0
Local waves in proximity of protective structures	8	3	24	5	40	4	32	1	8	3	24
Wind protection	7	2	14	1	7	3	21	1	7	3	21
Bottom suitable for piles	7	4	28	4	28	2	14	2	14	4	28
Depth suitable for piles	7	5	35	1	7	1	7	5	35	2	14
Foundation material (rubble-mound breakwaters)	8	3	24	1	8	1	8	2	16	3	24
Use of dredged material	6	5	30	4	24	4	24	1	6	4	24
Dredgability	7	4	28	4	28	2	14	3	21	4	28
Seismic risk	5	4	20	4	20	4	20	2	10	4	20
Ice/fresh water	9	4	36	1	9	3	27	2	18	3	27
Sedimentation (littoral processes)	7	5	35	5	35	5	35	3	21	5	35
Conflicts with other facilities	10	3	30	4	40	4	40	4	40	2	20
Proximity to community	8	5	40	3	24	1	8	1	8	1	8
Subtotal		**70**	**430**	**61**	**367**	**56**	**341**	**47**	**285**	**63**	**373**
Harbor Uplands:											
Land ownership / Availability	5	4	20	3	15	2	10	2	10	1	5
Competing uses	5	5	25	4	20	1	5	1	5	1	5
Ease of development (topography, etc.)	8	4	32	1	8	2	16	3	24	1	8
Pedestrian (shore) Access	6	5	30	2	12	3	18	4	24	1	6
Vehicle access - users, emergency response, etc.	10	5	50	4	40	1	10	1	10	1	10
Vessel security (vessels visible from harbormaster's office)	7	5	35	1	7	1	7	1	7	1	7
Congestion	5	3	15	3	15	5	25	5	25	1	5
Availability of utilities	5	5	25	3	15	1	5	1	5	2	10
Subtotal		**36**	**232**	**21**	**132**	**16**	**96**	**18**	**110**	**9**	**56**
Existing habitat											
Anadromous & commercially significant fish	10	3	30	3	30	3	30	3	30	3	30
Intertidal marine habitat (incl. eel grass beds, kelp beds)	10	2	20	5	50	1	10	1	10	3	30
Birds, marine mammals, land mammals	10	3	30	5	50	1	10	1	10	3	30
Endangered species	10	4	40	5	50	1	10	1	10	4	40
Sewage Outfall	5	3	15	5	25	5	25	5	25	5	25
Ambient water quality (circulation and flushing)	9	4	36	5	45	5	45	5	45	5	45
Mitigation measures	9	5	45	5	45	5	45	5	45	5	45
Archeological / Historical Sites	8	3	24	5	40	5	40	5	40	5	40
Social / Cultural Considerations	8	3	24	5	40	1	8	1	8	3	24
Dredging											
Dredged Material Disposal Sites	8	5	40	3	24	1	8	1	8	5	40
Contaminant Potential of Dredged Material	8	3	24	5	40	4	32	5	40	2	16
Subtotal		**38**	**328**	**51**	**439**	**32**	**263**	**33**	**271**	**43**	**365**

	Wght	Portage Cove		Letnikof Bay		Paradise Cove		Flat Bay		Lutak Inlet	
	(1–10)	Rank[1]	Tot.	Rank	Tot.	Rank	Tot.	Rank	Tot.	Rank	Tot.
Totals		144	990	133	938	104	700	98	666	115	794
		Additinal Costs associated with development of sites ($000)									
Road access ($312k/ kilometer)		0		0		1,560		2,184		0	
Additional Harbor Personnel/ vehicle($50k annual)		0		50		50		50		50	
Harbor office ($1,345/m2 x 74 m2)		0		100		100		100		100	
Land acquisition ($247k/ha waterfront)		0		0		200		200		0	
B/W maintenance. (Reflects higher cost for Floating b/w ($19k annual)		0		19		19		0		19	
Total Additional initial Cost		0		100		1,760		2,384		100	
Total Additional Annual Cost		0		69		69		50		69	

Note: Costs shown reflect requirements to achieve same level of NED benefits; [1]Ranking: Very good (5), Good (4), Fair (3), Poor (2), Very poor (1)

3.2.6 Conclusions for Site Selection

The result of this exercise determined that Portage Cove was the preferable site over Letnikof Cove as well as the others evaluated. The Portage Cove site for expansion was also considered environmentally preferred over the Letnikof Cove site in the Draft Fish and Wildlife Coordination Act Report (CAR) for the Haines harbor expansion project. Alternatives designed at Letnikof Cove would not be as effective as Portage Cove at providing protected moorage. Currently the floats located at this site receive damage due to icing because of the freshwater in the cove. Depths at the site greatly reduce the sites ability to efficiently provide protected moorage from the waves and wind associated with this site. And because of the agencies preference for development at Portage Cove over Letnikof Cove increased implementation costs associated with mitigation would reduce the sites ability to produce an acceptable alternative. Based on the recommendations from agency and local participation and matrix evaluation, only the Portage Cove site is carried forward for detailed analyses.

3.3 Site Considered in Detail

The Portage Cove site is the preferred site based on the preliminary analyses. This site is also the locally preferred location.

Portage Cove is already utilized for navigation with an existing harbor, a city owned cruise ship dock, and a privately owned water taxi dock. The site bathymetry is gradually sloping near shore. The existing rubblemound breakwater structure for the harbor is constructed in depths that reach –6 m MLLW. These depths make rubblemound breakwater construction cost-effective. Depths for a proposed basin just north of the existing harbor range from 3 to –6 m MLLW.

Upland and water disposal sites were evaluated during the study process. Although an upland disposal site could be made available for the project and would be less environmentally damaging, it would have been cost prohibitive. Cost for upland disposal would be significantly more expensive than water disposal due to the double handling of the material and additional real estate interest necessary. The material is unsuitable for breakwater construction or to be used as fill. Some of the material is to be used to create tide pools as mitigation.

In 1976 approximately 6,000 yd^3 of material dredged from the existing harbor was disposed in the area shown in figure 2. The site is located in depths of 55 meters of water, approximately 1.2 kilometers east and offshore from the existing harbor in Portage Cove. A square area measuring 0.47 kilometer by 0.47 kilometer would be designated for disposal of the dredged material. The material would likely be transported to the site by barge or dump scow. Bottom samples were obtained from the deep-water disposal area to characterize the bottom habitat. The similarity of the dredged material to the disposal site bottom substrate is likely which would tend to have less environmental alteration.

To avoid adverse impacts to the fish migration along the shore, a near-shore gap would be constructed in the breakwaters. This would allow fish to remain in the shallow water near shore and minimize the threat of deep-water predation.

There is no history of mining operations, industrial processes, or spillage of hazardous material at this site. Therefore, no potential HTRW concerns are anticipated.

Rock for the breakwaters was sized using the 50-year design wave. There was minimal difference in cost between rock sized for a 25-year event versus a 50-year event. Rock would likely be trucked from a local quarry to the project location. The quarry within the project vicinity has the capacity to produce rock for either a 25-year event or a 50-year event. Using the 25-year design rock does not result in an overall cost savings due to the probability of additional replacement actions that would be required throughout the life of the project. A 75 or 100-year design would reduce the chance of needed maintenance. A 50-year design provides the best balance between minimizing maintenance and keeping the rock cost reasonable. The loss of a small amount of armor stone over time would have little to no effect on the operation and use of the harbor, therefore, there was not sufficient justification for basing the design beyond the 50-year level.

3.4 Preliminary Alternative Design Screening

The next step taken in the development of alternatives evaluated various configurations of harbor layouts to meet the planning objectives using the Portage Cove site. The layouts incorporated varying amounts of the existing harbor to see if cost savings could be realized from their use for the additional moorage needed.

These designs were then presented at an onsite meeting with stakeholders from the community and various agencies. Designs presented at the meeting are shown in figure 8. The existing harbor configuration is shown in the top left of figure 8. The outcome of the meeting was the selection of 3 design concepts. The three selected designs are shown in figure 9.

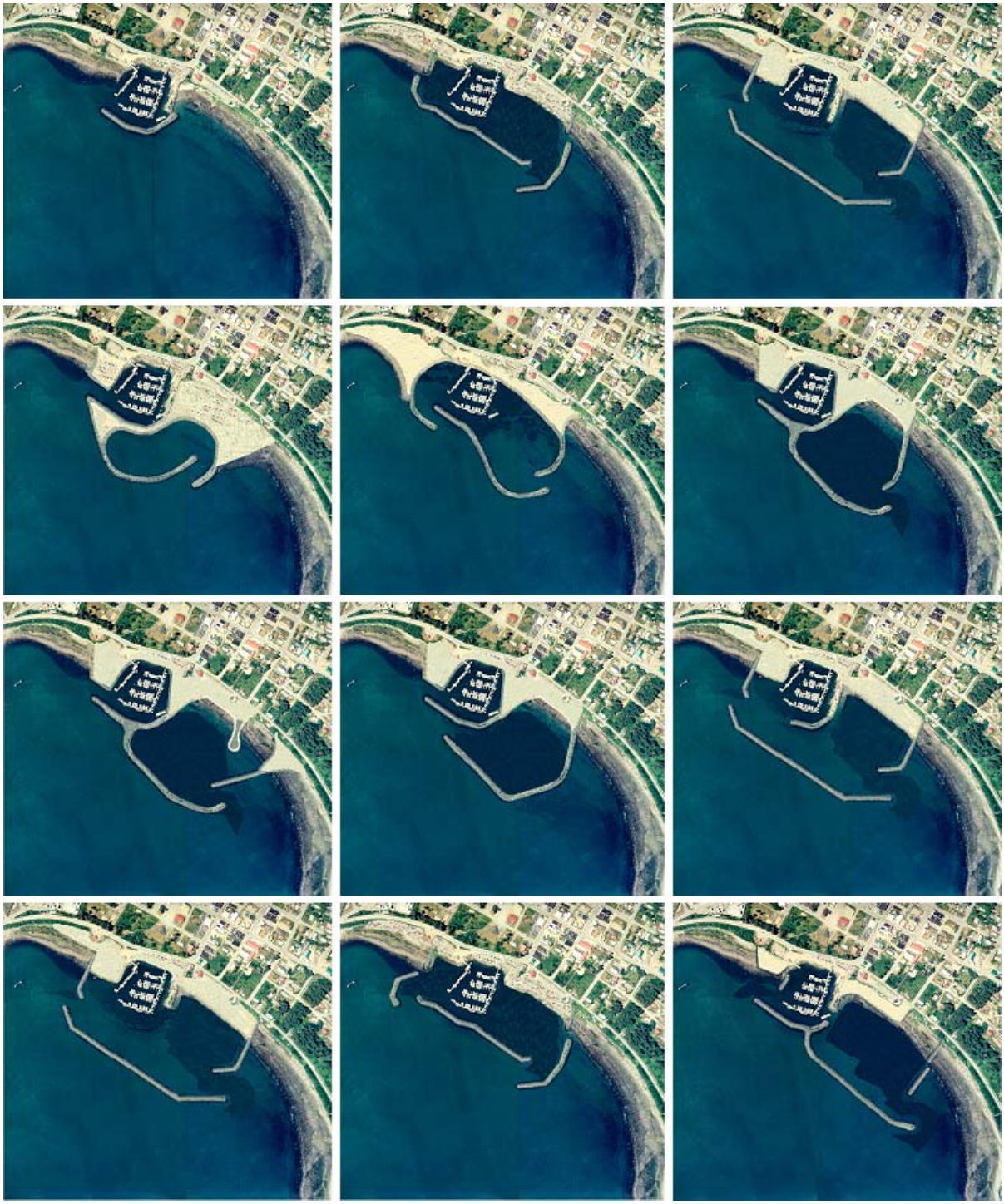

Figure 8. Preliminary Design Concepts: (Existing harbor show at top left of figure)

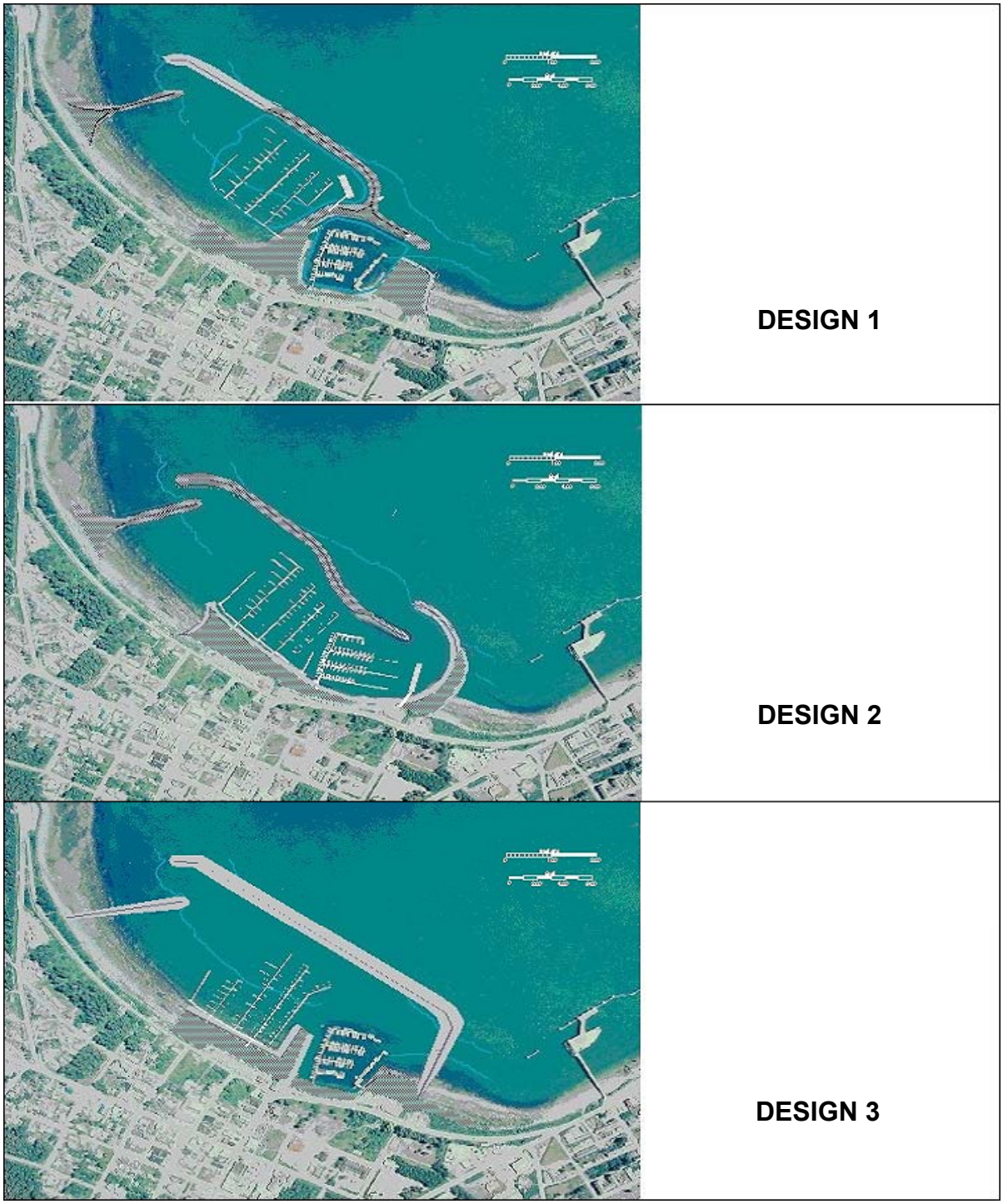

Figure 9. Designs Selected for Further Analysis

Using the data gathered from the economic analysis, four fleet sizes were picked to perform a preliminary evaluation of the 3 design concepts. The design concepts would each be sized to accommodate the various sized fleets derived from the moorage demand.

The first fleet option sought to provide adequate moorage of the existing 142 permanently moored vessels in Haines harbor. The economic analysis found that more than 60 percent of the existing vessels are larger than their assigned stalls were designed for. To provide

moorage for the existing fleet in properly designed slips and maneuvering channels, an additional .63 hectares of basin would be required. The total basin needed is 2.8 hectares. This option was dropped from further analysis because the benefits associated with this option could not cover the cost of the floats, dredging and additional protection needed. Furthermore this option did not take care of most of the planning objectives identified in this study.

Fleet option two would provide moorage for the existing permanently moored fleet and the 61 waitlisted and 31 transient commercial fishing vessels listed in the moorage demand analysis. Providing moorage for this fleet would capture 80 percent of the potential benefits listed in the economic analysis. The total basin needed is 6.6 hectares.

Option three incorporates the fleet of option 2 with the addition of the remainder of other commercial vessels listed in the moorage demand analysis. This list includes the addition of 8 waitlisted charter vessels including future charters, 7 other commercial vessels waitlisted, and 2 additional commercial transient vessels. This option provides moorage for all vessels listed as commercial in the moorage demand analysis. The total basin needed is 7.5 hectares.

The entire fleet identified in the moorage demand analysis is accommodated in option 4. This includes commercial as well as recreational/subsistence vessels desiring moorage at Haines. Permanent moorage for 279 vessels and 1095 lineal meters of transient moorage are to be accommodated for in the design of alternatives with this fleet. The total basin needed is 8.2 hectares.

The benefits attributed to the fleet options are listed in table 4. A detailed description of the benefit categories can be found in the economic appendix.

Table 4. Benefits associated with Fleet options

Option 1: Expanded existing harbor to provide properly sized slips to vessels with current moorage.			
Type of Benefits Realized		Amount ($)	
Oversized Vessel Delays	Commercial Fishing	70,777	
	Charter	5,410	
	Other Commercial	9,918	
	Pleasure/Subsistence	16,175	
	Subtotal	**102,281**	
Weather Delays	Commercial Fishing	49,424	
	Charter	3,778	
	Other Commercial	6,926	
	Subtotal	**60,127**	
Vessel Damages 1/	Commercial Fishing	15,251	
	Charter	1,166	
	Other Commercial	2,137	
	Subtotal	**18,554**	
Harbor Facilities Damages 1/	Commercial Fishing	2,055	
	Charter	157	
	Other Commercial	288	
	Subtotal	**2,500**	
1/ Realizes one-half of potential benefits.	**Total Benefits**	**183,461**	**Vessels Accommodated = 142**
Option 2: Option 1 plus moorage for resident and transient commercial fishing vessels.			
Type of Benefits Realized		Amount ($)	
Benefits from Option 1		**183,461**	
Rafting Delays	Commercial Fishing	27,519	
Hot-Berthing Delays	Commercial Fishing	16,694	
Vessel Damages	Commercial Fishing 1/	15,251	
Harbor Facilities Damages	Commercial Fishing 1/	2,055	**Vessels Accommodated:**
Salmon and Halibut Landings		733,005	**Permanent = 203**
	Increase in Benefits	**794,524**	**Transient = 31**
1/ Realizes one-half of potential benefits.	**Total Benefits**	**977,985**	**Total = 234**
Option 3: Option 2 Plus All Other Commercial Vessels			
Type of Benefits Realized		Amount ($)	
Benefits from Option 2		**977,985**	
Rafting Delays	Charter & Other Commercial	5,959	
Hot-Berthing Delays	Charter & Other Commercial	3,615	
Vessel Damages	Charter & Other Commercial 1/	3,303	
Harbor Facilities Damages	Charter & Other Commercial 1/	445	
Winter Moorage Cost Savings		3,600	
Large Cruise Ship Delays		31,375	**Vessels Accommodated:**
Oil Spill Response		87,730	**Permanent = 218**
	Increase in Benefits	**136,027**	**Transient = 33**
1/ Realizes one-half of potential benefits.	**Total Benefits**	**1,114,012**	**Total = 246**
Option 4: Option 3 Plus "Net" Pleasure/Subsistence Vessels			
Type of Benefits Realized		Amount ($)	
Benefits from Option 3		**1,114,012**	
Salmon Ice Operations		43,965	
Rafting Delays	Pleasure/Subsistence	3,820	**Vessels Accommodated:**
Hot-Berthing Delays	Pleasure/Subsistence	73,194	**Permanent = 274**
Vessel Damages		1,667	**Transient = 48**
Subsistence Harvest		194,163	**Total = 322**
	Increase in Benefits	**316,809**	
	Total Commercial Benefits	**1,430,822**	**Recreation vessels:**
Recreational Benefits	Charter Boat Operations	236,269	**(4 vessels)**
	Water Taxi Service	49,703	**(1 vessel)**

The benefits associated with accommodating the fleets were compared to the cost to capture the benefits using a parametric cost estimate. The comparison of the NED costs and benefits (October 2002 price levels) for the alternatives with the various fleet options is shown in table 5.

Table 5. Preliminary Comparison Of NED Costs And Benefits For Alternatives.

	Fleet option 2			Fleet option 3			Fleet option 4		
	Design 1	Design 2	Design 3	Design 1	Design 2	Design 3	Design 1	Design 2	Design 3
Construction Contract Cost	**$17,987,070**	**$21,636,210**	**$21,775,950**	**$20,122,470**	**$23,909,790**	**$24,097,590**	**$22,294,110**	**$26,653,770**	**$26,039,790**
Lands and Damages	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000	$20,000
Planning, Engineering, and Design	$630,000	$630,000	$630,000	$630,000	$630,000	$630,000	$630,000	$630,000	$630,000
Construction Management	$750,000	$750,000	$750,000	$750,000	$750,000	$750,000	$750,000	$750,000	$750,000
Subtotal	$1,400,000	$1,400,000	$1,400,000	$1,400,000	$1,400,000	$1,400,000	$1,400,000	$1,400,000	$1,400,000
Project Cost	**$19,387,070**	**$23,036,210**	**$23,175,950**	**$21,522,470**	**$25,309,790**	**$25,497,590**	**$23,694,110**	**$28,053,770**	**$27,439,790**
Interest During Construction[a]	$1,196,000	$1,418,000	$1,427,000	$1,326,000	$1,557,000	$1,568,000	$1,458,000	$1,724,000	$1,686,000
NED Investment Cost	**$20,583,070**	**$24,454,210**	**$24,602,950**	**$22,848,000**	**$26,866,790**	**$27,065,590**	**$25,152,110**	**$29,777,770**	**$29,125,790**
Annual NED Cost (50 years at 6-1/8%)	$1,329,000	$1,579,000	$1,588,000	$1,475,000	$1,734,000	$1,747,000	$1,624,000	$1,922,000	$1,880,000
Annual OMRRR[b]	$53,000	$63,000	$63,000	$55,000	$69,000	$66,000	$59,000	$77,000	$68,000
Total Annual NED Cost	$1,382,000	$1,642,000	$1,651,000	$1,530,000	$1,803,000	$1,813,000	$1,683,000	$1,999,000	$1,948,000
Vessels Accommodated									
Permanent	203	203	203	218	218	218	279	279	279
Transient	31	31	31	33	33	33	48	48	48
Total	**234**	**234**	**234**	**251**	**251**	**251**	**327**	**327**	**327**
Annual Benefits									
Average Annual Benefits	$977,985	$977,985	$977,985	$1,399,984	$1,399,984	$1,399,984	$1,716,795	$1,716,795	$1,716,795
Benefits to Cost Ratio	0.7	0.6	0.6	0.9	0.8	0.8	1.0	0.9	0.9
Net Annual Benefits	-$404,015	-$664,015	-$673,015	-$130,016	-$403,016	-$413,016	$33,795	-$282,205	-$231,205

Note: Comparison used parametric costs for preliminary analysis. Alternatives developed further are presented later in this report using MCACES estimates

From this evaluation Design 1 with fleet option 4 appeared to be the most economically efficient plan in NED terms. This plan is referenced as Alternative 2. The plan that appears to be the next most efficient plan for capturing the NED benefits is Design 1 with fleet option 3. This plan is referenced as Alternative 1. Both of these alternatives were further designed and

evaluated along with an additional design alternative the local sponsor provided that incorporated betterments that provided desired regional and local benefits not captured in the other two designs. The third plan is reference as Alternative 3 and includes moorage space for vessels beyond those listed in the moorage demand. A fourth alternative was also created using the same configuration as alternative 3 but did not include additional moorage space beyond fleet option 4. This plan was called Alternative 4.

These alternatives were then further designed to ensure Corps and State of Alaska engineering standards were met and that State and Federal environmental regulations and laws would be satisfied. Figure 10 illustrates the four alternatives.

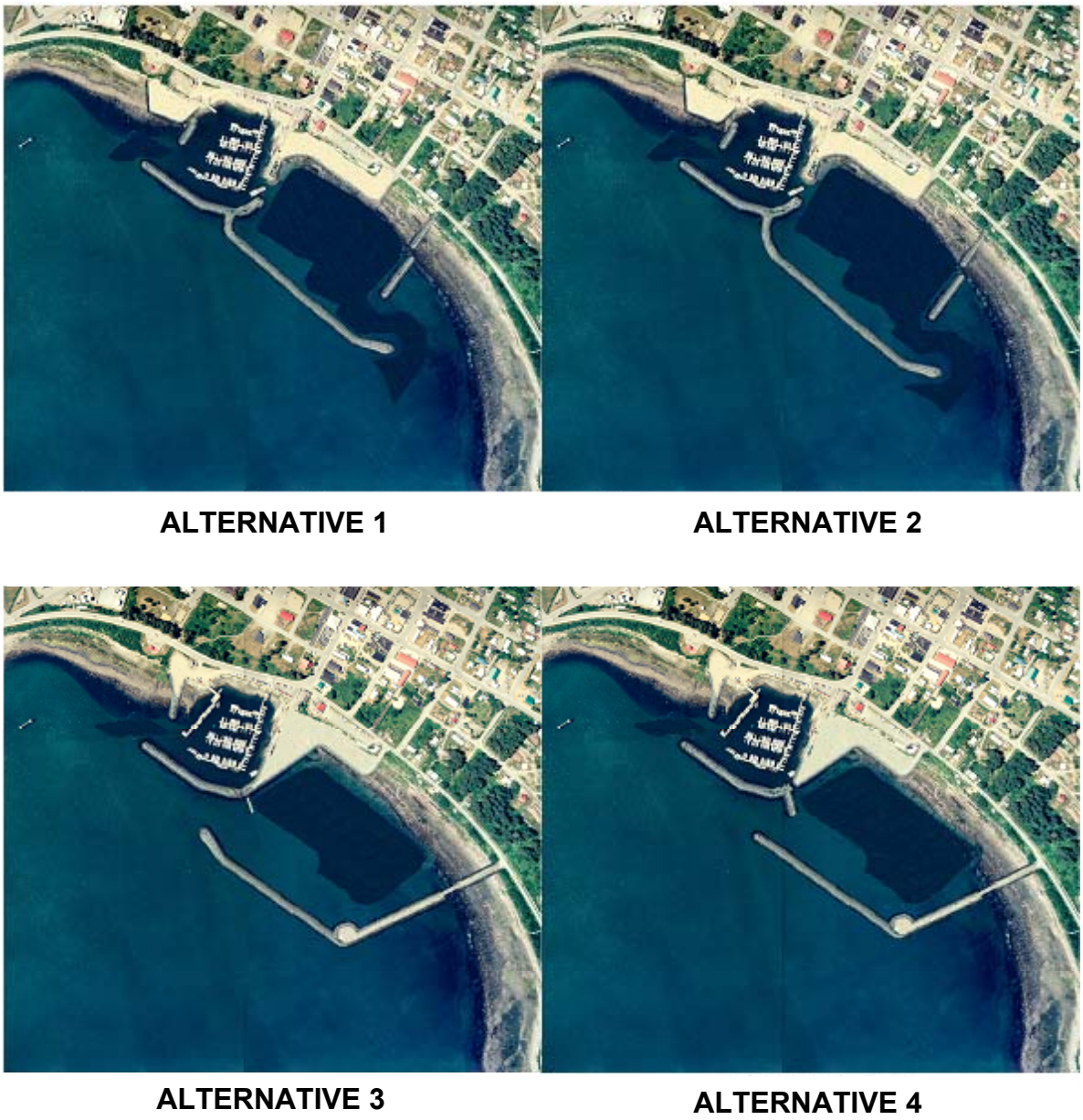

Figure 10. Four Alternatives

3.5 Description of Alternatives

3.5.1 Alternative 1

This alternative, shown in figure 11, incorporates the following rubblemound breakwaters: a 67-meter long north spur breakwater, a 92-meter long north breakwater, a 459-meter long main breakwater, a 62.2-meter long extension of the existing breakwater to the south, and a 49.9-meter long south spur breakwater. Foundation materials are silts and gravels underlain with lean clay, which would serve as a suitable base for the rubblemound structures. The breakwaters will have a crest elevation of 7.8 m MLLW and a crest width of 2.4 meters. The existing breakwater would be modified slightly by removing 46 meters of its length at its northern end. Two separate mooring basins would be created with this alternative.

The 2.25-hectare south basin (existing) would remain unchanged in size and depth; however additional wave protection would be provided, and the existing float system would be removed and the replacement system reoriented. Smaller vessels in the fleet would use the south harbor basin. Currently, the basin has depths of –3.7 m and –4.3 m MLLW. The new portion of the entrance channel into the south basin would be dredged to match the existing entrance channel depth of –4.6 m MLLW and oriented similar to the existing south entrance channel.

A small channel would be dredged to accommodate fish passage along the shoreward end of the south stub breakwater. This channel would be 5 meters wide by 51 meters long and be dredged to a depth of +1.75 m MLLW (replicating the existing fish passage at the northern limit of the existing harbor). This would allow continuous uninterrupted migration of fish through the harbor system by not altering the existing condition with respect to elevation and width of passage.

The 5.19-hectare north basin could accommodate the larger range of vessels in the fleet with stalls oriented with the prevailing wind direction. The north harbor entrance would be dredged to a depth of -5.5 m MLLW oriented with an approach around the end of the main breakwater and into the maneuvering area. Marker pilings would be placed along the outside of the dredged channel limits to guide mariners into the harbor. The north harbor basin would be step dredged to depths of –4.9 m and –4.3 m MLLW. The deeper portion of the mooring basin would be located nearest the entrance channel. The shallower portion would be located further into the harbor away from the entrance channel. The maneuvering area just inside the basin would be dredged to –4.9 m MLLW. A total combined maneuvering and mooring basin area of approximately 5.19 hectares would be available in the north basin for Alternative 1.

The mooring basin would accommodate a fleet of 218 permanently moored boats ranging in size from 5.5 meters to 42.7 meters and 866 lineal meters of transient float. The existing float system would be reconfigured for the new fleet. The entrance channels would be 37 meters wide, which is three and a half times the design beam width of the longest boat at 36 meters. The width of the entrance channels would allow for two-way traffic.

Dredging for this alternative material would be a total of 213,200 m^3. The dredged material is expected to consist primarily of lean clay with boulders. Disposal would be offshore approximately 4.8 kilometers from the proposed harbor in a designated deep-water disposal site. The disposal area has depths of up to 165 meters. In addition to the dredging

approximately 10,600 m^3 of material would be excavated from the existing breakwater. This material would be used in the construction of the new breakwater.

Shoaling of the entrance channel is expected to be minimal. Aerial photos of the existing project show some deposition of material that has occurred since the construction of the harbor but not in the depths where the entrance channel is to be constructed. Some sediment may enter the basin through the breaches in the breakwaters, but is expected to be minimal.

Maintenance dredging is expected to be minimal for the proposed plan. The existing project has not required any maintenance dredging in the past 25 years. Therefore, some accumulation of sediment may be encountered through the north breach. The amount of sediment would be expected to be minimal. Maintenance dredging would depend on storm conditions over the years but is expected to be infrequent if necessary at all.

3.5.2 Alternative 2

Alternative 2 is very similar in configuration to Alternative 1. The difference between the two is primarily the size of the northern basin. The breakwaters are slightly further offshore in deeper water and extend farther to the north on the north side. The modifications to the south existing basin are exactly the same as described in Alternative 1 above. As with Alternative 1, two separate mooring basins would be created. This alternative, shown in figure 12 incorporates the following rubblemound breakwaters: a 72.9-meter long north spur breakwater, a 109.4-meter long north breakwater, a 489.1-meter long main breakwater, a 62.2-meter long extension of the existing breakwater to the south, and a 49.9-meter long south spur breakwater.

The north harbor basin has a total combined maneuvering and mooring basin area of approximately 6.57 hectares would accommodate the larger range of vessels in the fleet with stalls oriented with the prevailing wind direction. The north harbor entrance would be oriented with an approach around the end of the main breakwater and into the maneuvering area. Marker pilings would be placed along the outside of the dredged channel limits to guide mariners into the harbor. The north harbor basin would be step dredged to depths of –4.9 m and –4.3 m MLLW. The deeper portion of the mooring basin would be located nearest the entrance channel. The shallower portion would be located further into the harbor away from the entrance channel. The maneuvering area just inside the basin would be dredged to –4.9 m MLLW.

This alternative provides a total of 8.8 hectares of basin. The mooring basins would accommodate a fleet of 279 permanently moored boats ranging in size from 5.5 meters to 42.7 meters and 1094 lineal meters of transient float. The existing float system would be reconfigured for the new fleet. The entrance channels would be 37 meters wide, which is three and a half times the design beam width of the longest boat at 36 meters in length. The width of the entrance channels would allow for two-way traffic. The depth of the entrance channel would be –5.5 m MLLW in the new basin. Basin depths would range from –4.9 m MLLW near the entrance channels to –4.3 m MLLW at the far end of the basins.

The dredged material is expected to consist primarily of lean clay with boulders. Dredged material would be a total of 232,100 m^3. Disposal would be offshore with approximately 4.8 kilometers from the proposed harbor in a designated deep-water disposal site. The disposal area has depths of up to 165 meters. In addition to the dredging approximately 10,600 m^3 of

material would be excavated from the existing breakwater. This material would be used in the construction of the new breakwater.

Foundation materials are silts and gravels underlain with lean clay, which would serve as a suitable base for the rubblemound structures. The breakwaters will have a crest elevation of 7.8 m MLLW and a crest width of 2.4 meters.

Shoaling of the entrance channel is expected to be minimal. Aerial photos of the existing project show some deposition of material that has occurred since the construction of the harbor but not in the depths where the entrance channel is to be constructed. Some sediment may enter the basin through the breaches in the breakwaters, but is expected to be minimal.

Maintenance dredging is expected to be minimal for the proposed plan. The existing project has not required any maintenance dredging in the past 25 years. Therefore, some accumulation of sediment may be encountered through the north breach. The amount of sediment would be expected to be minimal. Maintenance dredging would depend on storm conditions over the years but is expected to be infrequent if necessary at all.

3.5.3 Alternative 3

This alternative was designed to maximize the available mooring area within the north basin and incorporates a betterment by converting the north spur and first portion of the main breakwater into a causeway with a widened crest to accommodate vehicle access for a future dock to be located at the turn-around. The modifications to the south existing basin are exactly the same as described in the previous alternatives. As with the other alternatives, two separate mooring basins would be created. The main breakwater is located further offshore in deeper water and extends farther to the north on the north side than the previous two alternatives creating a larger basin that could accommodate vessels larger than those contained in the design fleet analyzed for this report.

This alternative, shown in figure 13 incorporates the following rubblemound breakwaters: a 103-meter long north spur breakwater, a 191-meter long first portion of the main breakwater, a turnaround portion of the main breakwater with a radius of 18.5 meters, a 325.9-meter long second portion of the main breakwater, a 51.2-meter long extension of the existing breakwater to the south, and a 33.3-meter long south spur breakwater. The existing breakwater would be unchanged except for the extension of the head to the south and the creation of a new fish passage channel near its northern angle point to replace the existing fish passage that would be filled by an intertidal fill project the city plans to construct in connection with this project. A concrete floating breakwater would be constructed and placed along the western edge of the new north entrance channel. The structure will reduce residual wave heights to acceptable levels inside the harbor by attenuation.

The 7.02-hectare north basin could accommodate the larger range of vessels in the fleet with stalls oriented with the prevailing wind direction. The north harbor entrance would be oriented with an approach around the end of the main breakwater and into the maneuvering area. The north harbor basin would be step dredged to depths of –4.3 m and –4.9 m MLLW with the deeper portion of the basin located in the northern half. The shallower portion of the mooring basin would be located nearest the entrance channel. The maneuvering area just inside the basin would be left undredged since natural depths are sufficient for maneuvering.

This provides a total of 9.27 hectares of basin. The mooring basins would accommodate the fleet of 279 permanently moored boats ranging in size from 5.5 meters to 42.7 meters and 1094 lineal meters of transient float and adds room for the potential of mooring and maneuvering of vessels up to 61 meters in length. The existing float system would be reconfigured for the new fleet. The entrance channels would be 37 meters wide, which is three and a half times the design beam width of the longest boat at 36 meters in length. The width of the entrance channels would allow for two-way traffic. The natural depths for the new basin are greater than the –5.5 m MLLW required for the entrance channel with the exception of a 0.03 hectare portion that would require dredging. Basin depths would range from –4.9 m MLLW near the entrance channels to –4.3 m MLLW at the far end of the basins. A total of 146,200 m^3 of dredging would be required for this alternative. The dredge material consisting mostly of clay, sand, and gravel would be disposed of in a deep-water area approximately 1.2 kilometers east of the basin offshore from the existing harbor.

As with the other alternatives shoaling of both entrance channels would not be expected since there is little evidence of significant long-shore transport of sediments at the site. There are no significant sources of sediment such as major rivers or creeks in the area. The north entrance channel would be located in deep water far offshore and would not be expected to experience shoaling. Similarly, the existing entrance channel has not required maintenance dredging and would not be expected to with this alternative.

Maintenance dredging of the new harbor basin would be minimal during the project life. It would depend on storm conditions and other factors over the years, but would be very infrequent if necessary at all.

3.5.4 Alternative 4

This alternative follows the same design as Alternative 3 but eliminated the extra basin area to accommodate vessels larger that the design fleet. Alternative 4 also incorporates a betterment by converting the north spur and first portion of the main breakwater into a causeway with a widened crest to accommodate vehicle access for a future dock to be located at the turn-around on the seaward side of the breakwaters.

The causeway is ultimately to be developed as a Intermodal Transfer Facility to support the fishing and tourism industry. The non-Federal sponsor would like to have the construction of the causeway to occur with the construction of the breakwater to take advantage of the costs savings that would occur by doing the work at the same time. No NED benefits have been identified with the construction of the causeway though from a regional or local viewpoint the costs associated with its construction are considered justified. The State of Alaska has indicated that the Fast Ferry system might be interested in utilizing the facility but could not confirm this. Also larger vessels than those identified to use the harbor could use this facility without interfering with operations of the harbor as proposed or other dock facilities currently used at Haines. The development of the causeway is an impact associated with the development of the harbor proposed and is included in the Environmental Assessment accompanying this report to assist in the permitting that will be required by the non Federal sponsor for their development of the causeway.

The modifications to the south existing basin are exactly the same as described in the previous alternatives. As with the other alternatives, two separate mooring basins would be

created. Because the basin is smaller than Alternative 3, the main breakwater is located in shallower depths for the main breakwater yet deep enough so no dredging is required for the entrance channel of the north basin.

This alternative, shown in figure 14 incorporates the following rubblemound breakwaters: a 103-meter long north spur breakwater, a 154-meter long first portion of the main breakwater, a turnaround portion of the main breakwater with a radius of 18.5 meters, a 316-meter long second portion of the main breakwater, a 46.7-meter long stub breakwater attached to the existing breakwater, a 51.2-meter long extension of the existing breakwater to the south, and a 33.3-meter long south spur breakwater.

The 6.60 hectare north basin could accommodate the larger range of vessels in the fleet with stalls oriented with the prevailing wind direction. The north harbor entrance would be oriented with an approach around the end of the main breakwater and into the maneuvering area. The north harbor basin would be step dredged to depths of –4.3 m and –4.9 m MLLW with the deeper portion of the basin located in the northern half. The shallower portion of the mooring basin would be located nearest the entrance channel. The maneuvering area just inside the basin would be left undredged since natural depths are sufficient for maneuvering.

This provides a total of 8.85 hectares of basin. The mooring basins would accommodate the fleet of 279 permanently moored boats ranging in size from 5.5 meters to 42.7 meters and 1094 lineal meters of transient float. The existing float system would be reconfigured for the new fleet. The entrance channels would be 37 meters wide, which is three and a half times the design beam width of the longest boat at 36 meters in length. The width of the entrance channels would allow for two-way traffic. The natural depths for the new basin are greater than the –5.5 m MLLW required for the entrance channel. Basin depths would range from –4.9 m MLLW near the entrance channels to –4.3 m MLLW at the far end of the basins. A total of 159,900 cubic meters (m^3) of clay, 3,300 m^3 of harder clay (diamictom), and 1,900 m^3 of boulders dredging would be required for Alternative 4. Dredged materials, with the exception of the boulders, would be disposed of in a designated area approximately 1.2 kilometers offshore and east from the harbor.

As with the other alternatives shoaling of both entrance channels would not be expected since there is little evidence of significant long-shore transport of sediments at the site. There are no significant sources of sediment such as major rivers or creeks in the area. The north entrance channel would be located in deep water far offshore and would not be expected to experience shoaling. Similarly, the existing entrance channel has not required maintenance dredging and would not be expected to with this alternative.

Maintenance dredging of the new harbor basin would be minimal during the project life. It would depend on storm conditions and other factors over the years, but would be very infrequent if necessary at all.

A comparison of the physical characteristics of the 4 alternatives is shown in table 6.

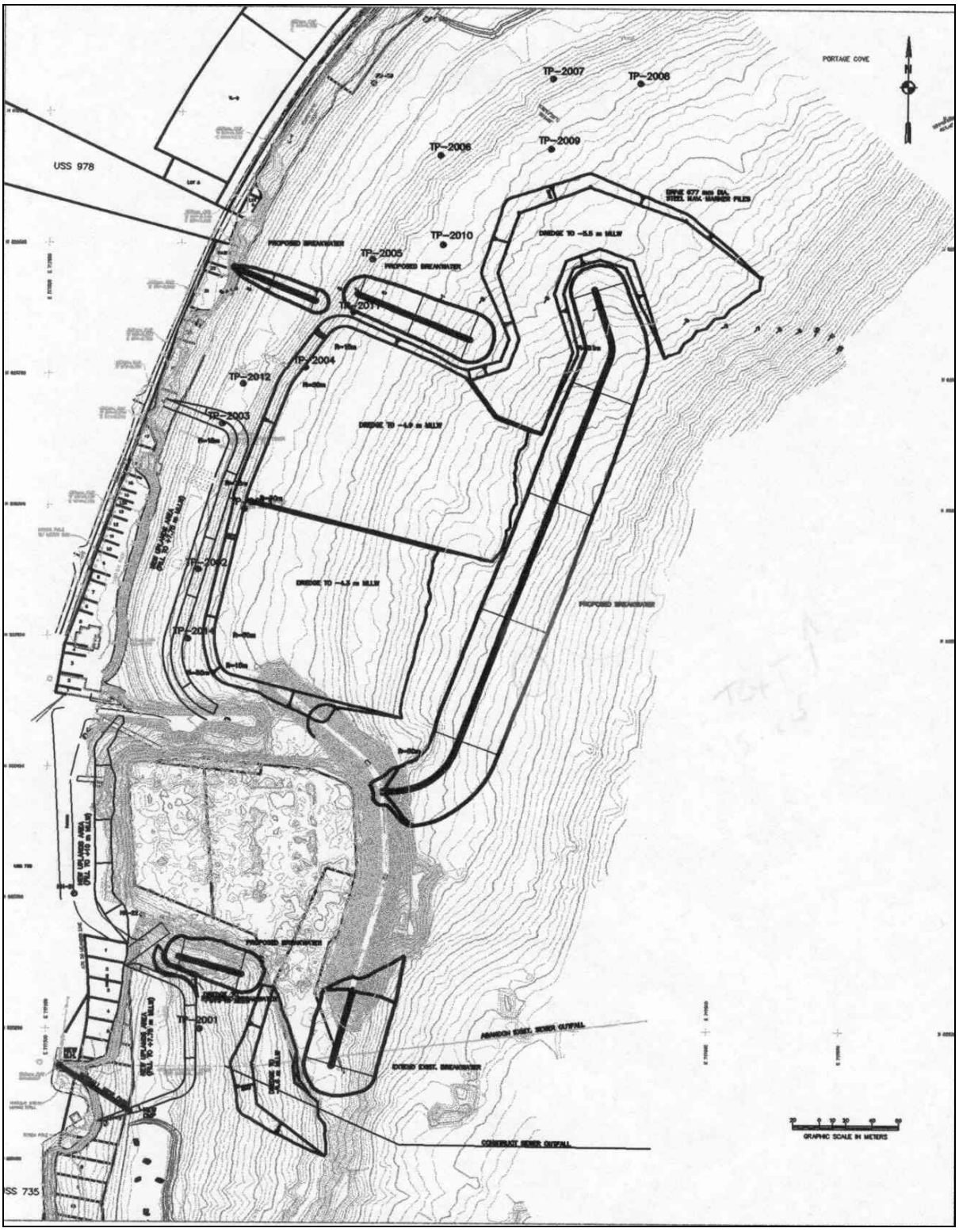

Figure 11. Alternative 1

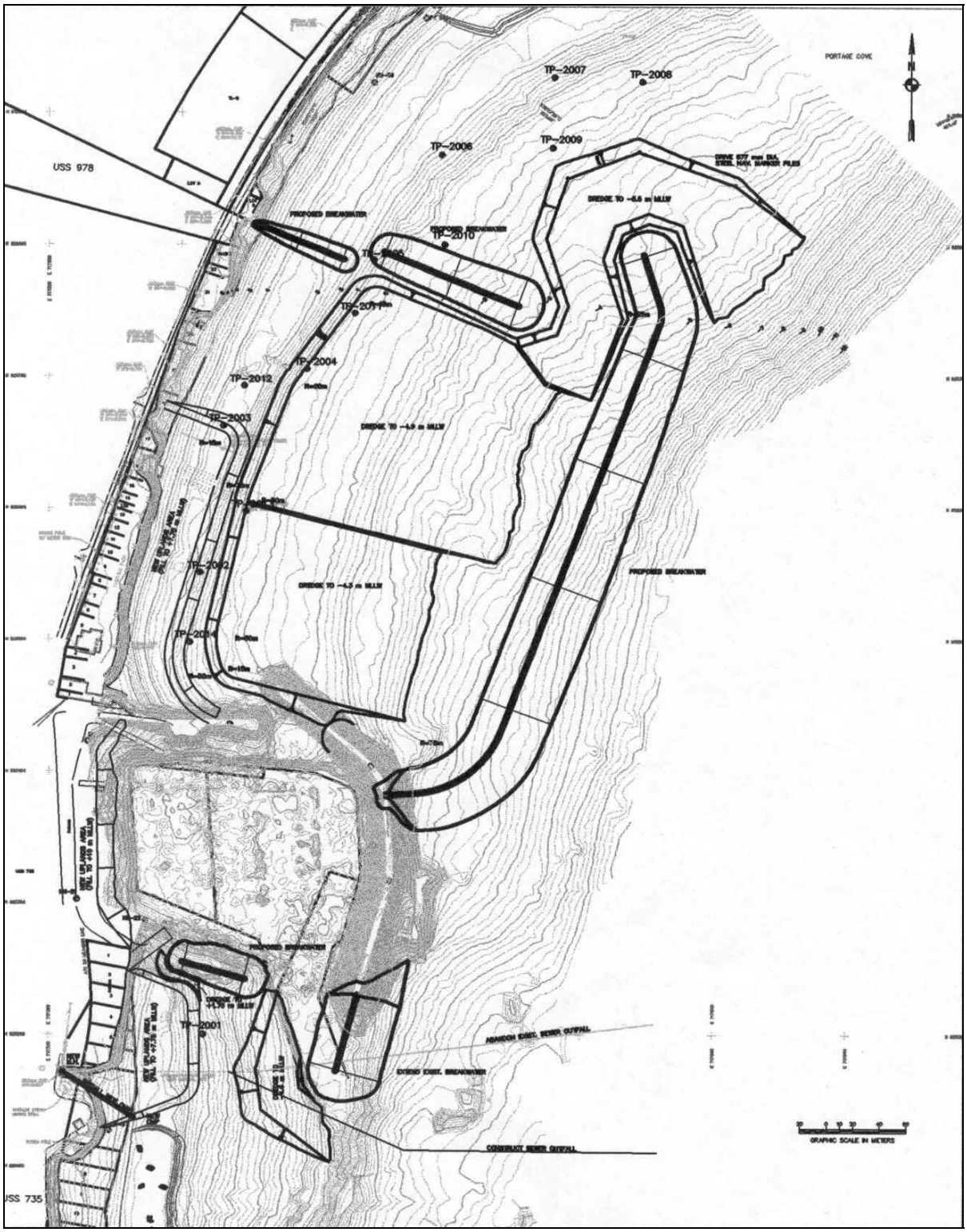

Figure 12. Alternative 2

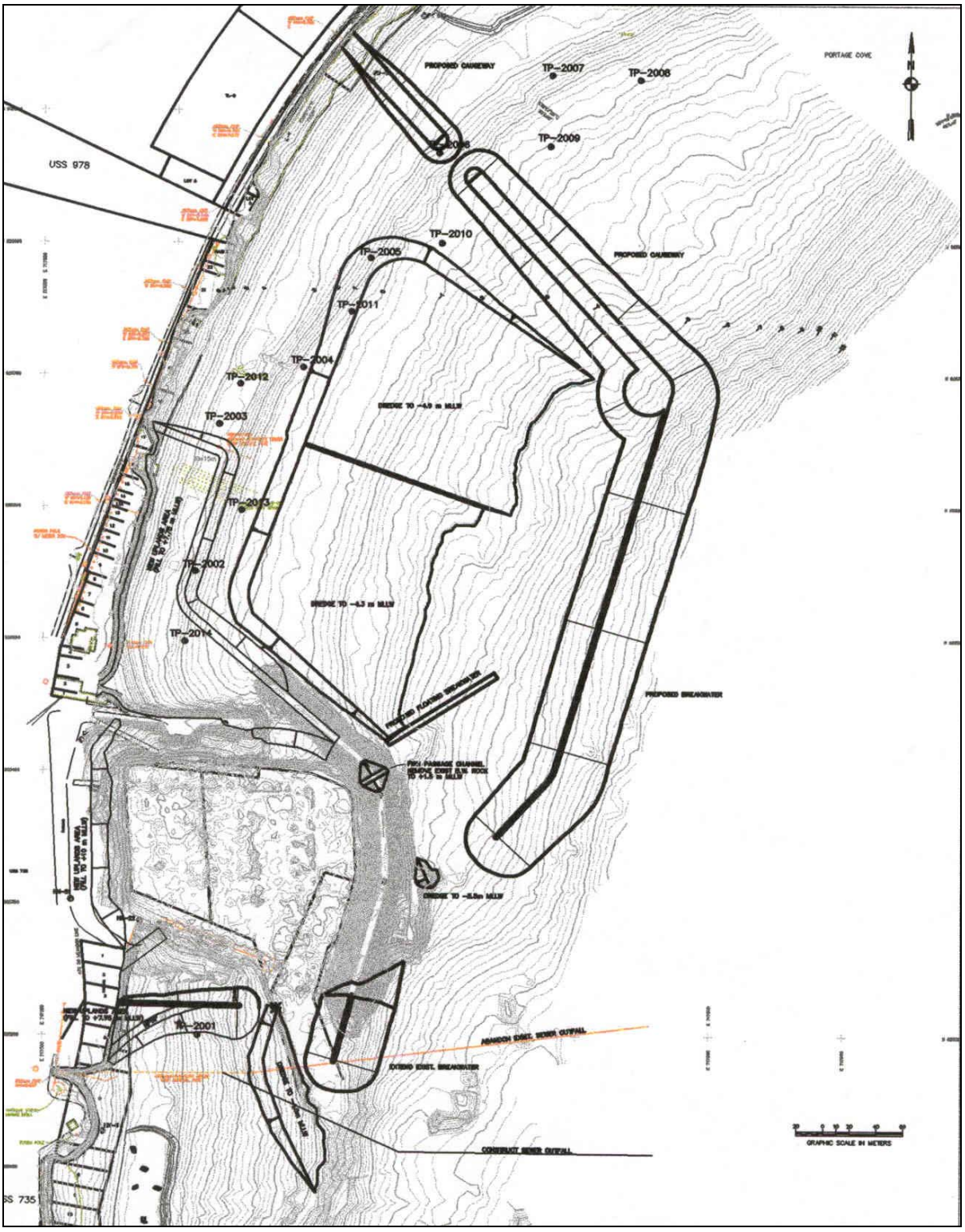

Figure 13. Alternative 3

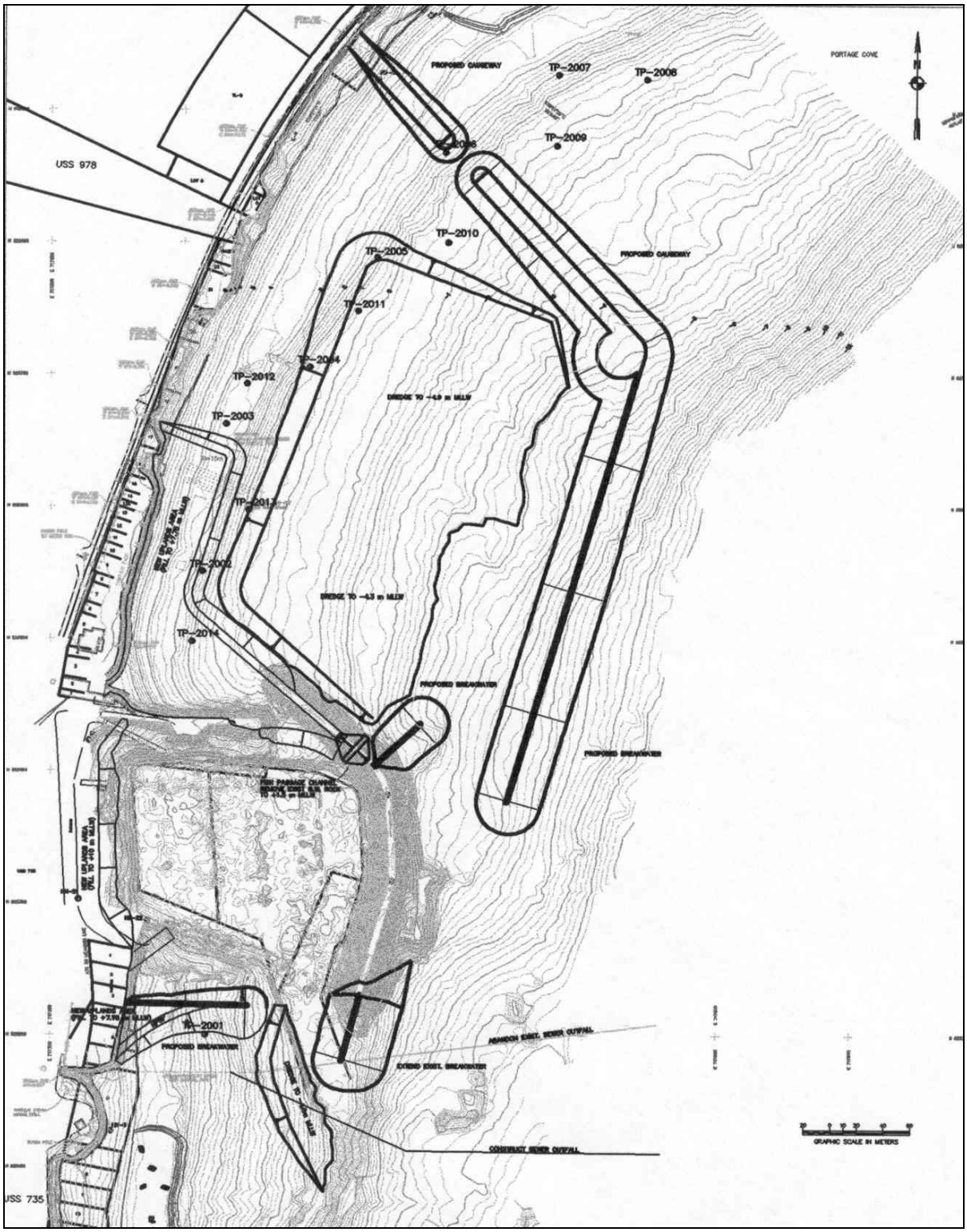

Figure 14. Alternative 4

4.0 COMPARISION OF PLANS AND SELECTION

The cost for the alternatives selected for further evaluation are listed in table 6. Interest during construction (IDC) was added to the initial cost to account for the opportunity cost incurred during the time after the funds have been spent, but before the benefits begin to accrue. IDC was calculated by matching the construction expenditure flow with the interest the funds would have accumulated had they been deposited in an interest-bearing account. Preconstruction, engineering, and design (PED) was assumed to take a minimum of nine months. Construction is expected to last for 24 months. For this analysis, level monthly expenditures were assumed.

Interest on the P&S for nine months at 6-1/8 percent was calculated as $14,000 and added to the initial cost before the IDC was calculated.

The four NED alternatives were evaluated based on environmental, economic, and engineering considerations. A comparison of the NED costs and benefits (October 2002 price levels) for the alternatives is shown in table 7. The recreational elements of the plans are the same for all the alternatives consisting mainly of basin dredging, floats, and maintenance costs. The costs associated with the recreation portion of the project compared to the benefits associated with the improvements are shown in table 8. Unit prices used in the calculation of the project cost for each alternative are shown in table 9.

Table 6. Comparison Of Alternatives: Physical Characteristics

	Alt 1	Alt 2	Alt 3	Alt 4*
South (existing) Entrance channel (-4.6 m MLLW)				
Dredged area (ha)	0.48	0.48	0.40	0.40
Dredged quantities (m^3)	9,300	9,300	8,600	8,600
North Basin Entrance channel (-5.5 m MLLW)				
Dredged area (ha)	2.04	2.05	0.03	0
Dredged quantities (m^3)	51,600	44,800	300	0
North Basin Manuevering basin (-4.9 m MLLW)				
Dredged area (ha)	0.48	0.71	0	0
North Basin Mooring basin (-4.9 & -4.3 m MLLW)				
Dredged area (hectare)	4.37	5.82	5.13	5.05
Dredged quantities (m^3)	152,300	178,000	139,200	156,500
North Basin Manuevering & Mooring area (ha)	5.19	6.57	7.02	6.60
Breakwaters (crest elevation 7.8 m MLLW)				
North Spur breakwater area (ha)**	0.10	0.11	0.29	0.29
North Spur breakwater length (m)	67	73	103	103
North Main breakwater area (ha)**	2.26	2.66	3.17	2.76
North Main breakwater length (m)	551	598	517	470
South breakwater extention area (ha)	0.40	0.40	0.36	0.36
South breakwater extention length (ha)	62.2	62.2	51.2	51.2
South Spur breakwater area (ha)	0.20	0.20	0.38	0.38
South Spurbreakwater length (m)	49.9	49.9	33.3	33.3
North Basin Stub breakwater area (ha)	0	0	0	0.21
North Basin Stub breakwater length(m)	0	0	0	46.7
Armor quantities (m^3), Avg. wt. 909 kg	45,600	48,900	36,800	36,600
Secondary quantities (m^3), Avg. wt. 91 kg	29,900	32,600	34,800	34,100
Core quantities (m^3), Avg. wt. 9 kg	114,300	135,000	185,800	150,600
Floating breakwater length (m)	0	0	95.7	0
Causeway Fill quantities (m^3)*	0	0	39,500	40,500
Causeway Armor quantities (m^3)*	0	0	1,800	1,900
Causeway Secondary quantities (m^3)*	0	0	4,500	5,000
Intertidal fill areas*				
North fill (ha)	1.44	1.44	1.99	1.99
Existing harbor fill (ha)	0.21	0.21	0.21	0.21
South fill (ha)	0.70	0.70	0.17	0.17

*Alternatives 3 and 4 includes betterments of fill material on south breakwater (causeway) and in the intertidal area.

**North breakwater area includes area for causeway.

Table 7. Comparison Of NED Costs And Benefits For Alternatives

	Al 1 ($)	Alt 2 ($)	Alt 3 ($)	Alt 4 ($)
Mobilization and Demobilization	337,000	337,000	337,000	337,000
Relocations	121,000	121,000	121,000	121,000
Breakwaters	9,733,000	10,945,000	11,548,000	9,227,000
Inner Harbor Development	6,724,000	6,210,000	5,558,000	5,696,000
Construction Contract Cost[a]	**16,915,000**	**17,613,000**	**17,680,000**	**15,381,000**
Lands and Damages	20,000	20,000	20,000	20,000
Engineering and Design	633,000	633,000	633,000	633,000
Construction Management	755,000	755,000	755,000	755,000
Subtotal	**1,408,000**	**1,408,000**	**1,408,000**	**1,408,000**
Project Cost	18,323,000	19,021,000	19,088,000	16,789,000
Interest During Construction[b]	1,131,000	1,173,000	1,177,000	1,037,000
NED Investment Cost	**19,454,000**	**20,194,000**	**20,265,000**	**17,826,000**
Annual NED Cost (50 years at 6-1/8%)	1,256,000	1,304,000	1,308,000	1,151,000
Annual OMRRR[c]	48,000	49,000	47,000	47,000
Total Annual NED Cost	1,304,000	1,353,000	1,355,000	1,198,000
Vessels Accommodated				
Mooring stalls	212	273	273	273
Transient Moorage (lineal meters)	1079	1095	1095	1095
Annual Benefits (commercial navigation)				
Average Annual Benefits	$1,307,000	$1,431,000	$1,431,000	$1,431,000
Benefits to Cost Ratio	**1.00**	**1.06**	**1.06**	**1.20**
Net Annual Benefits	**$3,000**	**$84,000**	**$82,000**	**$239,000**
Total Annual NED Costs w/ Recreation	1,408,000	1,454,000	1,456,000	1,298,000
Average Annual Benefits w/ Recreation	1,592,000	1,717,000	1,717,000	1,717,000
Benefits to Cost Ratio	**1.13**	**1.18**	**1.18**	**1.32**
Net Annual Benefits	**$184,000**	**$263,000**	**$261,000**	**$419,000**

[a]Includes 20% contingency. Does not include upland fill cost or cost for causeway

[b]Includes interest on PED, 9 months at 6-1/8%

[c]Replacement of 2% of the armor stone every 15 years, total float replacement every 30 years, Maintenance surveys performed every 5 years

Table 8. Costs And Benefits For Recreation Element

	Alt 1-4 ($)
Mobilization and Demobilization	0
Breakwater and Seawall Construction	0
Dredging	63,000
Inner Harbor Development	1,230,000
Project Cost[a]	**1,293,000**
Interest During Construction	79,000
NED Investment Cost	**1,372,000**
Annual NED Cost (50 years at 6 1/8%)	89,000
Annual OMRRR[b]	12,000
Total NED Cost	101,000
Additional Vessels Accommodated	6
Annual Benefits	
Average Annual Benefits	$286,000
Benefits to Cost Ratio	2.8
Net Annual Benefits	185,000

aAll features are 100% non-Federal costs

bBreakout of annual OMRRR cost are shown in detail in Section 5.6.2, Table 11

Table 9. Cost Estimate Unit Price Data

Item	Quantity[a]	Unit	Unit Price ($)	Total ($)[b]
Mobilization and Demobilization	1	LS	280,000	280,000
Breakwater[c]				
Armor rock	36,500	m^3	44.32	1,618,000
Secondary (B) rock	34,100	m^3	34.23	1,167,000
Core (quarry run)	150,600	m^3	31.49	4,742,000
Dredging				
Entrance & Maneuvering Channel	8,600	m^3	7.035	80,500
Mooring basin	156,500	m^3	5.72	895,200
Utility Relocations	1	LS	100,000	100,000
Floats	1	LS	4,780,000	4,780,000

[a]The quantities shown are for Alternative 4 and intended to provide an estimate of the order of magnitude of each cost item.

[b]Contingencies not shown in this table.

[c]Causeway quantities not included.

4.1 Environmental Considerations

4.1.1 Environmental Assessment

The Environmental Assessment is located in the environmental documents section (colored pages) of this report. The assessment concluded that the construction and operation of the Haines small boat harbor in Haines, Alaska, alternative 4, as discussed in this document, would not cause significant impacts to the environment. The proposed action is consistent with the State of Alaska and Alaska Coastal Management Programs to the maximum extent practicable. This assessment supports the conclusion that the proposed project does not

constitute a major Federal action significantly affecting the quality of the human environment; therefore, a finding of no significant impact will be prepared.

Construction would not affect any sites eligible for inclusion in the National Register of Historic Places. The project would not adversely affect any threatened or endangered species, or their critical habitat.

4.1.2 Project Mitigation

The mitigation plan has been coordinated with resource agencies including U.S. Fish and Wildlife Service, National Marine Fisheries Service, and Alaska Department of Fish and Game. No real estate acquisition is required as part of the mitigation plan. The mitigation plan would be the same for all alternatives due to the similarity of the design and location.

Following is a discussion of the mitigation opportunities that have been employed in this project:

- Designing the harbor to maximize the number of vessels it can safely accommodate while minimizing the project footprint.
- Construct near shore breaches in the breakwaters to minimize the threat of deep-water predation to fish migrating through the pass.
- Construction of the breakwaters prior to dredging to minimize the transport of material during dredging.
- Timing of construction from July 1 through March 31 would minimize disturbance to fish, seabirds, bald eagles, and marine mammals. Construction of the breakwaters prior to dredging would confine the sediment plumes and therefore reduce the restrictive construction windows.
- Use of silt curtains during dredging is recommended to contain suspended sediments. In-water disposal below the water surface would reduce sediment plumes.
- No pentachlorophenol preservatives may be used on pilings and wooden structures in marine waters. Any other preservative on pilings and wooden structures, including creosote, must be applied by pressure injection.
- Reasonable precautions and controls must be used to prevent incidental and accidental discharge of petroleum products.
- Material such as sorbent pads and booms must be available onsite, and must be used to contain and clean up any petroleum product spilled as a result of construction activity.
- Signs must be installed at the small boat harbor notifying harbor users that garbage, sewage, petroleum products, and fish viscera must not be discharged into the harbor.
- To protect water quality from pollutants generated from vessel maintenance and use, the constructed harbor must provide an adequate waste collection area that includes solid waste receptacles that are designed to prevent ravens and other wildlife from dispersing the waste material; a hazardous materials containment area located within a covered revetment that includes a minimum 300 gallon used oil tank and specific areas designated for oily rags/absorbent pads, oil/gas filters, anti-freeze, paints and

solvents, batteries, transmission fluid, and bad fuel; and a receptacle for used commercial fishnets.

- Shorelines must be provided in the harbor area for cleanup of non-hazardous debris such as plastic/nylon mesh recovery.
- Install eye bolts at entrance channels and breaches for rapid attachment of fuel spill containment booms.
- Have a waste oil recovery system on site to recover oils from vessels.

Compensatory mitigation. To mitigate for the salmon impact, Sawmill Creek, an anadromous stream, would be restored to more fully support salmon habitat. The location of the proposed mitigation is shown in figure EA-8 of the Environmental Assessment included in this report. The benefit would be more salmon production in the system. Several culverts would be replaced, splash pools created and stream banks revegetated to correct drainage, fish passage, and habitat deficiencies. This would be a cooperative program with the city of Haines and Alaska Department of Fish and Game.

4.1.3 Environmental Compliance Checklist

A checklist of project compliance with relevant Federal, State, and local statutes and regulations is shown in table 10.

Table 10. Environmental Compliance Checklist

FEDERAL	Compliance
Archeological & Historical Preservation Act of 1974	FC
Clean Air Act	FC
Clean Water Act	FC
Coastal Zone Management Act of 1972	PC
Endangered Species Act of 1973*	FC
Estuary Protection Act	FC
Federal Water Project Recreation Act	FC
Fish and Wildlife Coordination Act	FC
National Environmental Policy Act	PC
Land and Water Conservation Fund Act	FC
Marine Protection, Research & Sanctuaries Act of 1972	FC
National Historic Preservation Act of 1972	FC
River and Harbors Act of 1899	FC
Magnuson-Stevens Fishery Conservation & Management Act	PC
Marine Mammal Protection Act	FC
Bald Eagle Protection Act	FC
Watershed Protection and Flood Preservation Act	FC
Wild & Scenic Rivers Act	N/A
Executive Order 11593, Protection of Cultural Environment	FC
Executive Order 11988, Flood Plain Management	FC
Executive Order 11990, Protection of Wetlands	FC
Executive Order 12898, Environmental Justice	FC
Executive Order 13045, Protection of Children	FC
STATE AND LOCAL	
State Water Quality Certification	PC
Alaska Coastal Management Program	PC

PC = Partial compliance, FC = Full compliance

*Full compliance will be attained upon completion of the Public Review process.

4.2 Economic Considerations

Economic considerations in the selection process included a comparison of the costs of the alternatives. A summary of the costs and benefits for the alternatives is shown in table 7. Pricing level of the costs and benefits is October 2002. Cost components include the costs of construction, engineering and design, supervision and administration, navigation aids, interest during construction, and operation and maintenance based on a discount rate of 6-1/8 percent and a 24-month construction period. The project cost was reduced to an equivalent annual cost based on a project life of 50 years. This cost was added to the annual operation and maintenance, repair, replacement, and rehabilitation (OMRRR) cost to determine the total annual cost. This number was subtracted from the annual NED benefits to arrive at the net NED benefits.

Because it maximizes the net benefits, Alternative 4 is designated as the NED plan. The RECOMMENDED PLAN is discussed in more detail in Section 5. The economic benefits of the navigation improvements at Haines, both national and regional, are discussed in detail in appendix B.

4.3 Selection of Optimum Harbor Size

During the planning process various fleet options were evaluated to optimize the size of the harbor that would maximize the benefits attributed to the fleet detailed in table 2 of this report. All of the alternatives utilize the 2.25 hectare existing south basin with no change in the area of the basin. The new basin alternatives vary from an additional 5.19 hectares to 7.02 hectares. The harbor configurations were similar with the main difference being the location of the entrance channel for the north basin, which influenced the amount of breakwater that was necessary for adequate protection of the basin. Therefore, selection of the optimum harbor size was done as part of the selection of the NED plan. The optimum harbor size is 8.85 hectares (6.60, north basin and 2.25, south basin) and accommodates 279 vessels to provide the maximum net benefits at the selected harbor site.

4.4 Optimization of Entrance Channel and Project Features

The alternative identified as the NED plan must, by Federal policy, have the greatest net benefits. Engineering analysis determined a depth of –5.5 m MLLW was required for the north basin entrance channel. The plan identified as the NED plan, Alternative 4, does not require any dredging of the entrance channel for the north basin due to the natural depths in the basin, and optimization would not reduce project cost or capture more identified benefits

The south basin requires dredging of about 8,600 m^3 of material at an estimated cost of $80,500 for the entrance channel because of the extension that is necessary to provide adequate protection in exposed portions of the existing basin. The entrance channel dredging is needed to extend the existing channel around the new breakwater. The authorized depth of the existing harbor entrance channel is –4.6 m MLLW that is adequate for up to a 15 meters long vessel with a 2.1 meter draft. The new portion of the entrance channel is designed to be the same width and depth of the existing portion. Natural depths in the proposed channel range from –2 m MLLW to –4 m MLLW. Removal of boulders on the surface of the area to be dredged amount to $42,000 of the dredging costs. To design a channel with shallower depths as the vessel maneuvers around the breakwater would not be reasonable nor does it improve the plan as a result of efforts to optimize the design.

During the planning process the breakwaters were evaluated to look for possible optimization of the design. Originally the seaward side of the breakwaters was designed with a 2:1 side slope. This was the side slope that was proposed in previous studies at Haines. Survey information gathered for this study and visual observations seemed to indicate that the existing structures were constructed closer to a 1.5:1 side slope. Additional analysis was performed and concluded the breakwater could be designed with 1.5:1 side slopes for the seaward side of the new breakwaters. The results are a smaller footprint for the project and substantial reduction in breakwater material quantities without reducing the benefits or performance of the project.

5.0 DESCRIPTION OF RECOMMENDED PLAN

5.1 Plan Components

The RECOMMENDED PLAN, Alternative 4, was found to maximize the net NED benefits; thus, it is the NED plan. The plan contains several local features (betterments). These betterments were added at 100 percent cost to the sponsor. The RECOMMENDED PLAN is shown in figure 15.

Major construction items of the RECOMMENDED PLAN include breakwaters, dredging, inner harbor facilities in addition to the betterments, which include intertidal fill for additional uplands, expansion of the north breakwater to a causeway, and bridge that would be constructed on the causeway during future development by the local sponsor for a possible ferry dock. A bridge would be required to access the causeway from the upland to preserve the gap created by the detached breakwater that serves as a fish passage.

Construction would occur over a two-year period due to construction windows to minimize impact to fish and wildlife in the area. Project specifications would specify requirements for construction of the breakwaters to be completed to at least mean high water prior to commencing dredging activities to ensure environmental protection.

5.1.1 Rubblemound Breakwaters

The RECOMMENDED PLAN, shown in figure 15, incorporates the following rubblemound breakwaters: a 103-meter long north spur breakwater, a 154-meter long first portion of the main breakwater, a turnaround portion of the main breakwater with a radius of 18.5 meters, a 316-meter long second portion of the main breakwater, a 46.7-meter long stub breakwater attached to the existing breakwater, a 51.2-meter long extension of the existing breakwater to the south, and a 33.3-meter long south spur breakwater. The existing breakwater would be unchanged except for the extension of the head to the south and the creation of a new fish passage channel near its northern angle point. Two separate mooring basins would be created with this alternative. The positioning of the breakwaters would create entrance channel alignments allowing access from the east to the both basins. Maximum depths of water are –7.75 meters MLLW along the alignment of the main breakwater. Foundation materials would be clay, sand, and gravel, which would serve as a suitable base for the rubblemound structures. The north stub and first portion of the main breakwaters were separated by a 4-meter wide gap for fish passage. The elevation of the gap was set at the +0.80 m MLLW contour. The breakwaters will have a crest elevation of +7.93 m MLLW and a crest width of 2.44 meters.

5.1.2 Betterments

Betterments associated with the recommended plan include intertidal fills and additional crest width of the north breakwater to eventually be used as a causeway to access a proposed dock on the outside of the breakwater. Three areas along shore to be filled at the request of the local sponsor are to provide additional uplands area near the harbor totaling 2.37 ha. Figure 15 shows the locations of the area to be filled.

The causeway as shown in the recommended plan consists of a widening of the north breakwater required to provide the protection for capturing the NED benefits by 11.36 m to

provide a drivable surface 8.32 m wide. At the seaward end of the causeway a turnaround with a radius of 18.5m is to be constructed. A total of 47,400 m3 of fill including primary and secondary armor will be required to construct this betterment. Eventually the local sponsor would need to construct a bridge over the fish passage and a dock on the outside of the breakwater. The non-Federal sponsor would like to have the construction of the causeway to occur with the construction of the breakwater to take advantage of the costs savings that would occur by doing the work at the same time. Also these improvements are included in this report to provide information needed for the NEPA requirements.

5.1.3 Channels and Basin

The project would provide permanent moorage stalls for a fleet of 279 vessels and 1095 lineal meters of moorage for transient vessels in the two basins totaling 8.85 hectares, protected by rubblemound breakwaters as shown in figure 15. The mooring basin can accommodate boats ranging in size from 5.5 meters to 42.7 meters. The maneuvering areas and the fairway widths were designed so that there would be adequate room for vessels to turn and dock. Width for turning was determined using a factor of 1.75 times the length of the largest vessel using the finger piers in that area of the basin. The entrance channel has a minimum bottom width of 36.0 meters in straight sections and 39.6 meters in turning sections, which is 320 percent the design beam width of the design vessel. The entrance channel width allows for two-way traffic. The existing south basin entrance channel depth would remain the same at –4.6 m MLLW. –5.5 m MLLW is the depth required for the entrance channel for the north basin, which occur naturally. Basin depths would range from –4.3 m MLLW near the entrance channel to –4.9 m MLLW at the far end of the north basin. The south basin would remain unchanged with depths ranging from –3.3 m MLLW to –4.3 m MLLW.

5.1.4 Disposal of Dredged Material

The dredged material would consist of clay, sand, gravel, cobbles, and boulders to the project limits. A total of 159,900 m^3 of clay, 3,300 m^3 of harder clay (diamictom), and 1,900 m^3 of boulders dredging would be required. Dredged materials, with the exception of the boulders, would be disposed of in a designated area approximately 1.2 kilometers offshore and east from the harbor. Maintenance dredging would be expected to be minimal. Dredging has not been required in the existing harbor since its previous expansion in 1976.

5.2 Plan Benefits

Benefits from the NED and the RECOMMEND PLAN (Alternative 4) are those presented in table 4. As shown in table 4, annual benefits of the RECOMMENDED PLAN are $1,436,511 for Commercial Navigation and $285,972 for Recreation for a total of $1,722,483. The annual cost of the RECOMMENDED PLAN is $1,196,000 for Commercial Navigation and a total of 1,297,000 including Recreation. Thus, the net annual benefits are estimated to be $241,000 and the benefit to cost ratio is 1.2 for Commercial Navigation. With the Recreation portion of the project the net annual benefits are $425,483 and the benefit cost ratio is 1.33.

5.3 Plan Costs

Interest during construction (IDC) was added to the initial cost to account for the opportunity cost incurred during the time after the funds have been spent, but before the benefits begin to accrue. IDC was calculated by matching the construction expenditure flow with the interest the funds would have accumulated had they been deposited in an interest-bearing account. Preconstruction, engineering, and design (PED) was assumed to take a minimum of nine months. Construction is expected to last for 24 months. For this analysis, level monthly expenditures were assumed.

The initial cost for the RECOMMENDED PLAN is shown on table 15. Detailed M-CACES cost estimates are shown in appendix E. Initial cost of the RECOMMENDED PLAN is $18,086,000, excluding $12,000 for navigational aids to be provided by the U.S. Coast Guard and $4,302,000 for betterments. Interest on the P&S for nine months at 6-1/8 percent was calculated as $14,000 and added to the initial cost before the IDC was calculated. The IDC for the initial cost is $1,130,000, (1,037,000 + 93,000). The initial cost plus IDC equals $19,198,000, (17,826,000 + 1,372,000). The annual cost equals $1,239,000. With the annual operation and maintenance cost of $59,000, the total annual NED cost is $1,299,000.

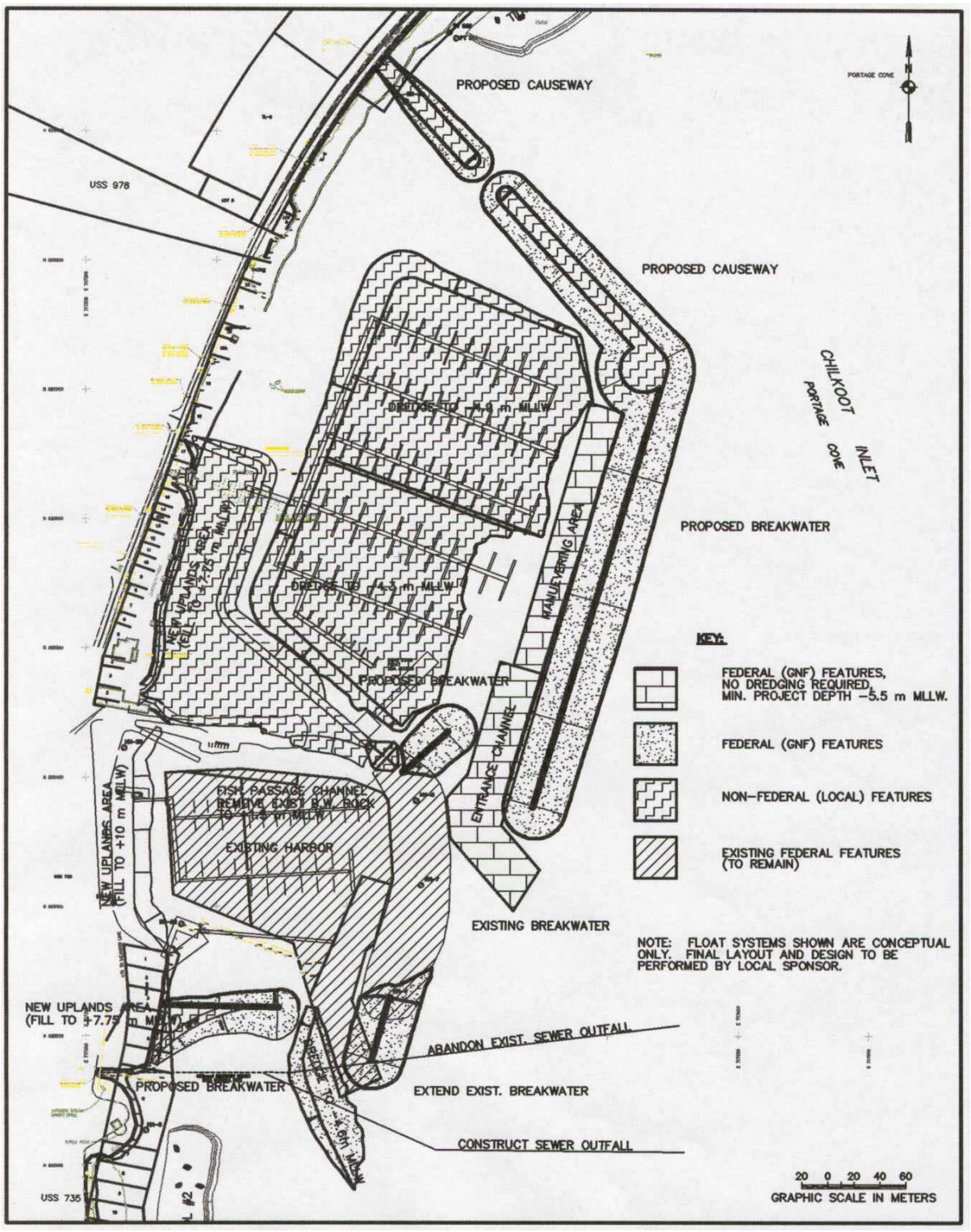

Figure 15. Recommended Plan

5.4 Risk and Uncertainty

As in any planning process, some of the assumptions made in this report are subject to error. Elements of risk and uncertainty could affect the design and performance of the project, cost, and benefits. A risk and uncertainty analysis is included in appendix B.

5.5 Plan Accomplishment

The RECOMMENDED PLAN would meet the planning objectives for Haines in the following ways:

- Provide properly sized stalls for mooring and increase wave protection from the southeast to reduce damages to vessels incurred from the overcrowded conditions in the existing harbor.
- Provide additional protected moorage to reduce travel costs incurred from the overcrowded conditions in the existing harbor.
- Extend existing breakwaters to reduce float maintenance costs incurred by the current lack of protection in the existing harbor.
- Provide for moorage of future charter and water taxi vessels to help the development of the tourism industry, and to increase recreation benefits.

5.6 Plan Implementation

5.6.1 Construction

Federal. The Corps of Engineers would be responsible for construction of the breakwaters and entrance channel. The U.S. Coast Guard would be responsible for installing aids to navigation.

Local. The sponsor would be responsible for excavating the mooring basin, constructing the float system, construction of the intertidal fill, and providing all lands, easements, and rights-of-way and relocations necessary for the project. The sponsor would also be responsible for utility service to the harbor and for funding its share of the Federal general navigational features (GNF). The sponsor is also responsible for the cost of all betterments including inner harbor fill for uplands, a proposed bridge over the breakwater gap, and converting the south breakwater to a causeway.

5.6.2 Operation, Maintenance, Repair, Replacement, and Rehabilitation (OMRRR)

Federal. The Corps of Engineers would maintain the breakwaters and channels as needed and would conduct periodic hydrographic surveys to determine if or when maintenance dredging is required. The U.S. Coast Guard would maintain navigational aids. Table 11 indicates OMRRR intervals and costs.

Local. The local sponsor would perform maintenance dredging of the mooring basin if necessary, maintain the floats, utilities, etc., and operate the completed project.

Table 11. Annual NED Costs Of OMRRR

		Equivalent Annual Cost ($)			
	Interval (yr)	Corps	Other Federal	Local Sponsor	Total
Replace 2% armor on breakwater	15	1,700			1,700
Hydrographic surveys	5	5,200			5,200
Maintain navigation aids	5		1,000		1,000
Maintain floats, stalls, and piles	1			10,000	10,000
Replace floats, stalls, and piles	30			41,100	41,100
TOTAL OMRRR COSTS		6,900	1,000	51,100	**59,000**

5.6.3 Real Property Interests

The Real Estate Plan and Assessment of Non-Federal Sponsor's Real Estate Acquisition Capability are contained in appendix F attached to this report. Table 12 lists the project's real estate costs for both the Federal and the non-federal portions. The sponsor's ability to acquire the necessary real estate is assessed in appendix F. Only real estate required for the general navigation features of the project is eligible for credit.

Table 12. Real Estate Costs

Item	Federal ($)	Local ($)	Subtotal ($)	Total ($)
Federal project portions (GNF)				
Administration	10,000		10,000	10,000
Payments for Real Estate	0	0	0	0
Relocations	0	121,000	121,000	121,000
Non-federal project portions				
Administration	0	10,000	10,000	10,000
Payments for Real Estate	0	0	0	0
Removals	0	0	0	0
Total	**10,000**	**131,000**		**141,000**

5.6.4 Cost Apportionment

Construction costs for the project would be apportioned in accordance with the Water Resources Development Act of 2000. The fully funded cost apportionment for the project features is summarized in table 13.

Table 13. Apportionment Of Construction Costs

	Construction cost contrib. (%)	
Portion of project	Federal	Local
General navigation features (includes entrance channel, maneuvering basin, and breakwaters)	80	20[a]
Local features (includes floats and mooring basin)	0	100
Betterments (Causeway fill, intertidal fill)	0	100
Coast Guard navigation aids	100	0

aNon-federal interests must provide cash contributions toward the costs for construction of the general navigation features (GNF) of the project, paid during construction (PDC) as follows: For project depths of up to 20 ft–10%; for project depths over 20 ft and up to 45 ft–25%, and for project depths exceeding 45 ft–50%. For all depths, they must provide an additional cash contribution equal to 10% of GNF costs (which may be financed over a period not exceeding 30 years), against which the sponsor's costs for LERR (except utilities) shall be credited. Note: Costs for general navigation features include associated costs, such as mobilization.

The sponsor is also responsible for 100 percent of the construction cost of the inner harbor facilities, which includes dredging the mooring area, and the betterments, which include inner tidal fill for harbor uplands, modification of the north breakwater to form a causeway, and a bridge. Table 14 provides a breakdown of the initial Federal and non-federal costs of the project of the RECOMMENDED PLAN.

The fully funded cost of the RECOMMENDED PLAN (Alternative 4) is estimated as $24,461,000 and includes locally funded betterments for intertidal fill and breakwater causeway,

The Federal Government would assume 100 percent of the operation and maintenance costs for the breakwater (except for the causeway portion of the breakwater) and entrance channel. The non-federal sponsor would assume all other operation and maintenance costs. The sponsor would be responsible for providing LERRD for construction and future maintenance of the inner harbor facilities and the betterments.

In addition to the sponsor's share of costs for General Navigation Features, the sponsor is responsible for costs associated with other NED and non-NED features. The pertinent data table in the front of this report provides a summary of all shared costs.

Table 14. Federal/Non-Federal Initial Cost Apportionment for NED Plan

(October 2002 price level)

Items	Total Project Cost ($000)	Implementation Costs ($000)			
		Federal	%	non-federal	%
General Navigation Features (GNF):					
Mobilization/demobilization	337	303		34	
Breakwaters	9,226	8,303		923	
Entrance Channel dredging	113	102		11	
Preconstruction, engineering, & design	633	570		63	
Construction management (S&A)	755	680		75	
LERR (GNF) - Administrative costs	10	9		1	
Subtotal GNF	11,074	9,967	90	1107	10
Additional Funding Requirement					
10% of GNF		-1,107		1,107	
GNF LERR credit		0		0	
Adjustment for GNF LERR credit		-1,107		1,107	
Relocations (GNF not creditable)[a]	121		0	121	100
Subtotal of GNF Related Items	11,195	8,860	80	2,335	20
LERR (GNF) - Acquisition credit	0	0	0	0	100
Aids to navigation	12	12	100	0	0
Local Service Facilities					
Mooring basin and disposal	1,052	0		1,052	
Floats	4,536	0		4,536	
LERR (LSF)	10	0		10	
TOTAL LOCAL SERVICE FACILITIES	5,598	0	0	5,598	100
Subtotal of Initial Cost Requirements for Commercial Navigation	**16,805**	**8,872**		**7,933**	
Recreation Features (Local Service Facilities)					
Dredging	64	0		64	
Floats	1,229	0		1,229	
TOTAL RECREATION FEATURES	1,293	0	0	1,293	100
Subtotal of Initial Cost Requirements for Commercial Navigation and Recreation	**18,098**	**8,872**		**9,226**	
Betterments					
Causeway	1,844	0		1,844	
Intertidal fill for uplands	2,458			2,458	
TOTAL BETTERMENTS COSTS	4,302	0	0	4,302	100
FINAL INITIAL COST REQUIREMENTS	**22,400**	**8,872**		**13,528**	

[a]Corps permit for this utility indicates relocation will be at no cost to the Federal government.

The initial construction cost of the General Navigation Features is 90 percent for the initial Federal investment and 10 percent for the initial local share because all dredging is less than 6.1 meters (20 ft). The non-federal sponsor must also contribute an additional 10 percent, plus interest, during a period not to exceed 30 years after completion of the General Navigation Features. The sponsor would be credited toward this 10-percent cost with the value of LERR necessary for construction, operation, and maintenance of the general navigation features. This post construction contribution is currently estimated at $1,107,000 as shown in table 15.

Table 15. Post-Construction Contribution

Total GNF	10 % of GNF	LERR Credit	Non-federal post construction contribution
$11,073,000	$1,107,000	$0	$1,107,000

5.6.5 Financial Analysis

The city of Haines is planning general obligation bonds to finance about half the local share of project costs. The State of Alaska expects to request funds from the legislature for the balance of the local share of the project. This has been the state practice on harbor projects in recent years. A letter stating the city's financial capability is enclosed in appendix D.

5.7 Public Involvement

Since initiation of this feasibility study, the City Administrator, City Council Representatives, and representatives from various groups from the community, have worked closely with the study team, and local concerns have been addressed. Cooperation between the staffs of the Corps of Engineers and the ADOT&PF, together with input from the city of Haines, resulted in the selection of the NED as the RECOMMENDED PLAN. The Haines community has stated their preference for the RECOMMENDED PLAN.

5.8 Consultation Requirements

This study has been coordinated with all relevant Federal and state agencies, including the U.S. Fish and Wildlife Service. Information on this coordination is provided in the EA. The project has received a final Alaska Coastal Management Program consistency determination and will be issued a State Certificate of Reasonable Assurance under the Clean Water Act.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

The studies documented in this report indicate that Federal construction of navigational improvements with rubblemound breakwaters, as described in the RECOMMENDED PLAN, is technically possible, economically justified, and environmentally and socially acceptable. Of the four NED alternatives evaluated in this study, Alternative 4 was found to maximize the net NED benefits; thus, it was designated the NED plan. Local features (betterments) were added to this alternative at 100 percent cost to the sponsor. The betterment identified as the causeway was established by comparing the quantities needed for a recommended breakwater designed to protect the basin to one with a causeway specified by the sponsors technical advisor. The additional cost of materials required were added 100 percent to the local sponsors share. The city of Haines is willing to act as local sponsor for the project and fulfill all the necessary local cooperation requirements. Thus it is concluded that Alternative 4, the RECOMMENDED PLAN, should be pursued by the Federal Government in cooperation with the city of Haines.

6.2 Recommendations

I recommend that the navigational improvements at Haines, Alaska, be constructed generally in accordance with the plan herein, and with such modifications thereof as in the discretion of the Chief of Engineers may be advisable at an estimated total Federal cost of $8,872,000 and $7,900 annually for Federal maintenance provided that prior to construction the local sponsor agrees to the following:

A. Enter into an agreement which provides, through the execution of the project cooperation agreement, 25 percent of the design costs.

B. Provide, during construction, any additional funds needed to cover the non-federal share of design costs.

C. The estimated non-federal initial costs for the general navigation features of the project is $2,214,000 plus $121,000 for relocation of the sewer outfall and $11,193,000 for local service facilities and betterments.

D. Provide and maintain, at its own expense, the local service facilities, consisting of the mooring basin and mooring facilities in addition to the intertidal fill uplands and causeway portion of the south breakwater, open to all on equal terms.

E. Provide all lands, easements, rights-of-way, and perform or ensure the performance of all relocations determined by the Federal Government to be necessary for the construction, operation, maintenance, repair, replacement, and rehabilitation of the general navigation features.

F. Prepare and implement a harbor management plan to be coordinated with local interest. The harbor management plan shall incorporate best management practices to control water pollution at the project site.

G. Provide, during the period of construction, a cash contribution equal to the following percentages of the total cost of construction of the general navigation features which

include the construction of aquatic dredged material disposal facilities operation, or maintenance and for which a contract for a contract for the facility's construction or improvement was not awarded on or before October 12, 1996.

1. 10 percent of the costs attributable to dredging to a depth not in excess of 6.1 meters (20 ft).
2. 25 percent of the cost attributable to dredging to a depth in excess of 6.1 meters (20 ft) but not in excess of 13.7 meters (45 ft).
3. 50 percent of the costs attributable to dredging to a depth in excess of 13.7 meters (45 ft).

H. Repay with interest, over a period not to exceed 30 years following completion of the construction of the project, an additional 0 to 10 percent of the total cost of construction of general navigation features depending upon the amount of credit given for the value of lands, easements, rights-of-way, relocations, and borrow and dredged, or excavated material disposal areas provided by the non-federal sponsor for the general navigation features. If the amount of credit exceeds 10 percent of the total cost of construction of the general navigation features, the non-federal sponsor shall not be required to make any contribution under this paragraph, nor shall it be entitled to any refund for the value of lands, easements, rights-of-way, relocations, and dredged or excavated material disposal areas, in excess of 10 percent of the total cost of construction of the general navigation features.

I. For so long as the project remains authorized, operate and maintain the local service facilities and provide lands, easements, and rights-of-way for any dredged or excavated material disposal areas, in a manner compatible with the project's authorized purposes and in accordance with applicable Federal and state laws and regulations and any specific directions prescribed by the Federal Government.

J. Give the Federal Government a right to enter, at reasonable times and in a reasonable manner, upon property that the non-federal sponsor owns or controls for access to the general navigation features for the purpose of inspection, and if necessary, for the purpose of operating and maintaining the general navigation features.

K. Hold and save the United States free from all damages arising from the construction, operation, and maintenance of the project, any betterments, and the local service facilities, except for damages due to the fault or negligence of the United States or its contractors.

L. Keep and maintain books, records, documents, and other evidence pertaining to costs and expensed incurred pursuant to the project, for a minimum of three years after completion of the accounting for which such books, records, documents, and other evidence is required, to the extent and in such detail as will properly reflect total cost of construction of the general navigation features, and in accordance with the standards for financial management systems set forth in the Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments at 32 CFR 33.20.

M. Perform, or cause to be performed, any investigations for hazardous substances as are determined necessary to identify the existence and extent of any hazardous substances

regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERLA), 42 USC 9601-9675, that may exist in, on, or under lands, easements, or rights-of-way that the Federal Government determines to be necessary for the construction, operation, and maintenance of the general navigation features. However, for lands that the Federal Government determines to be subject to the navigation servitude, only the Government shall perform such investigations unless the Federal Government provides the non-federal sponsor with prior specific written direction, in which case the non-federal sponsor shall perform such investigations in accordance with such written direction.

N. Assume complete financial responsibility, as between the Federal Government and the non-federal sponsor, for all necessary cleanup and response costs of any CERCLA-regulated materials located in, on, or under lands, easements, or rights-of-way that the Federal Government determines to be necessary for the construction, operation, or maintenance of the general navigation features.

O. To the maximum extent practicable, perform its obligations in a manner that will not cause liability to arise under CERCLA.

P. Comply with the applicable provision of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, as amended by the Title IV of the Surface Transportation and Uniform Relocation Assistance Act of 1987 (Public Law 100-17), and the Uniform Regulations contained in 49 CFR Part 24, in acquiring lands, easements, and rights-of-way; required for construction, operation, maintenance, of the general navigation features in connection with said Act.

Q. Comply with all applicable Federal and state laws and regulations, including, but not limited to, Section 601 of the Civil Rights Act of 1964, Public Law 88-352 (42 USC 2000d), and Department of Defense Directive 5500.11 issued pursuant thereto, as well as Army Regulation 600-7, entitled “Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army”.

R. Provide a cash contribution for costs of mitigation and data recovery activities associated with historic preservation attributable to commercial navigation that are in excess of one percent of the total amount authorized for construction of the general navigation features.

S. Accomplish all removals determined necessary by the Federal Governement other than those removals specifically assigned to the Federal Governement.

T. Do not use Federal funds to meet the non-federal sponsor’s share of total project costs unless the Federal-granting agency verifies in writing that the expenditure of such funds is authorized.

The recommendations for implementation of navigation improvements at Haines, Alaska reflect the policies governing formulation of individual projects and the information available at this time. They do not necessarily reflect the program and budgeting priorities inherent in the local and State programs or the formulation of a national civil works water resources program. Consequently, the recommendations may be changed at higher review levels of the executive branch outside Alaska before they are used to support funding.

Date:_____

District Engineer