

LAUPAHOEHOE NAVIGATION IMPROVEMENTS

Laupahoehoe, Hawaii

FINAL

**Detailed Project Report
and
Environmental Impact
Statement**



**US Army Corps
of Engineers**
Honolulu District

March 1984

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LAUPAHOEHOE NAVIGATION IMPROVEMENTS
LAUPAHOEHOE, ISLAND OF HAWAII, HAWAII

FINAL
DETAILED PROJECT REPORT
AND
ENVIRONMENTAL IMPACT STATEMENT

MAY 1984

SYLLABUS

SYLLABUS

The purposes of this report are to determine the need for and feasibility of providing light-draft navigational improvements at Laupahoehoe, Hawaii.

The existing launch ramp at Laupahoehoe is unsafe. Although located in a semi-sheltered cove, a troublesome surge is created by waves reflecting off the surrounding rocky shoreline. Needs expressed by commercial fishermen in the area are for a protected mooring basin that would permit them to launch, retrieve, and safely unload their catch and return to the fishing grounds off Laupahoehoe Point. Three alternative plans were developed, each consisting of construction of a rubblemound breakwater, wave absorber, and dredging of an entrance channel and turning basin. Improvements were designed to accommodate a design vessel of 27-foot length, 7-foot beam, and 3.5-foot draft.

Based on the needs and desires of the community, the expected benefits and costs, and environmental impacts of the alternatives investigated, Plan 3 is concluded to be the most feasible and suitable plan. The proposed plan is economically justified as shown in the following table. Firm project cost will be determined upon completion of the hydraulic model study. It is recommended that the model study be approved upon completion of the Detailed Project Report review. The County of Hawaii has agreed to provide the necessary local cooperation agreements.

PROJECT FEATURES

Breakwater, ft.	200
Wave Absorber, ft.	60
Entrance Channel, depth, ft.	9
Turning Basin, depth	7.5

PROJECT INVESTMENT COST \$2,218,000

AVERAGE ANNUAL BENEFITS AND COSTS

Total Average Annual Benefits	\$263,000
Total Average Annual Costs <u>1/</u>	\$192,000

NET ECONOMIC EFFECTS

Average Annual Net NED Benefits	\$71,000
Benefit-to-cost ratio	1.4

1/ Based on 50 year, 8-1/8% interest rate.

LAUPAHOEHOE POINT NAVIGATION IMPROVEMENTS
DRAFT
DETAILED PROJECT REPORT AND ENVIRONMENTAL IMPACT STATEMENT
ISLAND OF HAWAII, HAWAII

SYLLABUS

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MAIN REPORT

STUDY AUTHORITY

This study was accomplished under the authority provided by Section 107 of the River and Harbor Act of 1960, as amended by Section 310 of the River and Harbor Act of 1965; Section 112 of the River and Harbor Act of 1970; and Section 133(a) of the Water Resources Development Act. Pertinent paragraphs of the authority are included in Appendix A: Plan Formulation Criteria and Compliance Reports.

STUDY PURPOSE AND SCOPE

Purpose

The purposes of this study were to determine the need for and feasibility of providing light-draft navigational improvements on the island of Hawaii.

The Laupahoehoe Point Navigation Improvements Study was initiated following a written request from the County of Hawaii, Department of Parks and Recreation, dated 2 November 1981. A letter of support was received from the State of Hawaii, department of Transportation, Harbors Division, dated 24 November 1981. In addition, House Resolution No. 659 dated 19 May 1981 requesting the study was adopted by the House of representatives of the eleventh Legislature of the State of Hawaii, Regular Session of 1981. A reconnaissance report was completed by the US Army Corps of Engineers, Honolulu District on 29 January 1982 and approved for detailed project studies by the Chief of Engineers in March 1982.

Description of Study Area

The island of Hawaii (Figure 1), the largest of the Hawaiian Islands, encompasses 4,038 square miles of land area and 305 miles of coastline. This island has two main population centers, Kailua-Kona on the west coast and Hilo on the east coast. The town of Hilo is the economic and political center of the island and its main port.

The study area is the North Hilo and Hamakua Districts (Figure 2) which comprise about one fourth of the land area of the Big Island.

Laupahoehoe Point is located on a peninsula on the northeast coast of the island of Hawaii, about 25 road miles northwest of Hilo. The County of Hawaii's Laupahoehoe Point Park borders the shoreline of Laupahoehoe Point. Cliffs form a steep backdrop to the seaside park, making the park area accessible only by a narrow, winding cliff road. The park is classified as a rural regional park, used primarily for day picnicking, occasional family gatherings and as a tourist scenic attraction and rest stop. Historically, the launching site was a freight landing where livestock was imported to the area. The 19.4-acre park includes a concrete loading dock, restrooms, a picnic area, a pavilion and a paved parking area. In addition, a 20-foot-wide concrete launching ramp was constructed within the park limits by the County of Hawaii in 1970.

Scope of the Study

This study identified and evaluated the problems and needs associated with providing light-draft navigational improvements in the North Hilo and Hamakua Districts and the impacts upon the overall environmental, economic, social, cultural and recreational resources of the area. The development of alternative sites and design layouts, and the costs and benefits associated with implementing these measures were evaluated.

Studies conducted included site investigations, archaeological-cultural studies, hydrographic and topographic surveys, geologic, foundations and materials investigations, fish and wildlife studies, oceanographic and meteorological studies, engineering designs, economic evaluations and environmental assessment.

The objective of this study is to provide a planning process based on increasingly specific stages of investigation. At the conclusion of each stage, the range of possible alternatives was assessed and evaluated. Elimination of infeasible or undesirable measures narrowed the field of potential alternatives until an acceptable plan was developed.

The Detailed Project Report (DPR) constitutes the basic document for construction planning for the US Army Corps of Engineers small projects or continuing authorities program. Construction plans and specifications can be initiated after model testing and subsequent acceptance of the DPR by the Chief of Engineers and receipt of local assurances from the County of Hawaii.

Study Participants and Coordination

The US Army Corps of Engineers, Honolulu District, was responsible for conducting and coordinating the overall study and preparing the study report. Close coordination has been maintained with the County of Hawaii Department of Parks and Recreation, the local sponsor of the project, and the State of Hawaii Department of Transportation, Harbors Division.

Governmental agencies (Federal, State, and local), community groups, and private interests were contacted during the study to help identify study concerns, to obtain pertinent study information, and to develop and evaluate alternative plans. A list of those contacted and the public involvement program are presented in Appendix B.

PRIOR STUDIES, REPORTS AND EXISTING WATER PROJECTS

The US Army Corps of Engineers, Honolulu District, completed a reconnaissance report on possible light-draft navigation improvements at Laupahoehoe Point on 29 January 1982. This report established Federal interest in providing possible navigational improvements in Hawaii under Section 107 of the River and Harbor Act of 1960, as amended.

A previous reconnaissance report was completed on 28 February 1978 by the Corps of Engineers. At that time, it was determined there was no Federal interest in pursuing navigation improvements at Laupahoehoe. Since that time, a survey of small craft fleet parameters and use patterns of the Hilo tributary area has been completed. In light of this new data and interviews with fishermen in the study area, benefit computations show that navigation improvements at Laupahoehoe could be justifiable.

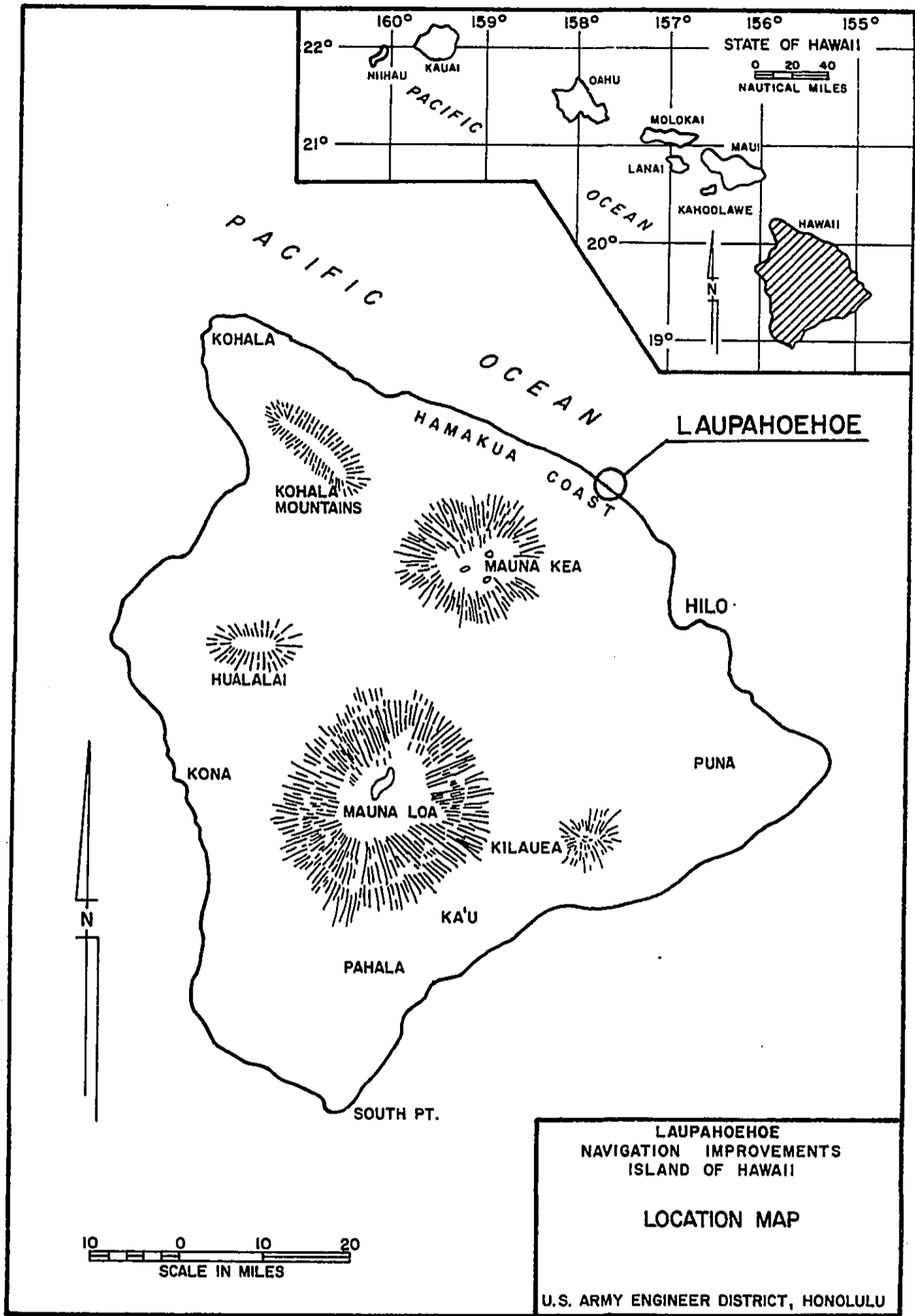


FIGURE 1

ISLAND OF HAWAII



Legend

- Small Boat Harbor
- Launch Ramp Only
- ★ Anchorage

LAUPAHOEHOE
NAVIGATION IMPROVEMENTS
ISLAND OF HAWAII

STUDY AREA

U.S. ARMY ENGINEER DISTRICT, HONOLULU

FIGURE 2

PLAN FORMULATION

Planning Methodology

The purpose of this section is to define the study area and the problems to be addressed in the study. This includes describing the base conditions, identifying public concerns, establishing planning criteria and analyzing the problems. Public concerns which relate to water and related land resource problems are identified and then refined, based on national and local policies.

National planning policies are prescribed by the Water Resources Council's Principles and Guidelines (18 CFR Part 711 et seq), the National Environmental Policy Act of 1969 (PL 91-190), Section 122 of the River and Harbor and Flood Control Act of 1970 (PL 91-611), the Water Resources Development Act of 1974 (PL 93-251), the Clean Water Act of 1977 (PL 95-217), and the Corps of Engineers' policy guidelines (ER's).

To help determine the resource management^{1/} problems, the base condition of the study area is initially defined. The base condition is the existing economic, social and environmental characteristics of the area. Future conditions are then projected and analyzed to determine the "most probable future"^{2/} which would prevail over the area without any changes to existing resource management plans. This analysis describes the "without condition" criterion. Planning objectives^{3/} are then formulated based on the problems and needs of the area related to the "without condition" criterion.

National Objectives

The Water Resources Council Principles and Guidelines (P&G) for planning water and related land resources, define the national objectives of national economic development (NED). The NED objective is achieved by increasing the value of the nation's output of goods and services and improving national economic efficiency. The Federal objective is to contribute to NED consistent with protecting the Nation's environment pursuant to National environment statutes, applicable executive orders, and other Federal planning requirements.

The P&G also states that various alternative plans are to be formulated in a systematic manner to insure that all reasonable alternatives are evaluated. A plan that reasonably maximizes the NED benefits, consistent with the Federal objective, is to be formulated. Other plans which reduce net NED benefits

1/ "Resource management" involves the development, conservation, enhancement, preservation and maintenance of water and related land resources to achieve the goals of society expressed nationally and locally.

2/ "Most probable future" is the projection of basic demographic, economic, social and environmental parameters, which is used as the basis for defining the "without condition" and the planning objectives for a particular study.

3/ "Planning objectives" are the national, state, and local water and related land resource management needs (opportunities and problems) specific to a given study area that can be addressed to enhance National Economic Development or Environmental Quality.

in order to further address other Federal, State, local, and international concerns not fully addressed by the NED plan may be formulated. A plan recommending Federal action is to be the alternative plan with the greatest economic benefit, unless the Secretary of a department or head of an independent agency grants an exception to this rule.

Four accounts are established to facilitate evaluation and display of effects of alternative plans. The national economic account is required. Other information that is required by law or that will have a material bearing on the decision-making process should be included in the other accounts or in some other appropriate format used to organize information on effects.

1. The national economic (NED) account displays changes in the economic value of the national output of goods and services.

2. The environmental quality (EQ) account displays monetary effects on significant natural and cultural resources.

3. The regional economic development (RED) account registers changes in the distribution of regional economic activity that results from each alternative plan. Evaluations of regional effects are to be carried out using nationally-consistent projections of income, employment, output, and population.

4. The other social effects (OSE) account registers plan effects from perspectives that are relevant to the planning process but are not reflected in the other three accounts.

Existing Conditions

Historic Resources. No known or identified resources remain in the immediate area of the proposed project, or in the adjoining portions of the County Park. Previous improvements, as well as natural events occurring at this long used landing site, have removed all surface indications of earlier prehistoric features and historic period structures.

Physical and Environmental Setting.

(a) **Physical Features.** The study area lies on the northeast (Hamakua) coast of the Island of Hawaii, northeast of Mauna Kea's summit. The coastline is characterized by many youthful streams dropping over wave-cut cliffs into the sea. The irregular coastline is characterized by extreme variations in relief over very short distances. Rock outcrops along the shoreline are rough and irregular (clinker texture) even though it is wave-cut and highly eroded. The cliffs along the shoreline are highly vegetated and provide a picturesque backdrop in the Laupahoehoe area.

(b) **Climate.** The Island of Hawaii has a semi-tropical climate, but has wide variations across the island in temperature and rainfall. Temperatures range from 58 to 90 degrees (minimum-maximum) along the coastal plain to subfreezing minimums in the mountains. Mauna Kea and Mauna Loa often have a mantle of snow during the winter months. Rainfall along the coast in the Hamakua and North Hilo District varies from 100 to 300 inches annually.

The predominant wind condition is the east and northeast trades which occur approximately 80 percent of the time.

(c) Astronomical Tides. The nearest tidal benchmark to Laupahoehoe Point is at the Hilo Harbor, approximately 25 miles to the southeast. Tidal measurements taken at this location by the US Coast Guard and Geodetic Survey in 1929 are:

Highest tide (estimated)	3.80
Mean higher high water (MHHW)	2.40
Mean high water (MHW)	1.90
Half tide level	1.10
Mean low water (MLW)	0.30
Mean lower low water (MLLW)	0.00
Lowest tide (estimated)	-1.60

All elevations in this report are referenced to mean lower low water (MLLW) datum.

(d) Wave Conditions. Waves arriving at Laupahoehoe Point originate from various areas in the Pacific Ocean. These waves have a variety of periods and heights depending on their origin and other factors related to wave building and decay. At Laupahoehoe, several distinct wave types may be acting simultaneously. This produces a very complex wave climate. Laupahoehoe Point faces roughly east and generally is subject to a wave spectrum from the north clockwise to the southeast. The two primary wave types are the local wind waves, expected to be less than 7 feet in height about 75% of the time, and the northern swell, waves generated in the North Pacific Ocean by winter storms with heights of 5 to 15 feet.

(e) Geology. The Island of Hawaii is the youngest and largest of the Hawaiian Archipelago, and is the result of the coalescence of the lava flows of five volcanoes. The volcanoes Mauna Loa and Kilauea are still very active.

Mauna Kea, (Figure 1) the tallest volcano with an elevation of 13,784 feet is located in the North Hilo area. The slopes and summit area of Mauna Kea is more rugged and irregular than the other volcanoes of the Big Island because of the numerous cinder cones along its three rift zones. The lower slopes of the mountain are covered with tan colored ash deposits consisting of fine grained, fire fountain debris from the numerous cinder cones.

The base rock in the area consists mainly of massive olivine basalts of the Hamakua volcanic series. This is overlain by 4 to 15 feet of ash which separates this formation from the overlying Laupahoehoe Volcanic Series (recent geologic age). The Laupahoehoe Volcanic Series is composed mostly of andesine andesites although some olivine basalts are present.

(f) Seismicity. The Island of Hawaii is situated within a seismically active zone and straddles the boundary between seismic Zone 3 and Zone 4. Many earthquakes of low and moderate magnitudes occur throughout the year. Most earthquakes that do occur are related to the volcanic activity of Kilauea and Mauna Loa.

(g) Terrestrial Biota. The terrestrial biota of the study area consists of common introduced and native species. Coastline flora consists principally of ironwood, naupaka, beach morning glory, coconut palm and common strandplants and lawn grasses. The fauna includes common introduced species of birds, and mammals such as feral cats, dogs and the mongoose.

(h) Marine Biota. In the few natural embayments along the Hamakua coastline can be found an abundance of diversified marine biota. A variety of common reef fish, and marine benthic invertebrates, including gastropod mollusks, sea urchins, sea cucumbers and crabs, are present along the coastline. Green sea turtles are common along this coastline, foraging for food, however there are apparently no areas suitable for nesting. The endangered Humpback whale is present in the coastal waters of the Hamakua coast during the months of December through May, in waters generally less than 600 feet deep.

The substratum throughout most of the Hamakua coastline consists of hard lava rock covered in places by accumulation of silt and coral rubble and bagasse.

A number of bays along this coastline contain scattered massive heads of Porites coral. Coral growth elsewhere in these bays include scattered Pocillopora colonies, possibly a consequence of the constant wave action occurring in these area.

Economic Characteristics.

Hawaii is a prosperous State with a growing economy. The gross State product in 1979 amounted to \$10 billion, or almost 6 times the 1960 total. The four largest contributors to the State economy are tourism (\$3.0 billion), defense expenditures (\$1.3 billion), sugar production (\$594 million), and pineapple production (\$223 million). The most rapid growth in the past decade has been in the tourist industry. Visitor expenditures have increased over 400 percent in the ten years. Visitor spending in 1980 resulted in tax revenues of \$323 million and generated 117,000 jobs.

Hawaii County experienced a population increase of 50 percent from 1960 to 1980, nearly equalling the State's overall increase of 52 percent for the same period. The resident population of the Hilo area (Puna, North Hilo and South Hilo districts) increased by 43 percent from 39,076 in 1960 to 55,708 in 1980. Sixty percent of the population on the island is centered in the Hilo area. Laupahoehoe, located some 20 miles north of Hilo, grew from a population of 452 in 1970 to 500 in 1980.

The basic elements of the economy of Hawaii County are tourism, agriculture and fishing, manufacturing, and scientific research with tourism being the number one industry. Visitor expenditures for Hawaii County grew from \$50 million in 1969 to \$172 million in 1979. While Hilo is not noted as a destination area, its role as a gateway to and from the State suggests a continued active role in the visitor industry. There are no tourist facilities at Laupahoehoe but there are scenic attractions in the area. As the urban, commercial, and governmental center for the County, Hilo has a stronger orientation toward transportation, communications and utilities, trade, services, and government. It is expected that Hilo will continue to be the major urban center on the island. The following tables summarize the demographic, general social, and economic characteristics of the County:

TABLE 1.
RESIDENT POPULATION OF HAWAII COUNTY AND DISTRICTS
1960 TO 1980

	1960	1970	1980
The State	632,772	769,913	965,000
Hawaii	61,332	63,468	92,053
Puna	5,030	5,154	11,751
South Hilo	31,553	33,915	42,278
North Hilo	2,493	1,881	1,679
Hamakua	5,221	4,648	5,128
North Kohala	3,386	3,326	3,249
South Kohala	1,538	2,310	4,607
North Kona	4,451	4,832	13,748
South Kona	4,292	4,004	5,914
Ka'u	3,368	3,398	3,699
Median Years of School Completed ^{1/}	8.6	11.4	NA

^{1/} 25 years old and over

Source: U.S. Bureau of the Census, U.S. Census of Population: 1970,
PC(1)-A13, Table 10, and advance counts from the 1980 Census of
Population.

TABLE 2.
INCOME, LABOR FORCE, AND EMPLOYMENT

	1960	1970	1980
Personal Income (\$ Millions)	100	241	650 ^{2/}
Per Capita Income (\$)	1,630	3,785	7,760 ^{2/}
Civilian Labor Force	22,270 ^{1/}	28,300	35,450
Civilian Employment	21,520 ^{1/}	27,050	33,050
Unemployment (%)	3.4	4.4	6.7
Subcount by Industry			
Total Job (Non-Agriculture)	16,040	28,870	28,400
Construction	820 ^{1/}	1,500	1,650
Manufacturing	3,300 ^{1/}	2,960	2,750
Transportation, Communication, and Utilities	970 ^{1/}	1,380	1,900
Trade	3,100 ^{1/}	5,010	7,000
Finance, Insurance and Real Estate	250 ^{1/}	900	1,100
Services	1,640 ^{1/}	3,730	7,450
Government	3,050 ^{1/}	4,370	6,550
Agriculture	2,910 ^{1/}	3,610	3,250

^{1/} Hawaii State Department of Labor and Industrial Relations

^{2/} 1979 Estimate

Source: State of Hawaii Data Book, 1981; County of Hawaii Data Book, 1980
and 1979, Department of Research and Development

TABLE 3.
TOURISM HAWAII COUNTY

	1960	1970	1980
Visitor Arrivals	72,300	445,401	761,000
Visitor Expenditures (\$ Millions)	5.6	53.4	172 ^{1/}
Hotel Room Inventory	558	3,092	6,260
Occupancy Rate (%)	NA	68.3	52.7

^{1/} 1979 Estimate

Source: County of Hawaii Data Book, 1981, Department of Research and Development; The State of Hawaii Data Book, 1962, Department of Planning and Economic Development

Navigation Problems and Needs

The Hilo Coast has three main navigation problems: (1) a rugged coastline; (2) a tradewind exposure; and (3) an excess demand for harbor facilities due to the rapidly growing commercial fishing industry.

The rugged coastline in east Hawaii affords few natural embayments for small craft harbor facilities or harbors of refuge. Hilo Bay and a launch ramp at Pohoiki Bay (located about 33 miles south of Hilo Bay) are currently the only protected facilities in east Hawaii. The great distances between the harbors of refuge on the Big Island (Figure 3) poses a serious problem should mechanical problems occur. The increase in the demand to participate in commercial fishing has caused a shortage in berthing, refueling, and other related facilities.

The existing launch ramp at Laupahoehoe is unsafe. Although located in a semi-sheltered cove, a troublesome surge is created by waves reflecting off the surrounding rock shoreline. In addition, the steep slope of the ramp and deteriorated condition of the concrete exacerbate the situation. Today the local fishermen find even calm conditions too hazardous to launch. The county has declared the ramp unsafe for use and posted a sign "Boat Ramp Closed". Boaters have been known to come from as far as Honokaa and Waimea to find the ramp unusable.

The next closest safe launch ramps are located at Hilo (24 miles to the south) and Kawaihae on the west coast (65 miles away). In the last five years, the local fleet has increased from 5 boats to 38 boats. Some of the fishermen have stated that they trailer their boats to Hilo to launch and travel back up to the Laupahoehoe fishing grounds. The relatively small (under 20') fishing boats have limited refrigeration space for large amounts of ice. This limits their catch. Fishermen report that their containers are usually filled quickly, but because of the time it takes to travel to Hilo to land and recover, their outings are limited. For the majority of boaters, it is not economical to trailer to Hilo to fish. A protected mooring basin would permit them to launch, retrieve, and safely unload their catch and return to the fishing grounds. The fishermen have also stated that they would purchase larger boats to increase their fishing capability. Some have expressed interest in becoming full-time commercial fishermen.

Laupahoehoe ramp can no longer be used by rescue boats during emergencies.

The Hilo Rescue Squad Team and the Coast Guard respond to emergency help at sea along the Hamakua Coast an average of 6 to 20 times each year. Both groups are stationed in Hilo and both cover the entire eastern coastline of the island. During rescue operations they would prefer to drive the half hour route on road to Laupahoehoe to launch rather than the one and one-fourth-hour route by sea. The route by sea incurs an extra 45 minutes of travel time. Because the ramp is unusable, all rescue boats are launched from Hilo today. As a result, there are additional costs and probable danger of losing lives.

Related Problems and Needs

Environmental Resources. Maintaining the district's natural environmental quality is important to the local community as well as to visitors to the Hamakua Coast. Any navigation improvements should be designed to complement existing uses of the area's natural resource and should have as little adverse effect on the coastal and marine environment as possible. Marine life is relatively diverse and abundant along this coastline.

Human Resources. The Hamakua coastline provides recreational opportunities for Hawaii residents and is actively used by fishermen and surfers as well as mainland visitors, attracted simply for its scenic beauty. The effect of navigation improvements on these activities and the possible secondary effects on the use of adjacent land areas must be assessed and evaluated.

Local interests, including fishermen and citizens in the area, have expressed the need for a new launch ramp, protection from damaging waves and mooring facilities for short docking periods at Laupahoehoe. The navigation problem at Laupahoehoe was brought to the attention of County officials, State legislators, the State Department of Transportation and the Corps of Engineers by local fishermen in the Laupahoehoe and Hilo areas.

"Without" Project Profile

If no Federal action is taken to provide navigation improvements, the lack of an adequate boating facility will continue to constrain full use of the ocean's resources in the study area for commercial fishing. In addition, the lack of an adequate facility may impose some constraints on economic growth in the area through reduced boating-related commercial enterprise and employment opportunities. Without improvements implemented at the site, there will continue to be a danger to lives due to the restricted launchings of rescue boats.

The resident population and small business activity will continue to grow in the study area. With the ever-increasing number of commercial fishermen, greater demands are being placed for an additional or improved boating facility. In recent years, the export of fresh fish to local and mainland markets have been making increasing contributions to the gross economic output of the area. Commercial fishing is fast becoming an important economic mainstay of the North Hilo District.

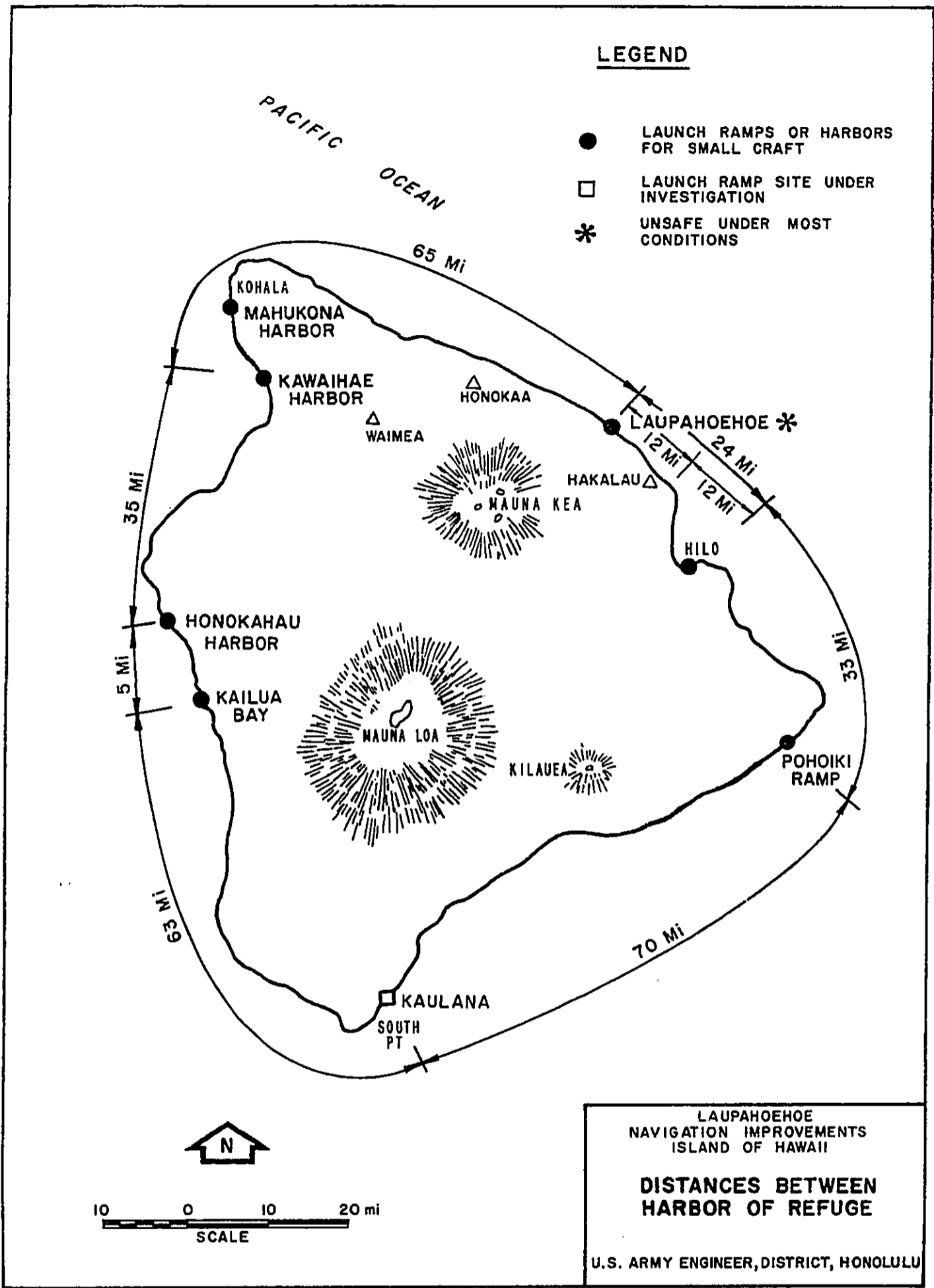


FIGURE 3

Desired Improvements

Commercial fishermen who have used the existing facilities at Laupahoehoe in the past have stated the need to protect the launch ramp from wave action and to improve the general navigation conditions in the bay. At a public workshop held on 26 October 1982, the boaters expressed the need for surge reduction and the elimination of breaking waves at the launch ramp. The urgency of the problem was emphasized at the 13 December 1983 public meeting.

Planning Objectives

The formulation of planning objectives for the study was completed in two stages. First, preliminary analyses of social, economic and environmental resources were performed in conjunction with the identification of the problems and needs related to light-draft navigation. Based on the analyses and the stated views of the County, the most immediate navigation needs are focused on commercial fishing.

Next, planning objectives were formulated to satisfy the specific light-draft navigational needs of commercial fishing. The following planning objectives served as guides in the formulation and evaluation of alternative plans for navigational improvements on the Big Island.

1. Improve commercial fishing opportunities in the North Hilo and Hamakua Districts during the 1985-2135 period of analysis.
2. Improve the recreational boating opportunities for the people of the North Hilo and Hamakua Districts.
3. Provide protection for trailer boat launching and recovery during all but storm conditions.
4. Limit the protected water area to launch and recovery operations, allowing sufficient maneuvering room.
5. Minimize conflicts with existing and planned uses of the affected area.

Formulation and Evaluation Concepts

Alternative measures were developed and evaluated to resolve the problems and needs of the study area and to fulfill the planning objectives defined in the previous section. Possible measures need not necessarily be within the Corps of Engineers' authority or capabilities. If favorable or superior measures are available outside the Corps of Engineers authorities, the final recommendations will also indicate these alternative measures. The initial step in the formulation process is the identification of broad measures (nonstructural or structural) available to resolve the problems. If structural measures are considered to be the best solution to meet the planning objectives, the second step is to identify and evaluate potential sites where structural solutions can be constructed with minimal adverse impacts. After the selection of a suitable project site or sites, specific design layouts can be formulated and evaluated. Those plans that meet the planning objectives and local desires can then be identified.

Available Measures

Nonstructural Alternatives. Nonstructural alternatives or measures are those actions that can meet the planning objectives without constructing new facilities. Typical measures include improving the efficiency of existing facilities or the conversion of other existing facilities.

The general lack of any public waterfront, harbor or protected boating facility in the North Hilo area makes it difficult to apply nonstructural alternatives as a management option. The next closest safe launch ramps are located at Hilo (24 nautical miles) and Kawaihae (65 nautical miles) away (Figure 3).

Although not intended to provide all-weather navigation protection, improving the navigation conditions for fair through marginal weather would greatly enhance fishing opportunities by increasing the percentage of time a vessel can use the launch facility. To meet the needs of these vessels, a protected basin to launch and retrieve boats is considered necessary for the safety and well-being of North Hilo fishermen.

Structural Alternatives. The following design and evaluation criteria were developed to analyze the potential specific harbor configurations:

(a) General Technical Criteria

(1) The design of the protective structure allows for an overtopping criteria by a design wave which may be expected from a severe combination of meteorological and hydrological conditions that are reasonably characteristic of the area.

(2) The entrance channel is to be of adequate depth and width to safely accommodate one-way traffic by the design vessel and the turning basin is to provide a safe maneuvering area. The prevailing wind and wave approach directions are to be evaluated to determine safe channel alignments for navigation. To insure navigational safety, the severity of turns (dog legs) of the entrance channel should be minimized and the widening (flaring) of the channel at the turns are to be provided. The protected basin is to have a maximum wave amplitude of 3 feet to insure minimal damage to vessels.

(3) Navigation improvements would be designed to accommodate a design vessel of 27-foot length, 7-foot beam, and a 3.5-foot draft. The proposed project is to provide safe navigation and protection during all weather and sea conditions except severe storms.

(4) Structural and foundation criteria should be applicable for an earthquake Zone 3 area.

(b) General Economic Criteria.

(1) The benefits should exceed the costs and the net benefits, as far as practicable, should be maximized.

(2) The costs for alternative plans of improvement are to be based on the latest unit prices and assumptions based on the prevailing conditions. The benefits and costs are to be expressed in comparable quantitative economic terms to the fullest extent possible. Annual costs are to be based on a 51-year amortization period and a 8-1/8 percent interest rate^{1/}. The annual charges include the expected annual maintenance cost.

(c) General Environmental Criteria.

(1) Identify, assess, and evaluate all forms of fish and wildlife which may be affected.

(2) Minimize long-term disturbances to the physical environment (e.g., water circulation, water quality and sediment transport) which may have secondary impacts on the living resources that inhabit the site.

(3) Preserve archaeological and historical resources.

(d) Other Concepts. The following general concepts were also used to guide the formulation, assessment and evaluation of alternative harbor plans:

(1) Both adverse and beneficial impacts of alternative plans are to be identified and measured, and the beneficial or adverse contributions of each plan evaluated.

(2) Alternative plans which maximize net economic benefits (National Economic Development--NED plan).

(3) Minimize conflicts with local land-use policy and physical community disruption.

Identification of Potential Sites

As expressed in the problems and needs section of this study, the construction of a protected basin was considered essential to commercial fishermen. A protected basin would permit safe passage of fishing boats during sudden storm conditions and provide safe launch and recovery operations. With improved conditions, increased fishing capabilities of existing boaters are anticipated. The initial step is to identify potential sites. The number of potential sites can then be reduced by eliminating areas that would not meet our preliminary environmental, economic and land-use concerns. The alternative of no development was considered but rejected because it would not meet the expressed desire for improvement which is the basic objective of this study.

Potential sites were restricted to the Hamakua coastline of the Big Island in the North Hilo and Hamakua Districts. Areas along the remaining coastline were considered too far from fishing grounds in the northeast coastal waters.

^{1/} As established by the US Water Resources Council.

In 1977, a report titled "Preliminary Planning for Small Craft Facilities in East Hawaii" was prepared for the Corps of Engineers under the Hilo Area Comprehensive Study. The purpose of the study was to identify needs and alternatives for small craft facilities in East Hawaii. The sites proposed under the Hilo Comp Study shown on Figure 4, were extracted from numerous sources such as previous studies, government agency recommendations, field observations and community input. Numerous public workshops were held to select sites and alternatives in which participants felt further exploration and consideration was necessary. Of the seventeen sites which were proposed in the Hilo area, only two were identified along the Hamakua Coast-- Laupahoehoe and Hakalau (Figure 5). Available sites along the coast are few due to rough sea conditions. No other location was identified by Hawaii County agencies or by the general public workshops.

Laupahoehoe. The Laupahoehoe site is situated approximately 25 miles from the city of Hilo. In 1971, the Hawaii County constructed a launching ramp at Laupahoehoe Point. This launching facility has since been the only one provided to service the Hamakua and North Hilo districts. Historically, the launching site was a freight landing where livestock was imported to the area.

(a) The Laupahoehoe site is located on a peninsula on the Hamakua coastline. The County of Hawaii's Laupahoehoe Point Park borders the shoreline of Laupahoehoe Point. It is relatively flat and open with scattered coco palms and ironwood trees. Cliffs form a steep backdrop to the seaside park, making the park accessible only by a narrow, winding cliff road. Although the existing ramp is in a small semi-sheltered cove, waves reflect off the adjacent rocky shoreline onto the ramp and dock area creating severe surge. Laupahoehoe Point faces roughly East and generally is subject to a wave spectrum from the north clockwise to the southeast.

(b) Land Use. The land around the Laupahoehoe site is owned by Hawaii County. The 19.4 acre County park provides many opportunities for recreational use, including fishing, picnicking and engaging in sports on the open field. A Laupahoehoe Point Park Master Plan has been developed for the County by the office of George S. Walters, landscape architect.

(c) Existing Facilities. Facilities include a 21-foot wide launch ramp, a concrete loading dock, a pavilion, restrooms, picnic areas and parking for approximately 8 cars with trailers.

(d) Summary. There are two probable spots at Laupahoehoe Point Park in which facilities may be developed, one on the west side (Site 1) where the existing ramp is located and the other on the east (Site 2) in a small rock-formed inlet. (Figure 6)

Frequent storm waves from the northwest ("Maui Waves") which collide on the western shoreline of the point would be very difficult to protect against. An extensive breakwater structure would probably be needed at Site 2. Sufficient land is available for backup facilities at this site. Dredging of the inlet would be necessary.

A small breakwater and wave absorber would be needed at Site 1 to secure safe launching conditions. A turning basin and refuge area could be blasted out of the existing parking area to create a harbor.

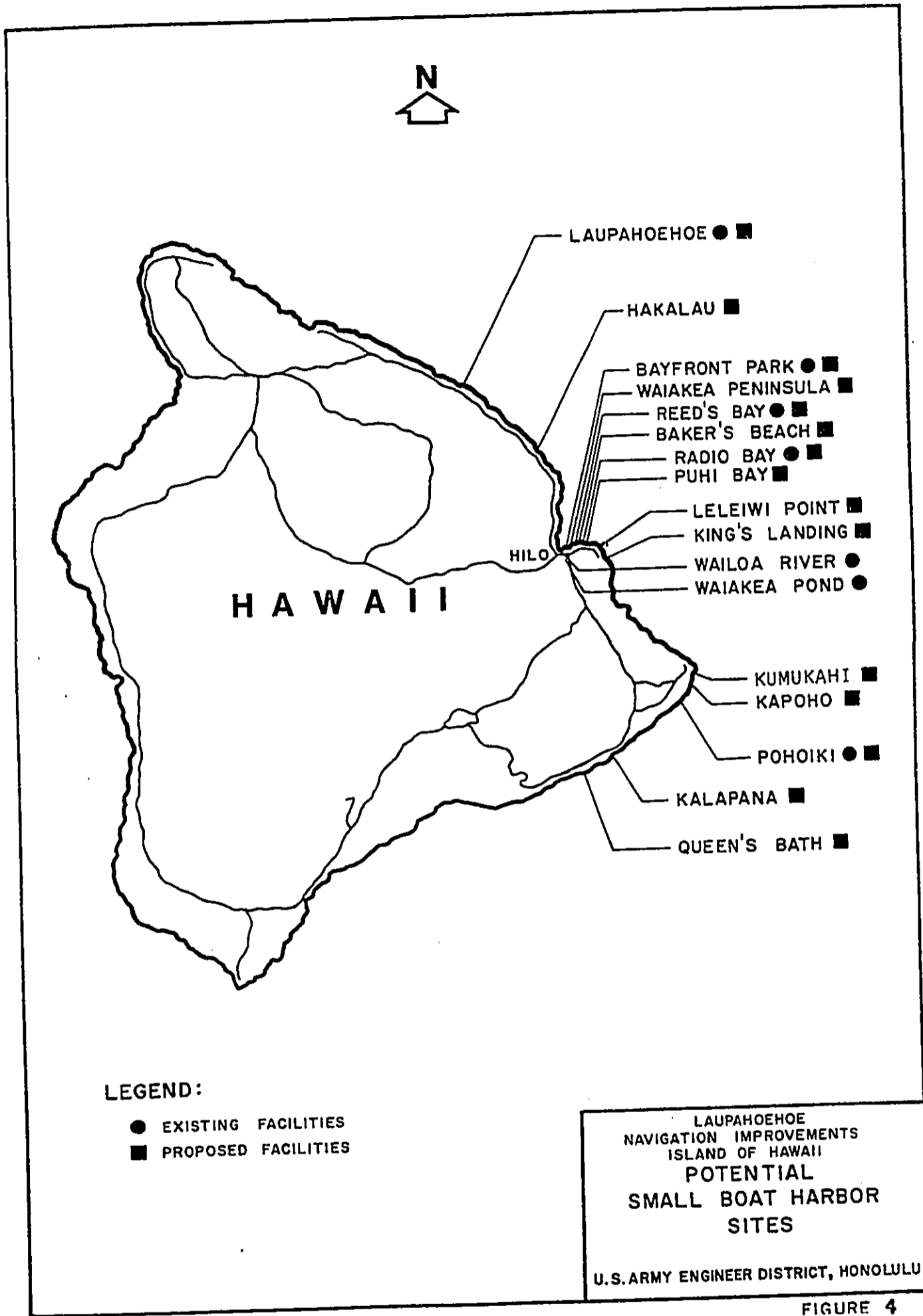


FIGURE 4

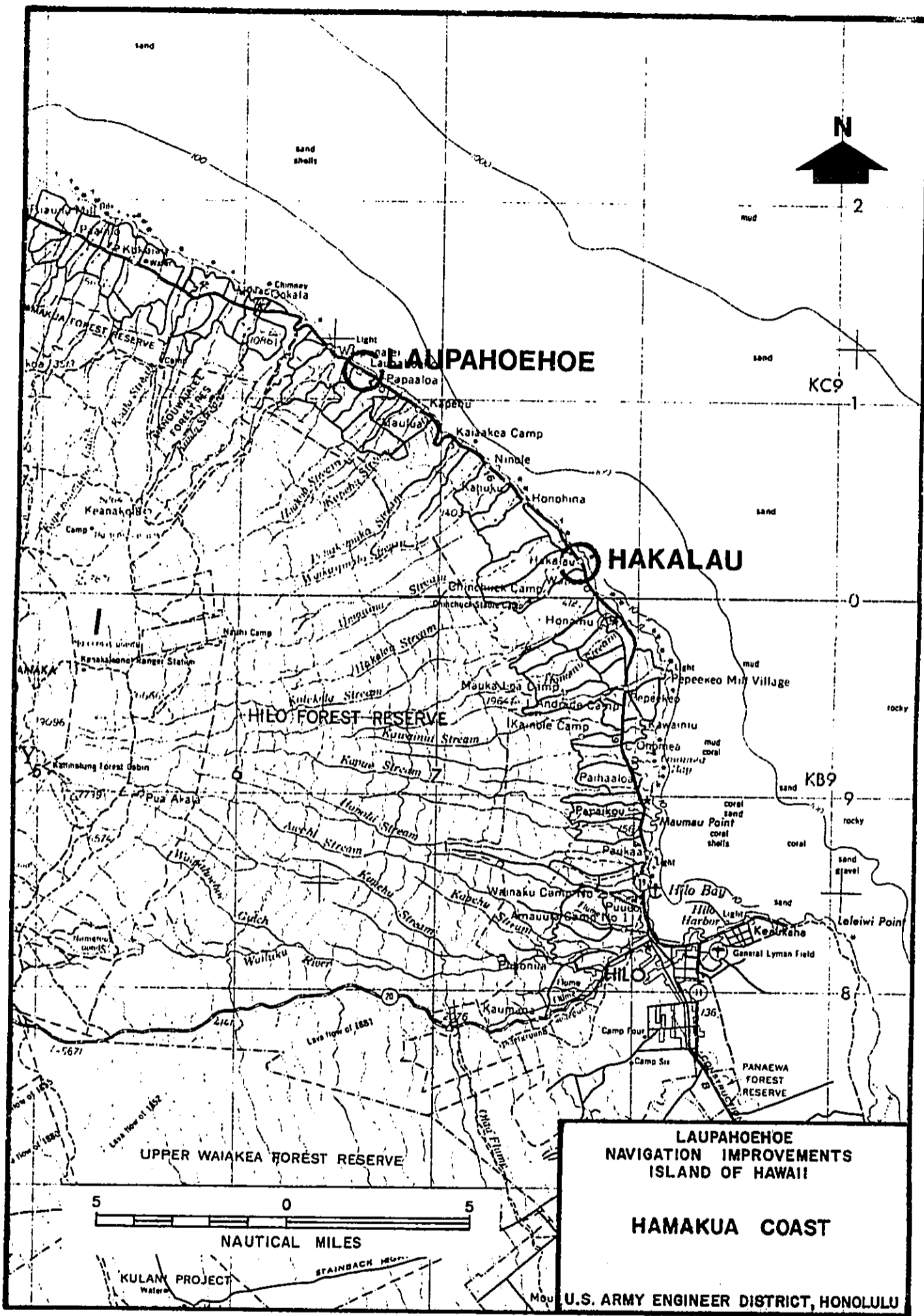


FIGURE 5

Site 1 is preferred to Site 2 by local residents who use the launching facilities at Laupahoehoe because of the periodic northwest storm waves which sometimes carry boulders into the park picnic area.

Hakalau. The Hakalau site is located between Hilo and Laupahoehoe at the mouth of the Hakalau Stream (Figure 5). This was formerly the site of the Hakalau Sugar Mill which has recently shut down. The Hakalau site was proposed by the Statewide Boat Launching Facilities Master Plan to house a new facility which would provide safe launching for North Hilo boaters. Field surveys taken along the Hamakua Coast indicate that because of rough offshore conditions, this is the only other feasible site available.

(a) Physical Features. The Hakalau site is in the Hakalau Bay at the bottom of a valley on the Hamakua Coast. The shoreline is rocky with silt at the mouth of the stream where waste bagasse was stored and flushed into the ocean when the sugar mill was still operational. Waters offshore are choppy and rough at times. The site is directly exposed to incoming waves.

(b) Land Use. The land at the site is privately owned, but Hawaii County may possibly develop the site into a park which could incorporate small craft facilities in the plan. Presently, auto access to the Hakalau site is very poor and extremely difficult. The waters in and around this site are fished by shoreline fishermen.

(c) Existing Facilities. None

(d) Summary. The offshore conditions at Hakalau are rough. In addition, the entire area is privately owned and access is very difficult to the site. Local boaters feel that this site is too close to Hilo Harbor to significantly reduce travel time to the preferred fishing grounds farther north.

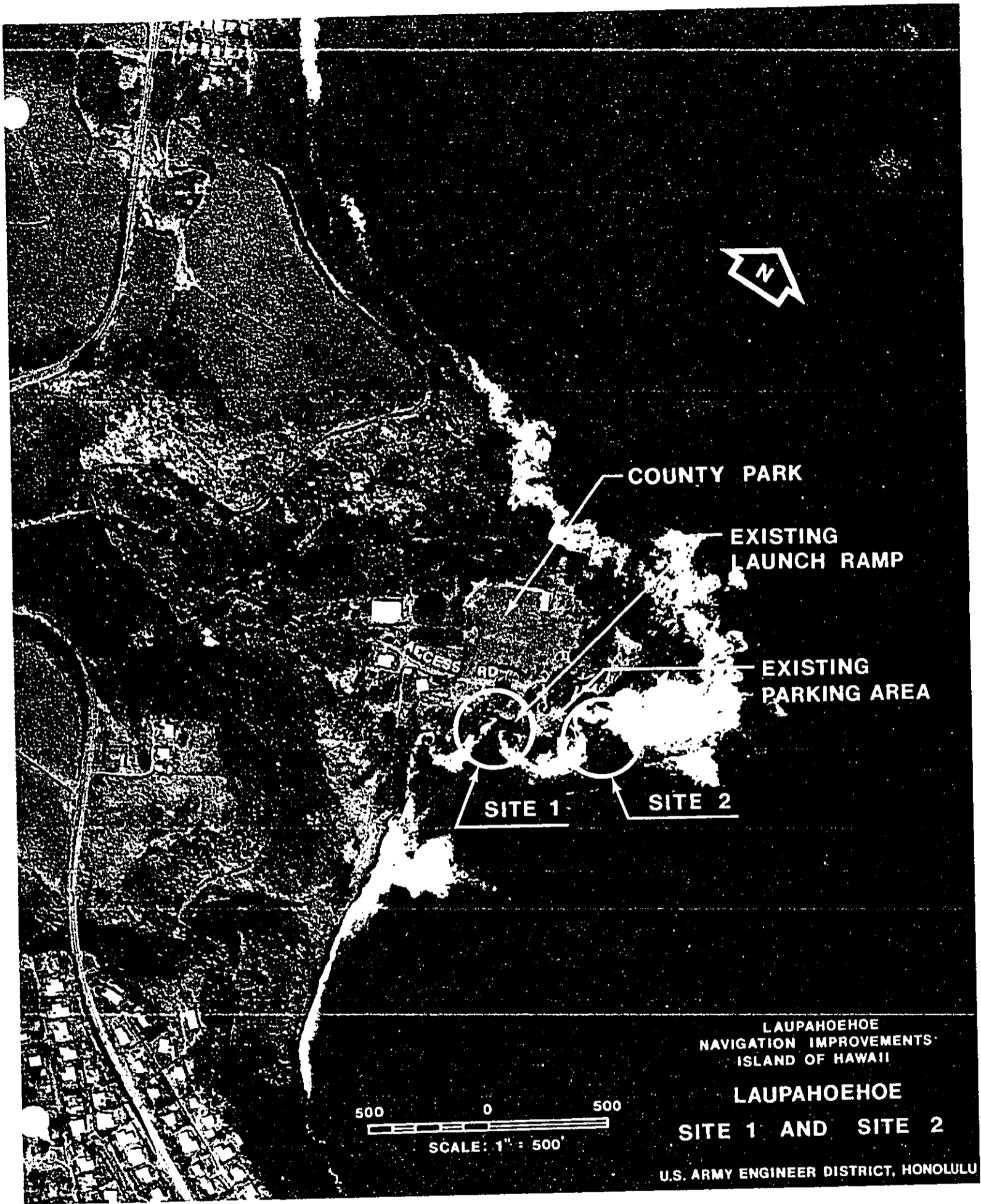
Screening of Potential Sites

Table 4 provides an overview of the various items considered in the selection of a site.

Hakalau does not fully meet the planning objectives of improving fishing opportunities in the North Hilo District by providing protection for trailer boat launching and recovery operations because of its proximity to Hilo Harbor. Located just 12 miles north of Hilo, travel time to the north Hilo fishing grounds would not be reduced significantly.

In addition, the offshore conditions at Hakalau are rougher than at Laupahoehoe and there are no environmental, social, or economic advantages to be gained by the Hakalau site over Laupahoehoe.

Two potential sites for development were identified at Laupahoehoe Point. Both sites meet the planning objectives of improving fishing opportunities and providing a harbor of refuge along the rugged Hamakua coast. Site 1, on the west side, is where the existing ramp is located and Site 2 is located on the east in a small rock-formed inlet. Storm wave exposure is more direct at Site 2 and a more extensive breakwater is necessary. Site 1 could be used under more sea conditions than Site 2.



COUNTY PARK

EXISTING
LAUNCH RAMP

EXISTING
PARKING AREA

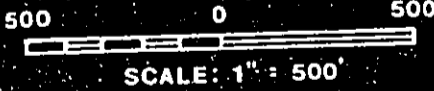
SITE 1

SITE 2

ACCESS RD

LAUPAHOEHOE
NAVIGATION IMPROVEMENTS
ISLAND OF HAWAII

LAUPAHOEHOE
SITE 1 AND SITE 2



U.S. ARMY ENGINEER DISTRICT, HONOLULU

Topography at Site 2 shows extensive blasting and dredging of the entrance channel and turning basin would be required. Therefore, fish and wildlife impacts at Site 2 would be greater than at Site 1. Social and cultural impacts are minimal and approximately equal at either site.

Based on the overall comparison of sites, state and local concerns, project construction costs, and fulfillment of planning objectives, Laupahoehoe Site 1 was selected for further detailed studies.

Development of Alternative Plans

Further investigations were conducted at Laupahoehoe Site 1 in order to better evaluate the existing conditions of the potential site and to prepare more detailed analysis and design.

(a) Hydrographic and topographic surveys were conducted at Laupahoehoe Point.

(b) Geotechnical investigations were completed by the Corps of Engineers. Investigations were limited to the vicinity of the bay and adjacent land areas. Preliminary foundation criteria were based on visual underwater inspections and their limitations are recognized. It would not be justified at this time to obtain costly offshore borings of the Laupahoehoe site. A conservative design can first be implemented based on the geotechnical data gathered from these investigations for the purposes of initial design and cost estimates. Reasonable ranges in design and cost reduction can be incorporated to determine if a less conservative design, which can later be substantiated by more detailed subsurface investigations, would reduce the overall costs (see Geotechnical Appendix for the foundations investigation analysis and program).

TABLE 4.
PRELIMINARY SCREENING OF ALTERNATIVE SITES

CRITERIA	HAKALAU	LAUPAHOEHOE SITE 1	LAUPAHOEHOE SITE 2
Meet planning objective of improving commercial fishing opportunities	Partially - too close to Hilo	Yes	Yes
Vehicular access to site	Poor	Accessible by narrow cliff road	Accessible by narrow cliff road
Access of site by design vessel	Moderate dredging required	Moderate dredging required	Extensive dredging required
Area to accommodate harbor	Adequate	Adequate	Adequate
Compatibility with existing land uses	No existing land uses	Compatible - presently used for launching	Compatible
Exposure	Directly exposed to incoming waves-extensive breakwater reqd.	Partially protected-short breakwater reqd.	Directly exposed to incoming waves-extensive breakwater reqd.
Landownership	Private	County	County
Existing facilities	None	Launch ramp, parking, rest-rooms, picnic area	Parking, rest-rooms, picnic areas
Environmental impacts on terrestrial or marine habitat	Not known	No significant impact anticipated	No significant impact anticipated
Archaeological/historical resources	Not known	None in area	None in area

(c) Archaeological/cultural reconnaissance. An archaeological reconnaissance was conducted to determine whether historic properties were situated near or within the project sites. Of particular importance was the determination of potential significance of historic properties known to be in the project area, if any, and whether actions to avoid or mitigate impacts to such properties were needed. Appendix G includes a summary of the reconnaissance findings.

Description of Alternative Plans

Based on the identified problems and needs, the planning objectives, and the formulation and evaluation concepts, the three alternative design plans for Laupahoehoe Site 1 were developed in detail and evaluated with respect to their contributions to navigation improvements, their beneficial and adverse impacts and their benefits and costs. Two of the alternative plans would involve constructing and providing protection for a new launch ramp while the other plan would provide protection for the existing ramp. A protected basin would provide adequate safety for launching and retrieval operations. Ample parking for car/trailer vehicles is available in areas adjacent to the existing and proposed ramp. However, the county has posted a sign, "Boat Ramp Closed, Do Not Use." Therefore, it is expected that no one will use the ramp.

Benefits. Under current conditions, safe launch and recovery at Laupahoehoe ramp is not possible. Plan 1 and Plan 2 proposed improvements would permit safe launch and recovery an estimated 75 percent of the time (See Appendix D for percent usage justification). Plan 3, with a shorter breakwater, is estimated to permit safe launching and recovery an estimated 70 percent of the time. Benefits accruing from each plan were derived from navigation benefits and expected improvements in commercial fishing due to safer launching conditions. Economic evaluations were conducted in accordance with procedures and standards prescribed by the Water Resources Council and Corps of Engineers' policy. The computations are based on an 8-1/8 percent interest rate and a 50-year project life. The project base year, 1985, is when benefits are expected to begin accruing to the proposed harbor. Benefits are based on 1983 price levels. A detailed economic analysis is presented in Appendix E.

Costs. Estimated project first costs were developed from October 1983 price levels and assumptions based on the prevailing physical conditions and construction methods suitable to the project area. The average annual cost for the purposes of the benefit to cost comparison include interest (8-1/8 percent) and amortization (50 years) of the project first cost and the estimated annual maintenance costs associated with maintenance dredging, repairs to the breakwater structure, and maintenance for aids to navigation. Cost breakdowns and assumptions are provided in Appendix D.

Cost Apportionment. The apportionment of costs between Federal and non-Federal interests corresponds to Section 107 of the River and Harbor Act of 1960, as amended, which limits Federal participation in this type of project to a monetary maximum of \$2 million. This Federal limit excludes the cost of aids to navigation, but does include the costs of preauthorization studies. There are also guidelines on the cost sharing of light-draft navigation facilities which apportion costs based on the allocation of benefits between general and local interests. The relative proportion of

benefits allocated to general and local interests determines the apportionment of costs to Federal and non-Federal interests, respectively. The cost sharing percentages determined by this method apply to the Federal portion of the project (i.e., cost of breakwater, wave absorber, dredging of entrance channel, turning basin, engineering and design, supervision and administration, and contingency costs). At Laupahoehoe, 100% of the benefits are related to commercial fishing and accrue to general interest and are 100% Federal costs. The costs of the launch ramp, parking area and shoreside facilities, utilities, necessary lands, easements and rights-of-way are entirely local costs.

Plan 1 Description: Plan 1, shown on Figure 7, consists of a 205-foot long, 90-foot wide, and 9-foot deep entrance channel; 100-foot long, 100-foot wide, and 7.5-foot deep turning basin; 60-foot long wave absorber; and a rubble mound breakwater capped with dolos, approximately 285 feet long. A new launch ramp will be provided by the local sponsor.

TABLE 5. PLAN 1 COSTS AND BENEFITS (\$)

Construction Cost	2,925,000
US Coast Guard Aids to Navigation	20,000
Engineering, Design, Supervision and Administration (E&D, S&A)	259,000
Project First Cost	3,204,000
Interest During Construction (IDC) <u>1/</u>	141,000
Project Investment Cost <u>2/</u>	3,345,000
Total Project Investment <u>3/</u>	3,653,000
Interest & Amortization (.08292 or 8-1/8%) on the Project Investment Cost	277,000
Annual Operation & Maintenance (O&M) Cost	11,000
Total Average Annual Cost	288,000
Average Annual Benefits	282,000
Benefit - Cost Ratio	0.98
Net NED Benefits	-6,000

1/ $IDC = A(1 + i)^{n/2} - A$
 where A = Project First Cost
 i = interest rate = .08125
 n = construction period in years = 1.1

2/ Excludes preauthorization study costs of \$308,000.

3/ Includes preauthorization study costs of \$308,000.

COST APPORTIONMENT (\$)

	<u>NON-FEDERAL</u>	<u>FEDERAL</u>	<u>TOTAL</u>
Project Investment Cost <u>1/</u>	1,653,000	1,692,000	3,345,000
Average Annual Costs	137,000	140,000	277,000
O&M Costs	---	11,000	11,000
Total Annual Cost	137,000	151,000	288,000

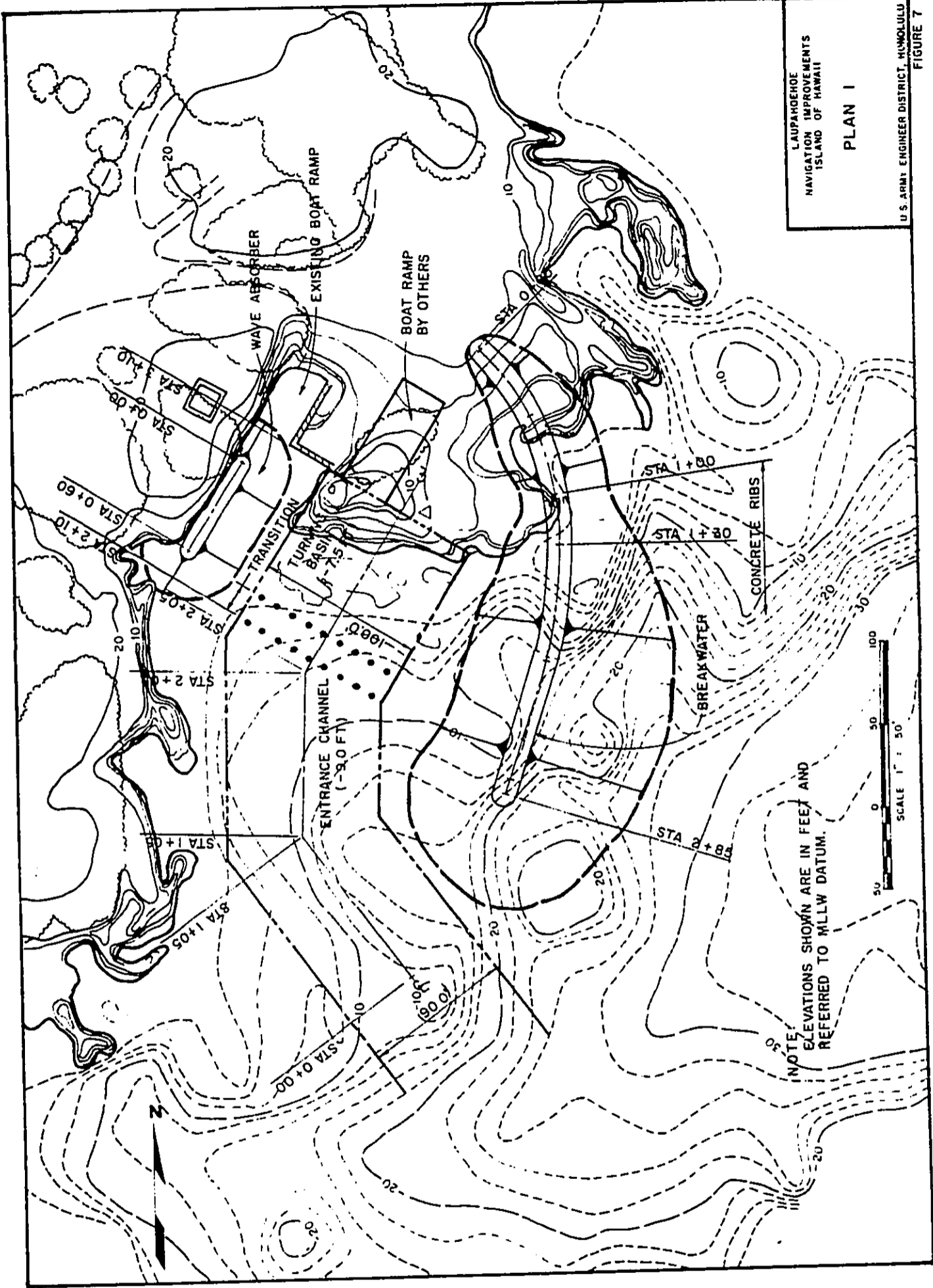
1/ Excludes cost of preauthorization studies (\$308,000) and cost of miscellaneous shoreside facilities.

Impact Assessment. No significant environmental impacts are expected. There will be no effect on any species of plant or animal which is listed, proposed, or candidate for listing as a threatened or endangered species.

Mitigation Requirements. None.

Implementation Responsibilities. The Corps would provide overall management for implementation and the local sponsor would be responsible for the launch ramp and all future shoreside and parking facilities.

Cost Allocation. None.



Plan 2 Description: Plan 2, shown on Figure 8, consists of a natural entrance channel (90-foot wide and 9-foot deep); 100-foot wide, varying in length from 100 to 170 feet and 7.5-foot deep turning basin; 60-foot long wave and rubble mound breakwater capped with dolos approximately 255 feet long. A new launch ramp will be provided by the local sponsor.

TABLE 6. PLAN 2 COSTS AND BENEFITS (\$)

Construction Cost	2,782,000
US Coast Guard Aids to Navigation	20,000
Engineering, Design, Supervision and Administration (E&D, S&A)	250,000
Project First Cost	3,052,000
Interest During Construction (IDC)	134,000
Project Investment Cost ^{1/}	3,186,000
Total Project Investment ^{2/}	3,494,000
Interest & Amortization (.08292 or 8-1/8%) on the Project Investment Cost	264,000
Annual Operation & Maintenance (O&M) Cost	11,000
Total Average Annual Cost	275,000
Average Annual Benefits	282,000
Benefit - Cost Ratio	1.03
Net NED Benefits	7,000

^{1/} Excludes preauthorization study costs of \$308,000

^{2/} Includes preauthorization study costs of \$308,000

COST APPORTIONMENT (\$)

	<u>NON-FEDERAL</u>	<u>FEDERAL</u>	<u>TOTAL</u>
Project Investment Cost ^{1/}	1,494,000	1,692,000	3,186,000
Average Annual Costs	124,000	140,000	264,000
O&M Costs	---	11,000	11,000
Total Annual Cost	124,000	151,000	275,000

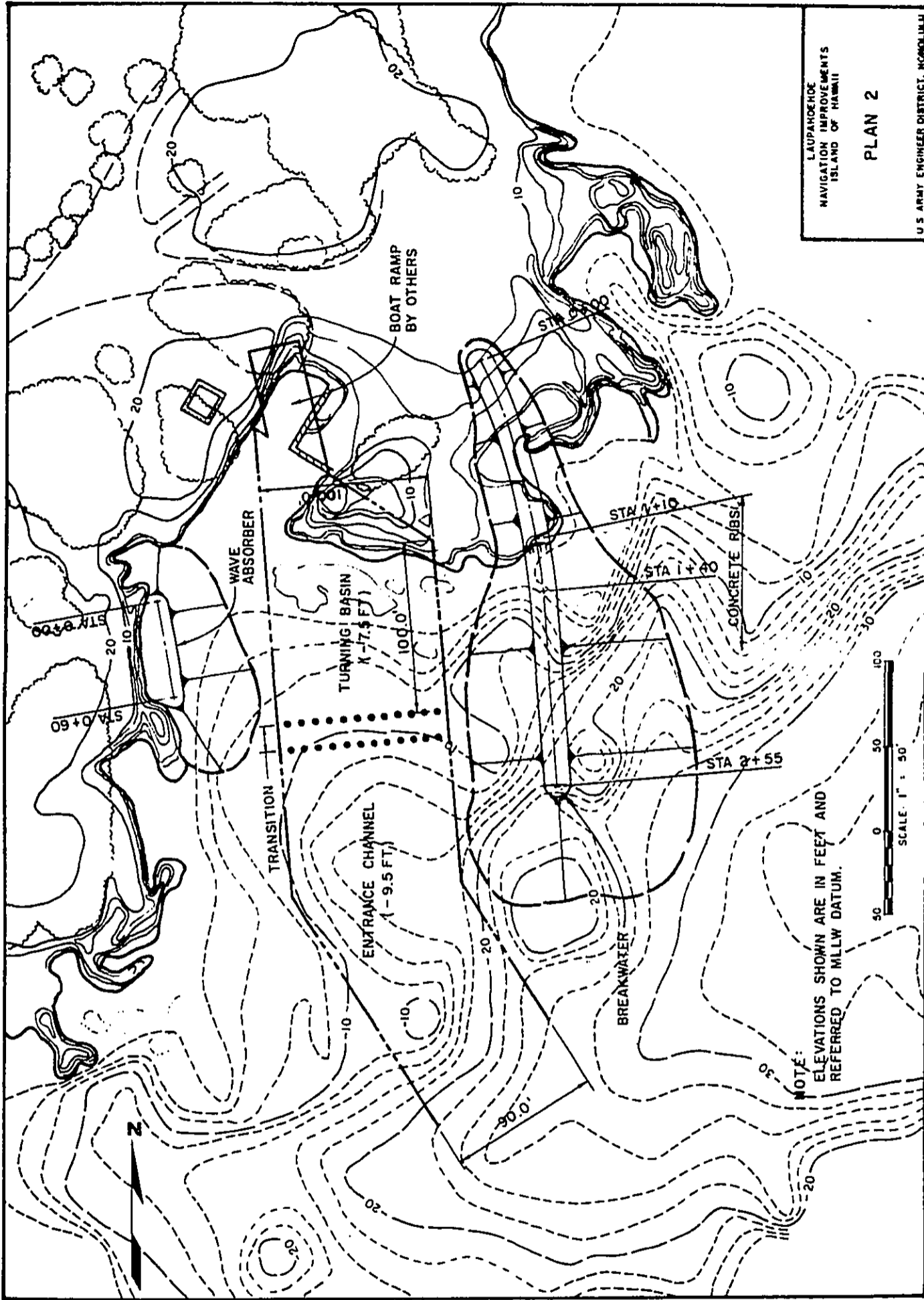
^{1/} Excludes cost of preauthorization studies (\$308,000) and cost of miscellaneous shoreside facilities.

Impact Assessment. No significant environmental impacts are expected. There will be no effect on any species of plant or animal which is listed, proposed, or candidate for listing as a threatened or endangered species.

Mitigation Requirements. None.

Implementation Responsibilities. The Corps would provide overall management for implementation and the local sponsor would be responsible for the launch ramp and all future shoreside and parking facilities.

Cost Allocation. None.



LAUPAHOEHOE
 NAVIGATION IMPROVEMENTS
 ISLAND OF HAWAII
 PLAN 2
 U.S. ARMY ENGINEER DISTRICT, HONOLULU

FIGURE 8

NOTE:
 ELEVATIONS SHOWN ARE IN FEET AND
 REFERRED TO MLLW DATUM.

Plan 3 Description: Plan 3, shown on Figure 9, consists of a natural entrance channel (90-foot wide and 9-foot deep); 100-foot wide, varying in length from 100 to 140 feet and 7.5-foot deep turning basin; 60-foot long wave absorber; and rubble mound breakwater capped with dolos approximately 200 feet long. A new launch ramp will be provided by the local sponsor.

TABLE 7. PLAN 3 COSTS AND BENEFITS (\$)

Construction Cost	1,915,000
US Coast Guard Aids to Navigation	20,000
Engineering, Design, Supervision and Administration (E&D, S&A)	198,000
Project First Cost	2,133,000
Interest During Construction (IDC)	85,000
Project Investment Cost ^{1/}	2,218,000
Total Project Investment ^{2/}	2,526,000
Interest & Amortization (.08292 or 8-1/8%) on the Project Investment Cost	184,000
Annual Operation & Maintenance (O&M) Cost	8,000
Total Average Annual Cost	192,000
Average Annual Benefits	263,000
Benefit - Cost Ratio	1.4
Net NED Benefits	71,000

^{1/} Excludes preauthorization study costs of \$308,000.

^{2/} Includes preauthorization study costs of \$308,000.

COST APPORTIONMENT (\$)

	<u>NON-FEDERAL</u>	<u>FEDERAL</u>	<u>TOTAL</u>
Project Investment Cost ^{1/}	526,000	1,692,000	2,218,000
Average Annual Costs	44,000	140,000	184,000
O&M Costs	---	8,000	8,000
Total Annual Cost	44,000	148,000	192,000

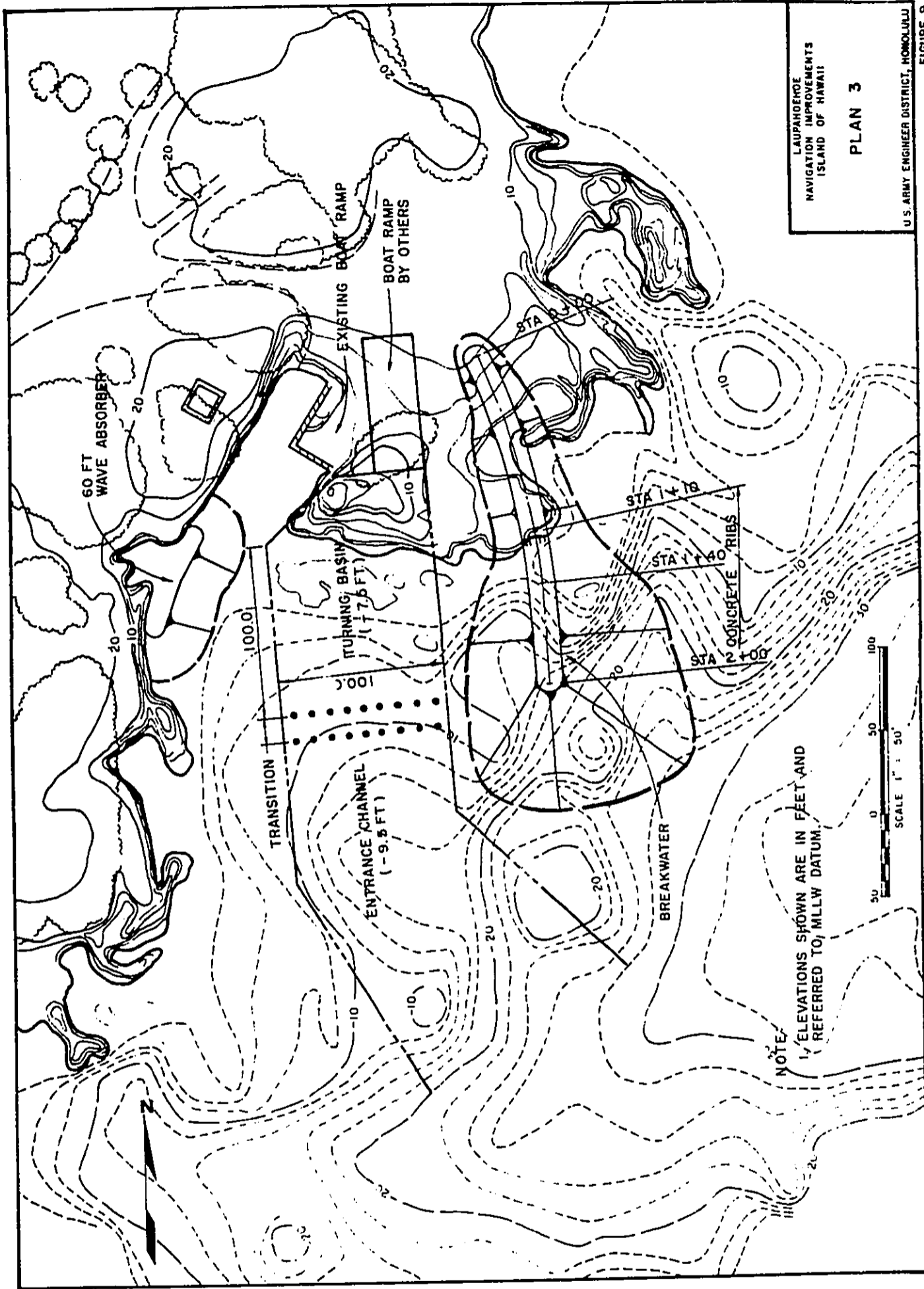
^{1/} Excludes cost of preauthorization studies (\$308,000) and cost of miscellaneous shoreside facilities.

Impact Assessment. No significant environmental impacts are expected. There will be no effect on any species of plant or animal which is listed, proposed, or candidate for listing as a threatened or endangered species.

Mitigation Requirements. None.

Implementation Responsibilities. The Corps would provide overall management for implementation and the local sponsor would be responsible for the launch ramp and all future shoreside and parking facilities.

Cost Allocation. None.



Planning Considerations.

a. Aids to Navigation. The U.S. Coast Guard will provide the necessary aids to navigation for the selected site and plan. These aids are a Federal cost and are not included in the maximum Corps of Engineers monetary limitation under the authorizing authority.

b. Dredged Material. During alternative design, the quantities of dredged material and necessary coral fill were balanced as closely as the specific designs permitted.

c. Disposal Site. An upland disposal site on private lands has been identified approximately 1 mile from the project site. The Yamada and Sons rock quarry has sufficient land suitable for random fill to dispose of any excess material generated during excavation.

d. Construction Material Sources. Selected rock materials from the project excavation would be appropriate for use as armor or underlayer material. However, excavated materials would account for only a small percentage of the suitable rock needed for the breakwater. Most of the rock excavated will be welded clinker which is not acceptable as armor or underlayer stone. These materials could, however, be used as core materials for the interior of the breakwater.

All excavated materials may be used for grading the site provided they are broken down to appropriate sizes to facilitate placement. Sands and other suitable materials should be used as fill material under pavements or as overlot grading material.

Armor and underlayer are available at existing commercial quarry operations at Hilo or at the stockpile area at Honokohau Harbor. Armor stone sizes of 5 to 10 tons will be required.

e. Access Road. The project site is presently accessible by a narrow, winding cliff road. Any improvements to the access road will be a local concern.

Benefits and Costs Summary

Table 8 presents a summary of the estimated average annual benefits to average annual costs associated with each plan.

TABLE 8. SUMMARY OF COSTS AND BENEFITS (\$)

	<u>Plan 1</u>	<u>Plan 2</u>	<u>Plan 3</u>
Project Investment Cost ^{1/}	3,345,000	3,186,000	2,218,000
Federal Share	1,692,000	1,692,000	1,692,000
Non-Federal Share	1,653,000	1,494,000	526,000
Average Annual Costs	288,000	275,000	192,000
Average Annual Benefits	282,000	282,000	263,000
Net Annual NED Benefits	-6,000	7,000	71,000
Benefit-Cost Ratio	0.98	1.03	1.4

^{1/} Project Investment Cost includes all costs associated with the project except preauthorization study costs of \$308,000.

Rationale for Designation of NED Plan.

Plan 3 is the plan with greatest positive net benefits. It is the NED Plan.

Evaluation of Final Array of Plans

The evaluation of the economic, social and environmental effects of each alternative plan is displayed in Table 9. This table displays the significant contributions, the beneficial and adverse effects, and the extent to which various planning objectives and evaluation criteria met by each plan.

Trade-Off Analyses

Plan 1 makes net deductions from the national economic development account. Plans 2 and 3 make net contributions to NED.

In addition to the economic or monetary factors analyzed for each plan, trade-off analysis must also include the environmental, social, regional and aesthetic effects associated with each plan. Table 9 facilitates the evaluation and comparison of these criteria for each plan.

TABLE 9. COMPARISON OF ALTERNATIVE PLANS AND SYSTEMS OF ACCOUNTS

PLAN DESCRIPTION	NO IMPROVEMENT 'WITHOUT CONDITION'		
	Plan 1	Plan 2	Plan 3
A.	Use of existing facility. Closest safe launching facilities at Hilo Bay, approx 33 miles south.	Construction of 285-foot long breakerwater, 60-foot long wave absorber, dredging of 205-foot long entrance channel and turning basin.	Construction of 255-foot long breakerwater, 60-foot long wave absorber, dredging of an entrance channel 300 ft long and turning basin.
B. SIGNIFICANT IMPACTS			
1. <u>Economic</u>			
Local Government Finance*	None	Requires approximately \$1,653,000 local contribution not including costs for local assurances and cooperation.	Requires approximately \$526,000 local contribution not including costs for local assurances and cooperation.
Land Use	Existing County Park with many opportunities for recreational use.	No change to local land use policy.	Same as Plan 1.
Public Facilities and Services	Existing ramp. Minor shoreside facilities. Water and power at nearby pavillion.	Would provide for safe navigation and launch/recovery of boats and could promote the growth of related public facilities and services.	Same as Plan 1.
Regional Growth*	May impose some constraints on economic growth in the area.	Would increase economic growth due to increased fishing opportunities.	Same as Plan 1.
Employment*	Existing condition. Employment opportunities may be contrained due to reduced commercial fishing opportunities.	Would increase employment opportunities in commercial and general boating related services.	Same as Plan 1.

TABLE 9. COMPARISON OF ALTERNATIVE PLANS AND SYSTEMS OF ACCOUNTS (Continued)

	<u>NO IMPROVEMENT 'WITHOUT CONDITION'</u>	<u>Plan 1</u>	<u>Plan 2</u>	<u>Plan 3</u>
Damages to Boats and Related Equipment	Numerous damages during launch and recovery operations. Twenty percent use factor.	Marked decrease in damages during launch and recovery operations.	Same as Plan 1.	Same as Plan 1.
Commitment of Economic Resources	Not applicable.	Commitment of 9,860 tons of stone and fill, time, manpower and energy resources.	Commitment of 10,430 tons of stone and fill, time, manpower and energy resources.	Commitment of 6,340 tons of stone and fill, time, manpower and energy resources.
<u>2. Environmental</u>				
Marine Environment	No change.	1.10 acres dredged or covered. (1,6,9)	0.80 acres dredged or covered. (1,6,9)	0.56 acres dredged or covered. (1,6,9)
Terrestrial Environment	No change.	0.24 acres modified. (1,5,9)	0.16 acres modified. (1,5,9)	0.23 acres modified. (1,5,9)
Fish and Wildlife	Common introduced species of animals, diverse and abundant fishes and invertebrates.	Dredging will remove the tops of some coral heads; blasting will kill some invertebrates and fish and the break-water will smother some benthic organisms. (1,6,9)	Same as Plan 1.	Same as Plan 1.

TABLE 9. COMPARISON OF ALTERNATIVE PLANS AND SYSTEMS OF ACCOUNTS (Continued)

	NO IMPROVEMENT 'WITHOUT CONDITION'		
	Plan 1	Plan 2	Plan 3
Water Quality*			
Temporary Increase in Water Turbidity Anticipated During Construction; Grossly Estimated by Length of Construction Time and Quantity of Material Removed	Good, no significant sources of pollution. Classified as Category A Oceanic Waters by State of Hawaii.	No marine dredging.	No marine dredging.
	13 months. 900 cubic yards. (1,6,9)		
Long-Term Alterations to Water Quality	Not Applicable.	Same as Plan 1.	Same as Plan 1.
			No significant effect expected except for slight increase in petrochemicals and fish related pollutants. (1,6,9)
Circulation & Flushing			
Increase in Water Residence Time	No.	Yes. (1,6,9)	Yes. (1,6,9)
Air Quality*			
Dust Nuisance Estimated by Length of Construction Period	Good, no major sources of air pollution, except vehicle exhausts.	Same as Plan 1.	Same as Plan 1.
			Fish odors and vehicle exhaust fumes will increase (during construction dust and other air pollutants will increase.)

TABLE 9. COMPARISON OF ALTERNATIVE PLANS AND SYSTEMS OF ACCOUNTS

	Plan 1	Plan 2	Plan 3
Natural Resources*	<p>NO IMPROVEMENT 'WITHOUT CONDITION'</p> <p>Natural, unaltered shoreline except for existing ramp and natural bay area.</p>	<p>Would commit approx. 1.10 acres of natural marine environment to navigation improvements and 9,860 tons of quarried stone for protective structure. (1,6,9)</p>	<p>Would commit approx. 0.56 acres of natural marine environment to navigation improvements and 6,340 tons of quarried stone for protective structure. (1,6,9)</p>
Man-Made Resources*	<p>Continued demand for safe boating facility.</p>	<p>Completes boating facility for safe navigation. (1,6,9)</p>	<p>Same as Plan 1.</p>
3. Social			
Noise*	<p>Noise level low, no sources of high sound levels in area.</p>	<p>Vehicle related noise will increase (during construction noise will increase considerably). (1,2,5,10)</p>	<p>Same as Plan 1.</p>
Population*	<p>No impact.</p>	<p>No significant effect on population growth and no displacement of people. (1,2,6,9)</p>	<p>Same as Plan 1.</p>
Aesthetic Values*	<p>No change.</p>	<p>Visual intrusion from breakwater. (1,6,9)</p>	<p>Same as Plan 1.</p>
Historic, Cultural, and Archaeological Resources	<p>No sites listed on the National or State Register of Historic Places, but monument of 1946 tsunami located on cliff overlooking present ramp.</p>	<p>No effect.</p>	<p>No effect.</p>

TABLE 9. COMPARISON OF ALTERNATIVE PLANS AND SYSTEMS OF ACCOUNTS (Continued)

	NO IMPROVEMENT 'WITHOUT CONDITION'	Plan 1	Plan 2	Plan 3
Recreational opportunities	No change.	Increase access for sport fishing.		
Health, Safety, and Community Well-Being	Hazardous navigation conditions at Laupahoehoe Point.	Would enhance health, safety and community well-being by providing a protective basin for boating operations. Also decreased accidents at sea. (2,6,8,10)	Same as Plan 1.	Same as Plan 1.
Community Growth and Cohesion*	No change.	No significant change.	Same as Plan 1.	Same as Plan 1.
C. PLAN EVALUATION				
37	1. Contributions to the Planning Objectives			
	Improve Commercial Fishing Opportunities on the Big Island for the Period 1985-2035	Restricts commercial fishing opportunities.	Provides protected basin for operation of trailer boats, contributes to development of commercial fishing, increases efficiency and opportunities for existing fishing operations provides a social and economic commitment on the importance of fishing.	Same as Plan 1.

TABLE 9. COMPARISON OF ALTERNATIVE PLANS AND SYSTEMS OF ACCOUNTS (Continued)

	<u>NO IMPROVEMENT 'WITHOUT CONDITION'</u>	<u>Plan 1</u>	<u>Plan 2</u>	<u>Plan 3</u>
Improve the Socio-Economic Opportunities for the People of the North Hilo and Hamakua	Contributes to socio-economic opportunities.	Provides employment opportunities, provides diversity of Big Island's tax revenue base, produces stability of fish supply and prices.	Same as Plan 1.	Same as Plan 1.
Minimize Alteration to Historical and Cultural Resources of the Area	No modifications.	No modifications.	No modifications.	No modifications.
Minimize Alteration to Bay Marine Environment	No modifications.	1.10 acres modified.	0.80 acres modified.	0.56 acres modified.
2. <u>Response to Specified Criteria</u>				
Providing a Protected Basin that can Accommodate a Typical Fishing Vessel of 27-Foot Length, 7-Foot Beam Width and 2.5-Foot Draft	No.	Yes.	Yes.	Yes.
Providing Ancillary Land Area that can Accommodate Parking.	Yes.	Yes.	Yes.	Yes.

TABLE 9. COMPARISON OF ALTERNATIVE PLANS AND SYSTEMS OF ACCOUNTS (Continued)

	NO IMPROVEMENT 'WITHOUT CONDITION'	Plan 1	Plan 2	Plan 3
Minimize Conflicts with Local Land-Use Policy and Physical Community Disruption	Unchanged.	Yes.	Yes.	Yes.
Enhancing, Preserving, or Minimizing Effects on Marine and Terrestrial Flora and Fauna Resources	Unchanged.	Minimal effects.	Minimal effects.	Minimal effects.
Preserving Archaeological and Historical Resources	Unchanged.	No adverse effects.	No adverse effects.	No adverse effects.
3. <u>Relationship to National Accounts</u>				
National Economic Development (NED)				
Average Annual Benefits	N/A	\$282,000	\$282,000	\$263,000
Average Annual Costs	N/A	288,000	275,000	192,000
Net Annual Benefits	N/A	-6,000	7,000	71,000
Benefit-to-Cost Ratio (B/C)	N/A	0.98	1.03	1.4
Environmental Quality	See item B.2 on this table.			

TABLE 9. COMPARISON OF ALTERNATIVE PLANS AND SYSTEMS OF ACCOUNTS (Continued)

NO IMPROVEMENT
'WITHOUT CONDITION'

Plan 3

Plan 2

Plan 1

See item B.3 on this table.

See item B.1 on this table.

Other Social
Effects (OSE)

Regional Economic
Development (RED)

4. Response to Associated
Evaluation Criteria

	Medium	Medium	High
Acceptability	Not acceptable		
Completeness	N/A		
Effectiveness	N/A	Effective	Effective
Efficiency	N/A	Efficient	Highly Efficient

COMPLETE AS DESCRIBED EXCEPT FOR PERIODIC MAINTENANCE DREDGING.

D. IMPLEMENTATION
RESPONSIBILITIES

1. Corps of Engineers N/A

Provide estimated project first cost share of \$1.7 million, design and construction of breakwater, entrance channel and turning basin.	Provide estimated project first cost share of \$1.7 million, design and construction of breakwater, entrance channel and turning basin.	Provide estimated project first cost share of \$1.7 million, design and construction of breakwater, entrance channel and turning basin.
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2. County of Hawaii N/A

Provide estimated local first cost share of \$1.7 million and provide local assurances and cooperation.	Provide estimated local first cost share of \$1.5 million and provide local assurances and cooperation.	Provide estimated local first cost share of \$0.5 million and provide local assurances and cooperation.
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TABLE 9. COMPARISON OF ALTERNATIVE PLANS AND SYSTEMS OF ACCOUNTS (Continued)

	<u>NO IMPROVEMENT 'WITHOUT CONDITION'</u>	<u>Plan 1</u>	<u>Plan 2</u>	<u>Plan 3</u>
3. <u>US Coast Guard</u>	N/A	Provide navigational aids.	Provide navigational aids.	Provide navigational aids.

INDEX OF FOOTNOTES

TIMING

1. Impact is expected to occur prior to or during implementation of the plan.
2. Impact is expected within 15 years following plan implementation.
3. Impact is expected in a longer time frame (15 or more years following implementation).

UNCERTAINTY

4. The uncertainty associated with impact is 50% or more.
5. The uncertainty is between 10% and 50%.
6. The uncertainty is less than 10%.

EXCLUSIVITY

7. Overlapping entry: Fully monetized in NED account.
8. Overlapping entry: Not fully monetized in NED account.

ACTUALITY

9. Impact will occur with implementation.
10. Impact will occur only when specific additional actions are carried out during implementation.
11. Impact will not occur because necessary additional actions are lacking.

(*) Item specifically required.

THE SELECTED PLAN

Rationale for Selection

The selection of the most desirable plan of improvement involved comparison and tradeoffs among the alternative plans. A comparison of the alternative plans was performed on the basis of (1) beneficial and adverse effects of each alternative, (2) relative contribution to the planning objectives, and (3) response to associated evaluation criteria as listed in Table 7. A key criterion pertinent to plan selection was that Plan 3 was the plan with the greatest net NED benefits.

Based on the comments received during coordination and review of the draft Detailed Project Report with Federal, State, and County agencies, and during the public meeting conducted on 13 December 1984, Plan 3 appeared to be the most favored.

In view of its cost-effectiveness, the desires of the sponsor and local and Federal agencies, Plan 3 is selected for implementation.

Components

The selected plan includes the following components:

- a. A natural entrance channel (90-foot wide and 9-foot deep).
- b. A turning basin 100-foot wide, varying in length from 100 to 140 feet and 7.5-foot deep.
- c. A 60-foot long wave absorber.
- d. A rubble mound breakwater capped with dolos approximately 200-feet long.
- e. A new launch ramp will be provided by the local sponsor.

Plan Implementation

Plans and Specifications. Construction Plans and Specifications will be prepared by the Corps of Engineers upon authorization of the project. During this stage the following will also be conducted:

- a. Obtaining any necessary rights-of-way and easements;
- b. Obtaining local assurances in accordance with Section 221 of the River and Harbor Act of 1970; and
- c. Completing all Federal, State, and County compliance documents and obtaining all necessary permits for construction.

Construction Schedule. Construction will require approximately 12 months to complete. Construction will be accomplished by contract to a private construction firm through competitive bidding under Corps of Engineers supervision.

Maintenance. The County of Hawaii, as the local sponsor, will be responsible for all maintenance measures of the completed project. Should the County decide to turn the completed project over to the State of Hawaii Department of Transportation, the State Department of Transportation would then be responsible for maintenance measures.

Federal Funding

The preparation of Plans and Specifications and the initiation of construction must be approved and authorized by the Chief of Engineers. U.S. Army Corps of Engineers' priority for funding of construction under the small projects authority is based on the needs and merits of similar projects nationwide and the availability of funds.

Views of the Sponsor

The sponsor approves of the plan and has submitted a letter of intent (Figure 10).



DEPARTMENT OF PARKS & RECREATION

COUNTY OF HAWAII

Herbert Matayoshi, Mayor

Milton Hakoda, Director

February 28, 1984

Colonel Michael M. Jenks, District Engineer
Corps of Engineers
U. S. Army Engineer District, Honolulu
Fort Shafter, Hawaii 96858

Dear Colonel Jenks:

Subject: Laupahoehoe Navigation Improvements - North Hilo, Hawaii

The County of Hawaii concurs with the U. S. Army Corps of Engineers' recommended plan (Alternative Plan 3) for implementation of the "Laupahoehoe Navigation Improvements Study" dated November 1983. Pursuant to the local cooperation requirements of Section 107 of the Rivers and Harbors Act of 1960, as amended, the County of Hawaii gives assurance that it will:

- a. Provide without cost to the United States all lands, easements and rights-of-way necessary for construction of the project.
- b. Hold and save the United States free from claims for damages due to the construction work and subsequent maintenance of the project, except where such damages are due to the fault or negligence of the United States or its contractors.
- c. Maintain and operate the project after completion and acceptance in accordance with regulations prescribed by the Secretary of the Army.
- d. Provide the balance of funds as the County's share of the total project construction costs, subject to the Federal share participation of \$2,000,000 and subject to the availability of County appropriations and funds for the project.
- e. Maintain continued ownership of the shore upon which the amount of Federal participation is based and its administration for public use during the economic life of the project.
- f. Comply with Title VI of the Civil Rights Act of 1964 (P.L. 88-352).

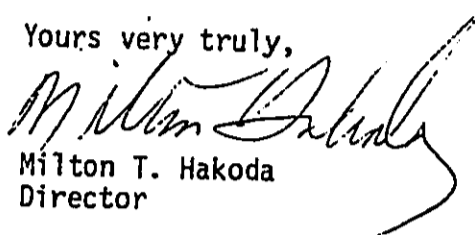
This letter expresses the intent of the County of Hawaii and we understand that it does not legally bind the County to the above agreement. We also understand that this agreement must be formally executed in accordance with

Colonel Michael M. Jenks
Page 2
February 28, 1984

Section 221 of the Rivers and Harbors Act of 1970, prior to commencement of construction of the project.

With warm personal regards, I remain,

Yours very truly,



Milton T. Hakoda
Director

A P P R O V E D:



MAYOR

SUMMARY OF COORDINATION, PUBLIC VIEWS AND COMMENTS

The public involvement program has consisted of workshops with the public at large, and meetings of the Federal, State and County agencies. The first public workshop was conducted at the Laupahoehoe boat ramp on 17 November 1981. About 30 fishermen, residents and concerned individuals attended, along with the following officials:

Representative Yoshito Takamine
Councilwoman Merle Lai
Councilman William Choy Hee
Lucille Chung, President, Laupahoehoe Community Association
Robert Yanabu, Department of Public Works, County of Hawaii
Ron Okamura, Department of Parks and Recreation, County of Hawaii

The local people prepared a handout listing their problems and needs, launch ramp usage, fishing activity and productivity, and several suggestions for layout of the launch ramp and protective structure. The general feeling of the participants was very supportive. Everyone who spoke expressed the urgent need for improvements to navigation at Laupahoehoe, for both economic and safety reasons.

The second public workshop was held 26 October 1982 at the Laupahoehoe School Library. About 35 people attended this workshop, including the following officials:

Councilwoman Merle Lai
Councilwoman Helene Hale
Representative Yoshito Takamine
Dan Tanaka, State Harbors Division
Adam Vincent, State Harbors Division
Bob Nishimoto, DLNR-Aquatic Resources
Ron Okamura, Department of Parks and Recreation, County of Hawaii
Lucille Chung, President, Laupahoehoe Community Association

The proposed plan of improvement, as formulated in the reconnaissance phase, was presented at the workshop. Comments were all favorable and the participants again expressed the urgency of the improvements.

On 6 September 1983, an informal meeting was held at the Laupahoehoe Park Pavilion with Congressman Dan Akaka and local government officials. The meeting was arranged by the North Hilo Community Council for the purpose of being briefed on the study and to listen to the views of Congressman Akaka and local officials regarding the project. Approximately 60 people attended this meeting. Local officials who participated in the discussions and expressed their strong support for improvements at Laupahoehoe were:

Councilwoman Merle Lai
Representative Yoshito Takamine
Adam Vincent, State Harbors Division
Ron Okamura, Department of Parks and Recreation, County of Hawaii

The final public meeting was held on 13 December 1983 at the Laupahoehoe Community School Library. Approximately 55 people attended this meeting, including the following officials:

Congressman Daniel K. Akaka, US Representative
Helene Hale, County Council Councilwoman
Merle K. Lai, County Council Councilwoman
Thomas Nakahara, Hawaii Island Representative for Congressman Akaka
Yoshito Takamine, State House Representative
John W. McDonald, Department of Transportation Harbors Division
Dan Tanaka, Department of Transportation Harbors Division
Ronald Okamura, Department of Parks and Recreation

The attendees agreed to support Plan 3.

Appendix B includes the final public meeting transcript, pertinent correspondence, and a list of final report recipients.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The purposes of this report were to determine the need for and feasibility of providing light-draft navigational improvements at Laupahoehoe, Hawaii. Based on evaluation of the feasibility and public acceptability and comments received during coordination of the alternative plans, Plan 3 was selected to be the recommended plan for implementation.

The proposed plan is economically feasible with a benefit-to-cost ratio of 1.4. The net NED benefits of this plan are estimated to be \$71,000. The estimated project investment cost is \$2,218,000, consisting of \$1,692,000 for the Federal share and \$526,000 for the non-Federal share. The County of Hawaii has agreed to provide the necessary local assurances. On 20 June 1984, the items of local cooperation listed below were discussed with and concurred by the local sponsor. Accordingly, I conclude that the total public interest would be served best by implementation of the proposed improvements; I further conclude that a hydraulic model study is required to determine a firm cost estimate prior to project approval and prior to initiation of preparation of plans and specifications for construction.

Recommendations

I recommend that the plan of navigation improvements in the Laupahoehoe Area herein indicated as Plan 3 be approved for construction. This recommendation is made with the provision that the non-Federal sponsors shall, prior to implementation, agree to comply with the following requirements.

a. Provide without cost to the United States all lands, easements, and rights-of-way necessary for implementation and maintenance of the project and for aids to navigation upon the request of the Chief of Engineers, including suitable areas determined by the Chief of Engineers to be required in the general public interest for initial and later disposal of dredged material, and including necessary retaining dikes, bulkheads, and embankments therefor, or the costs of such retaining works;

b. Accomplish without cost to the United States all alterations and relocations of transportation facilities, storm drains, sewer outlets, utilities, and other structures and improvements made necessary by the projects;

c. Hold and save the United States free from damages due to implementation and maintenance of the project, not including damages due to fault or negligence of the United States or its contractors;

d. Provide and maintain without cost to the United States the necessary launch ramp facilities, appropriate onshore structures, access roadways and parking areas to insure a complete and adequate project. These facilities must be open to all on equal terms;

- e. Retain fee ownership of all lands required for project operation;
- f. Prohibit any structures or other usage which impedes navigation movement in the channel and turning basin areas; and
- g. Assume all project costs (excluding costs for aids to navigation) in excess of the \$2 million statutory Federal limitation under Section 107 of the River and Harbor Act of 1960, as amended.

Michael M. Jenks
Colonel, Corps of Engineers
District Engineer

**FINAL
ENVIRONMENTAL
IMPACT
STATEMENT**

FINAL
ENVIRONMENTAL IMPACT STATEMENT
LAUPAHOEHOE NAVIGATION IMPROVEMENTS
ISLAND OF HAWAII, HAWAII

21 MARCH 1984

21 March 1984

FINAL
ENVIRONMENTAL IMPACT STATEMENT
LAUPAHOEHOE NAVIGATION IMPROVEMENTS
ISLAND OF HAWAII, HAWAII

The responsible local cooperating agency is the County of Hawaii, Department of Parks and Recreation.

The responsible lead federal agency is the US Army Engineer District, Honolulu, Hawaii.

The US Fish and Wildlife Service is a cooperating federal agency.

Information, displays and figures referred to in the Main Report and Appendices are incorporated as a part of this environmental impact statement.

Abstract: The proposed project will provide a protected launch ramp for trailered commercial fishing vessels and recreational craft at Laupahoehoe, Hawaii. Three alternatives were considered, each of which would provide a launch ramp, protected by a short breakwater, and a wave absorber. The three vary only in their alignment relative to Laupahoehoe Point. Alternative 3 is the environmentally preferred plan because the breakwater covers less of the marine substrate. It is also the recommended alternative because of its more favorable wave climate, and its favorable benefits. No significant environmental impacts are expected with any of the alternatives and there will be no effect on any species of plant or animal which is listed, proposed or candidate for listing as a threatened or endangered species.

The notice of availability of this Environmental Impact Statement is expected to be published in the Federal Register on or about 18 May, 1984.

SEND YOUR COMMENTS TO THE DISTRICT ENGINEER WITHIN 45 DAYS FROM THE DATE OF ACTUAL FEDERAL REGISTER NOTICE.

If you would like further information on this environmental impact statement, please contact:

Dr. James E. Maragos, Chief
Environmental Resources Section
US Army Engineer District, Honolulu
Building T-1
Fort Shafter, Hawaii 96858

Phone: (808) 438-2264

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1. SUMMARY

1.1 MAJOR CONCLUSIONS AND FINDINGS: Three plans were evaluated in detail for the Laupahoehoe navigation improvements Study.

TABLE 1. PLAN FEATURES

- PLAN 1. Rubble mound breakwater approximately 285 feet long and 125 feet wide at the base, with a crest elevation of 15 feet capped with dolos. Entrance channel 90 feet wide, 9 feet deep and approximately 205 feet long. Turning basin 100 feet square and 7.5 feet deep with a wave absorber approximately 60 feet long and 25 feet wide. A launch ramp will be provided by local agencies (Figure 8, Main Report).
- PLAN 2. Rubble mound breakwater approximately 255 feet long and 130 feet wide at the base with a crest elevation of 15 feet capped with dolos. Entrance channel 90 feet wide, 9 feet deep and approximately 250 feet long. Turning basin 100 feet wide, varying in length from 100 to 170 feet, 7.5 feet deep with a wave absorber 60 feet long and 25 feet wide. A launch ramp will be provided by local agencies (Figure 9, Main Report).
- PLAN 3. Rubble mound breakwater approximately 200 feet long and 125 feet wide at the base with a crest elevation of 15 feet capped with dolos. Entrance channel 90 feet wide, 9 feet deep and approximately 300 feet long. Turning basin 100 feet wide, varying in length from 100 to 140 feet, and 7.5 feet deep, with a wave absorber 60 feet long. A launch ramp will be provided by local agencies (Figure 10, Main Report).

Plan 3 is the recommended alternative because of its greater overall benefits and more favorable wave climate. It is also the environmentally preferred plan because the breakwater covers less of the marine substrate. There is no nonstructural plan that will fulfill the goals of the project.

No wetlands are involved, but part of the study area is in a tsunami inundation area. No prime agricultural lands are located in the area. No sites eligible or listed on the State or National Registers of Historic Places are affected. The effects of the discharge of fill material were evaluated under section 404(b)(1) of the Clean Water Act. For all plans, the fill material will be clean quarry stone, classified as Category 5, not requiring testing.

The project is expected to have a net beneficial environmental impact. The project will increase the number of days boats can be launched from zero days per year to an estimated 256 days per year, with very little loss of coral or other biological resources, thereby allowing more fishing and recreational boating for local residents.

TABLE 2. RELATIONSHIP OF THE PLANS TO ENVIRONMENT PROTECTION
STATUTES AND OTHER ENVIRONMENTAL REQUIREMENTS

<u>Federal Statutes</u>	<u>Plan 1</u>	<u>Plan 2</u>	<u>Plan 3</u>
Archaeological and Historic Preservation Act	Full	Full	Full
Clean Air Act	Full	Full	Full
Clean Water Act	Full	Full	Full
Coastal Zone Management Act	Full	Full	Full
Endangered Species Act	Full	Full	Full
Estuaries Protection Act	N/A	N/A	N/A
Federal Water Project Recreation Act	Full	Full	Full
Fish and Wildlife Coordination Act	Full	Full	Full
Land and Water Conservation Act	N/A	N/A	N/A
Marine Protection, Research and Sanctuaries Act	N/A	N/A	N/A
National Historic Preservation Act	Full	Full	Full
National Environmental Policy Act	Full	Full	Full
River and Harbor Act	Full	Full	Full
Watershed Protection and Flood Prevention Act	N/A	N/A	N/A
Wild and Scenic Rivers Act	N/A	N/A	N/A
<u>Executive Orders, Memoranda</u>			
Flood Plain Management	Full	Full	Full
Protection of Wetlands	N/A	N/A	N/A
Environmental Effects Abroad of Major	N/A	N/A	N/A
<u>Federal Actions</u>			
Analysis of Impacts of Prime and Unique Farmlands	N/A	N/A	N/A
State EIS law (See Section 6.2)	Partial	Partial	Partial
State Coastal Zone Management Program (See Section 6.2)	Full	Full	Full
County Special Management Area Permit (See Section 6.2)	Full	Full	Full
State Conservation District Use Application Permit (See Section 6.2)	Full	Full	Full
State Water Quality Certification (See Section 6.2)	Full	Full	Full
County General Plan	Full	Full	Full

TABLE 2. RELATIONSHIP OF THE PLANS TO ENVIRONMENT PROTECTION
STATUTES AND OTHER ENVIRONMENTAL REQUIREMENTS (Cont)

<u>State and Local Policies</u>	<u>Plan 1</u>	<u>Plan 2</u>	<u>Plan 3</u>
County Development Plan (Primary Urban Center - Central)	Full	Full	Full
State Land Use Law	Full	Full	Full
<u>Required Federal Entitlements (Permits)</u>			
None required.			

NOTES:

a. Full (Full Compliance). Having met all requirements of the statute, Executive Order or other environmental requirements for the current stage of planning (either pre- or post-authorization).

b. Partial (Partial Compliance). Not having met some of the requirements that normally are met in the current stage of planning. Partial compliance entries should be explained in appropriate places in the report (Section 6.2) and/or EIS and referenced in the table.

c. Non-Compliance. Violation of a requirement of the Statute, Executive Order, or other environmental requirement. Non-compliance entries should be explained in appropriate places in the report and/or EIS and referenced in the table.

d. N/A (Not Applicable). No requirement for the statute, Executive Order or other environmental requirement for the current stage of planning.

1.2 AREAS OF CONTROVERSY. None.

1.3 UNRESOLVED ISSUES. None.

1.4 RELATIONSHIP TO ENVIRONMENTAL REQUIREMENTS: Table 2.

2. NEED FOR AND OBJECTIVES OF THE ACTION

2.1 STUDY AUTHORITY: The study was accomplished under the authority of Section 107 of the River and Harbor Act of 1960, as amended. This Section provides the Corps of Engineers with continuing authority to construct small navigational improvements. The study was initiated following a written request from the County of Hawaii, Department of Parks and Recreation.

2.2 PUBLIC CONCERNS. In general, the public has expressed the need to:

a. Improve the safety of launch and recovery operations for boaters using the Laupahoehoe ramp.

b. Provide a protected mooring area for boats operating in the area.

c. Improve fishing success for commercial fishermen in the North Hilo and Hamakua Districts.

d. Minimize long-term disturbances to the physical environment which may have adverse impacts to the biota of the site.

e. Preserve archeological and other cultural resources if present.

3. ALTERNATIVES, INCLUDING THE PROPOSED ACTION

3.1 PLANS ELIMINATED FROM FURTHER STUDY. The North Hilo and Hamakua coastlines are generally steep with rough seas offshore, and the possible sites for a boat launching facility are very limited. In addition to the Laupahoehoe site selected for detailed studies, two other sites were briefly considered. The Hakalau site is located between Hilo and Laupahoehoe at the mouth of Hakalau Stream (Figure 5, Main Report). This site was eliminated because of: the rougher sea conditions caused by the site's orientation; its proximity to Hilo, which would not provide a significant advantage over launching at Hilo; and the fact that the land is privately owned with poor access and high acquisition costs.

The other site briefly considered is also at Laupahoehoe, and is referred to as "Site 2" in the Main Report. Site 2 was eliminated because of the more direct wave exposure and the significantly increased dredging requirements (with attendant cost) compared to the selected site.

3.3 PLANS CONSIDERED IN DETAIL.

a. Plan 1 - This plan consists of a breakwater to protect a launch ramp, along with a wave absorber, turning basin and entrance channel as shown in Figure 8 of the Main Report. The breakwater would be constructed of basalt rock, capped with 1-3, 3-5, and 5-7 ton armor stones, 6.5 and 30 ton dolos and concrete ribs. The crest elevation would be 15 feet above mean lower low water (MLLW) and the breakwater would be approximately 285 feet long and 125 feet wide at the base. The entrance channel would be 90 feet wide, with a depth of 9 feet below MLLW, and the turning basin would be 100 feet square, dredged to 7.5 feet below MLLW. The wave absorber would be constructed of 3-5 ton stones, and would be approximately 60 feet long. The launch ramp would be provided by local agencies.

b. Plan 2 - This plan is similar to Plan 1, with the launch ramp being in a different location as shown in Figure 9. The breakwater would be approximately 255 feet long, 130 feet wide and have a crest elevation of 15 feet. The entrance channel would be 90 feet wide for part of its length and 100 feet wide for the rest with a depth of 9 feet below MLLW. The turning basin would be 100 feet wide, varying in length from 100 to 170 feet, with a depth of 7.5 feet. The wave absorber would be 60 feet long. Materials for the breakwater and wave absorber would be the same as for Plan 1.

c. Plan 3 - This plan is similar to Plans 1 & 2, as shown in Figure 10. The breakwater would be 200 feet long, 125 feet wide with a crest elevation of 15 feet. The entrance would be 90 feet wide and 9 feet deep, with the turning basin 100 feet wide, varying in length from 100 to 140 feet, and 7.5 feet deep. The wave absorber would be 60 feet long. Materials for the breakwater and wave absorber would be the same as for Plan 1.

TABLE 3. COMPARISON OF ALTERNATIVE IMPACTS

Resource	Base Condition	Plan 1	Plan 2	Plan 3
Recreation Swimming	Poor, except in the ramp area, due to heavy wave action most of the time.	Reduced wave action inside the protective revetment would improve swimming.	Same as Plan 1.	Same as Plan 1.
Diving & Snorkeling	Good when the weather is calm enough so the area is safe, and visibility is acceptable.	No significant effect (during construction, area may be inaccessible.)	No significant effect (during construction, area may be inaccessible.)	No significant effect (during construction, area may be inaccessible.)
Picnicking & camping	Facilities are available in Laupahoehoe Point Park, including restrooms.	No direct effect.	No direct effect.	No direct effect.
Fishing (from shore)	Fair - no catch data available.	During calm seas, the breakwater will provide increased fishing sites.	Same as Plan 1.	Same as Plan 1.
Boating				
Fishing, both commercial and recreational	Off-shore fishing is good much of the year, but launch and recovery from existing ramp is no longer possible.	Increased number of fishing days.	Same as Plan 1.	Same as Plans 1 & 2 but 5% fewer days.
Other boating activities	Very poor due to rough seas.	Little effect, sea would still be rough, but launch and recovery would be much safer.	Same as Plan 1.	Same as Plan 1.
Aesthetics	Peaceful rural park, from most view planes ocean and shore are natural, without man made obstructions. Parking lot, ramp and dock visible from some angles.	Breakwater and wave absorber will intrude into many view planes. Boating activities will reduce the "peaceful nature of the park."	Same as Plan 1.	Same as Plan 1.

TABLE 3. COMPARISON OF ALTERNATIVE IMPACTS (CONT)

<u>Resource</u>	<u>Base Condition</u>	<u>Plan 1</u>	<u>Plan 2</u>	<u>Plan 3</u>
Natural Hazards				
Tsunamis	The area is a high risk tsunami inundation zone.	No effect on tsunamis, but tsunami may damage navigation facilities.	Same as Plan 1.	Same as Plan 1.
Volcanic Activity	Site is located in risk Zone "B" which indicates no eruptions during the past 10,000 years.	No effect.	No effect.	No effect.
Seismic Activity	Site is located on the border of risk zones 3 & 4 (Major to Great).	No effect if structures are designed to withstand earthquake.	Same as Plan 1.	Same as Plan 1.
Water Quality	Good, no significant sources of pollution. Classified as Category A Oceanic Waters by State of Hawaii.	No significant effect expected, but there may be slight increase in petrochemicals and fish related pollutants (during construction an increase in turbidity is expected).	Same as Plan 1.	Same as Plan 1.
Air Quality	Good, no major sources of air pollution, except vehicle exhausts and agriculture fires.	Fish odors and vehicle exhaust fumes will increase (during construction, dust and other air pollutants will increase).	Same as Plan 1.	Same as Plan 1.
Noise	Noise level low, no sources of high sound levels in area.	Vehicle related noise will increase (during construction, noise will increase considerably).	Same as Plan 1.	Same as Plan 1.
Traffic	Traffic in park area and near project site light. Moderate on nearby Highway 9.	Vehicle traffic will increase due to increased number of launches and recoveries.	Same as Plan 1.	Same as Plan 1.

TABLE 3. COMPARISON OF ALTERNATIVE IMPACTS (CONT)

Resource	Base Condition	Plan 1	Plan 2	Plan 3
Historic Resources	No sites listed on the National or State Register of Historic Places, but monument to victims of 1946 tsunami located on cliff overlooking present ramp.	No effect.	No effect.	No effect.
Biological Resources				
Terrestrial	Common introduced species of animals, and common introduced and native species of plants.	Shore-side facilities such as parking lot will destroy some vegetation, knoll and iron-wood tree will be removed. (Construction activities will also destroy other vegetation, but it will be replaced.)	Same as Plan 1.	Same as Plan 1.
Marine	Diverse and abundant fishes and invertebrates, including at least nine species of coral. Algae abundant.	Dredging will remove the tops of some coral heads; blasting will kill some invertebrates and fish, and the break-water will smother some benthic organisms. Construction related sedimentation and turbidity will stress and may kill some coral and other organisms.	Same as Plan 1.	Same as Plan 1, but breakwater is smaller, so will smother fewer organisms.
Endangered Species	Endangered Humpback Whale and threatened Green Turtle found along Hamakua Coast.	No significant effect if blasting limited to June through October.	Same as Plan 1.	Same as Plan 1.

3.4 COMPARISON OF ALTERNATIVE IMPACTS. (See Table 3). The environmental impacts of the three plans are essentially the same, since they differ only slightly in alignment and size of the breakwater. Plan 3 is environmentally preferred because the breakwater covers less of the marine substrate than Plans 1 & 2. Plan 3 is also the overall preferred plan because of the maximum net economic benefits and more favorable cost-benefit ratio.

4. AFFECTED ENVIRONMENT

4.1 PHYSICAL SETTING

a. The Hawaiian Islands are centrally located in the North Pacific Ocean. The eight islands, seven of which are inhabited, form a 400-mile-long arc at the southeastern end of the archipelago and constitute 6,500 square miles of land area. The island of Hawaii, the largest of the Hawaiian Archipelago covers an area of over 4,000 square miles. The island has been forming for the past 800,000 years through volcanic activity, which is still taking place. The County of Hawaii County Seat is the town of Hilo, which also has the major port for the island.

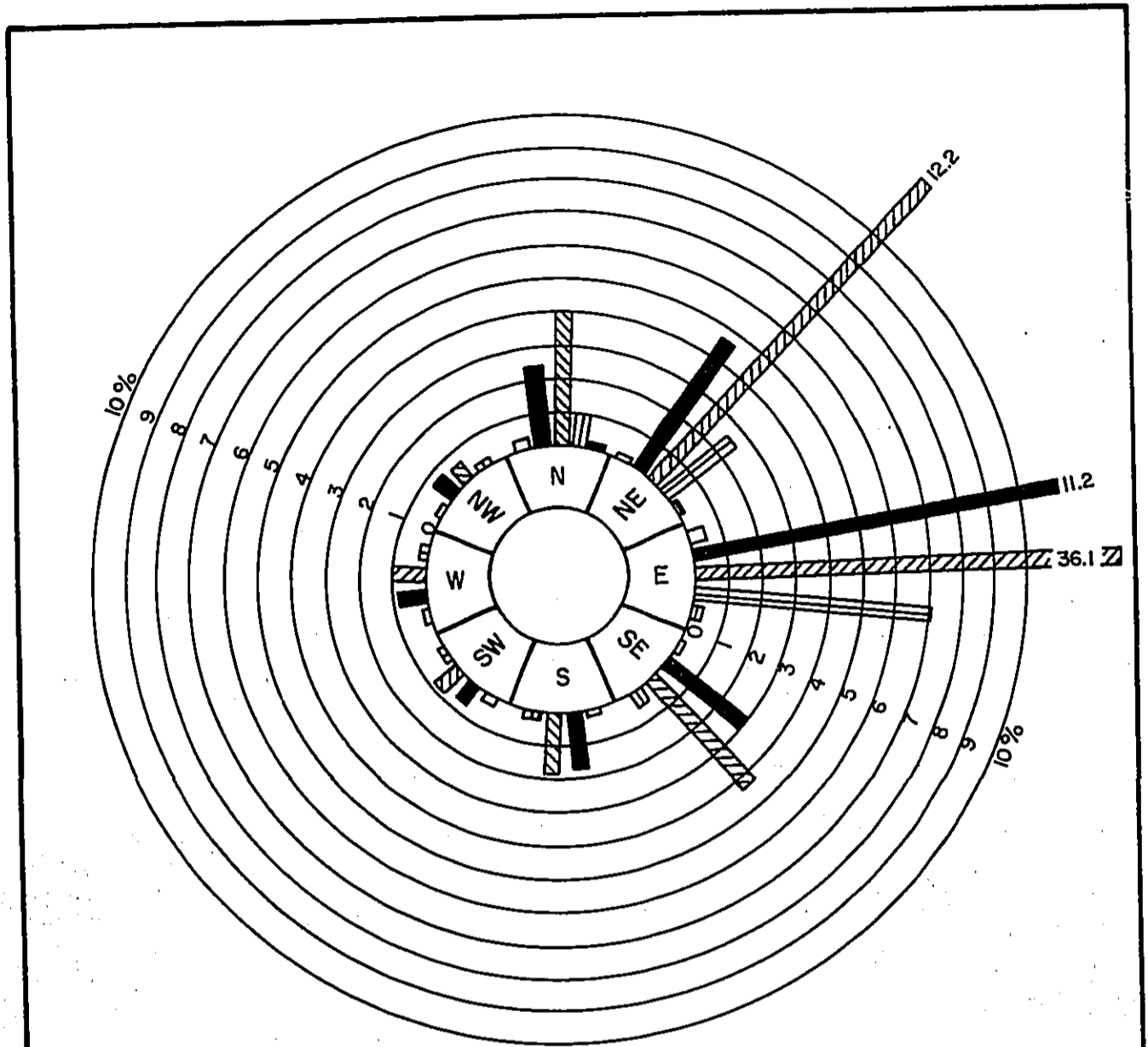
b. The planning area is located on Laupahoehoe peninsula which is located on the windward, Hamakua, coast of Hawaii. It is about 25 miles north-northwest of Hilo. The County of Hawaii's Laupahoehoe Point Park borders the shoreline. Cliffs form a steep backdrop to the 19-acre seaside park, making the park area accessible only by a narrow, winding cliff road.

c. Winds in this area are predominately from the east and northeast, and occur approximately 80 percent of the time. Although no wind gages exist in the immediate vicinity of Laupahoehoe, information has been extrapolated from statistical data on offshore winds provided by the US Naval Weather Service. The wind information is for the position 20.9" north latitude and 156.0" west longitude. Figure 1 shows wind direction, speed and frequency at this station, and is representative of conditions at the project site.



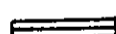

d. Waves arriving at Laupahoehoe Point originate from various areas in the Pacific Ocean, with a variety of periods and heights. Since several wave types may be acting simultaneously, a very complex wave climate can be produced. The two primary wave types are local wind waves, and the northern swell.

(1) The majority of waves affecting Hawaii are easterly tradewind-generated waves. As shown in Table 4, deep water waves approaching Laupahoehoe can be expected to be less than 7 feet in height about 75% of the time.

(2) Northern swells are generated in the north Pacific Ocean by winter storms. Waves may typically have periods of 10 to 15 seconds and heights of 5 to 15 feet. Some of the largest waves reaching the Hawaiian Islands are of this type. Northern swells usually occur during the winter season from October to April.



LEGEND:

-  1-3 KTS
-  4-10 KTS
-  11-21 KTS
-  22-33 KTS
-  34-37 KTS

TOTAL % OF THE YEAR

10 %

PERIOD OF RECORD

1963 TO 1970

STATION LOCATION

20.9° NORTH LATITUDE
156.0° WEST LONGITUDE

SOURCE

U.S. NAVAL WEATHER SERVICE COMMAND

LAUPAHOEHOE
NAVIGATION IMPROVEMENTS
ISLAND OF HAWAII
**OFFSHORE WIND
DIAGRAM**
U.S. ARMY ENGINEER DISTRICT, HONOLULU

TABLE 4. ANNUAL PERCENT OF OCCURRENCE OF WAVE HEIGHTS VERUS DIRECTION

Wave Ht (Feet)	<u>N</u>	<u>NE</u>	<u>E</u>	<u>SE</u>	<u>TOTAL</u>
1	0.7	0.8	1.4	0.4	3.3
1-2	1.8	4.1	10.0	2.1	18.0
3-4	2.6	7.0	19.1	3.2	31.9
5-6	1.5	4.5	13.9	1.5	21.4
7	0.7	2.1	6.2	0.6	9.6
8-9	0.3	0.9	3.0	0.1	4.3
10-11	0.1	0.2	0.9	0.1	1.3
12	0.1	0.1	0.4	0.1	0.7
13-16	-	-	0.2	-	0.2
17-19	-	-	0.1	-	0.1
TOTAL	7.8	19.7	55.2	8.1	90.8

(3) Tropical storms and hurricanes occasionally affect Hawaii. According to the National Weather Service, from 1950 to 1978 at least 14 tropical storms or hurricanes have intruded within 500 miles. These storms, which impact on sea and weather conditions in Hawaii, generally occur during the summer months.

e. Natural hazards present risks in the Laupahoehoe area.

(1) Tsunamis are a high risk at Laupahoehoe, although somewhat less than in Hilo. On April 1, 1946, 24 persons were lost as a result of a tsunami hitting what is now the park area. The victims included many children from Laupahoehoe. Table 5 shows a comparison of the tsunami runup for Laupahoehoe, Honolulu and Hilo.

TABLE 5. TSUNAMI RUN UP AT LAUPAHOEHOE

Date	Source and Intensity	Damage in Hawaiian Islands	Run Up (Feet)		
			Laupahoehoe	Hilo	Honolulu
April 1, 1946	Aleutians (7.4)	Very Severe	30	26	2
Nov. 4, 1952	" (8.5)	Moderate	0	4.9	2
Mar. 9, 1957	" (8.5)	Moderate	10	14	2
May 23, 1960	Chile (8.5)	Very Severe	7	35	3

(After Adams, 1969)

(2) Volcanic activity in the form of eruptions has apparently ceased in the study area. The US Geological Survey indicates the area is in Risk Zone "B", which means there have been no eruptions during the past 10,000 years.

(3) Seismic activity on the other hand is still present in the area. The US Army Corps of Engineers indicates the site is on the border between Risk Zones 3 & 4, which means there is a "major" to "great" risk of an earthquake in the area.

f. Water Quality. The water in the project area is classified as "Open Coastal Waters, Class A" by Title II Chapter 54 of the Hawaii Revised Statutes. It is the objective of this class of waters that their use for recreational purposes and aesthetic enjoyment be protected. Any other use shall be permitted as long as it is compatible with the protection of fish, shellfish, and wildlife, and with recreation in and on these waters. At the present time there are no significant point source discharges of pollutants into the waters of the study except storm water runoff which carries large amounts of terrigenous material into the ocean. During heavy rains, turbidity and sedimentation are severe; however, the wave action appears to remove sediment from the area within a few days.

g. Noise

The noise level in the study area is low, with no sources of high sound levels in the area.

h. Air Quality

Air quality in the study area is good, due to the presence of the northeast tradewinds which predominate throughout the year. These winds continually bring clean ocean air to windward coastal areas such as Laupahoehoe Point. Problems of poor air quality would be more likely to occur when tradewinds diminish or give way to southerly winds, however there are no sources of pollutants near the area except for vehicle exhausts (including boats).

4.2. SIGNIFICANT RESOURCES. The significant resources identified by Section 122 of Public Law 91-611 (River and Harbor Act of 1970) were considered in the following discussion.

a. Human Activities and Resources.

(1) Laupahoehoe Community. Laupahoehoe is a small rural community with a population of approximately 500. There are no major non-agricultural industries in the area, and many of the residents work for the sugar industry. During the decade between 1970-1980, the population of Laupahoehoe increased by 11 percent while the State average was 25%.

(2) Land Use. The proposed project site is within the boundaries of Laupahoehoe Point Park, on State of Hawaii land. There are no residences, farms or businesses at or near the site.

(3) Recreation.

(a) Swimming in the project area is generally confined to the immediate vicinity of the existing boat ramp because of the heavy wave action which occurs much of the time. A protected swimming and wading area was planned for an adjacent area along the park shoreline, but was never constructed. At that time, it was estimated the area was unsafe for wading more than 60-70 percent of the time.

(b) Diving and snorkeling are good in the study area during calm sea conditions. The underwater topography is varied and the fauna is surprisingly abundant. Much of the time, however, the seas are rough enough to make this activity hazardous. During heavy rains, runoff carries large amounts of silt into the water, reducing visibility to near zero, especially near the surface.

(c) Picnicking and day camping are popular recreation activities at the park. Adequate facilities are available, including restrooms, picnic tables, potable water and a pavillion. The park has an area of about 20 acres, so picnickers are not crowded.

(d) Fishing along the shoreline in the study area is popular, and fairly productive when conditions are not hazardous. During most of the time when heavy wave action occurs, much of the shoreline is subject to wave runup and is not safe for shore fishing.

(e) Boating activities in the study area are almost non-existent except for commercial and recreational/subsistence fishing. The area offshore of Laupahoehoe is a popular and productive fishing ground much of the year, but was under-exploited due to the closure of the existing ramp. Although a launch ramp is located in a semi-sheltered cove, a troublesome surge is created by waves reflecting off the surrounding rock shoreline, and the ramp has deteriorated so that it is no longer used. Boaters using the ramp found launching operations to be extremely hazardous. They indicate that every launch resulted in some propeller damage, and trailers were damaged about 50 percent of the time. The vehicle used for launching also frequently received damage. Because of these conditions a launch and recovery required six persons besides the crew: a vehicle driver, one man on the front winch and two men on each side of the boat to help guide it. The crew must stand ready in the boat. Local boaters estimate that launching was possible only one out of four times an outing was planned, and at times when the weather worsened after launch, the boat had to be retrieved in Hilo. Presently, boaters must trailer their boats to Hilo to launch.

(4) Historic Resources

There are no properties or sites that are presently listed on either the State or National Registers of Historic Places located within or directly adjacent to the proposed project area. A memorial monument for the 24 victims of the 1946 Tsunami (mentioned above in Sec. 4.1e) is located immediately inshore but well above the proposed wave absorber in the preferred plan. This monument, however, is not presently eligible for nomination to either Register.

Historically (and prehistorically) this point of flat land was the site of an extensive village. The village owed its existence to the fact that this location was the only relatively well protected oceanfront landing along the

otherwise steep faced cliffs of the Hamakua Coastline. By the turn of this century Laupahoehoe had become a major shipping point for sugar. The only other landing place along the whole northeast, or windward side of the island is the port of Hilo, some 25 miles to the southeast. Historic description and photographs, some taken in the 1880's, indicate that the location of the present boat ramp was where the main landing facility was built for handling the lightered cargo and passengers from steamers anchored offshore. Photos show a main building served by a light rail connection to a sugar warehouse some distance inshore and to the south and east. The main building is approximately in the location of the Tsunami memorial. An inclined gantry spans the small inlet (where the present ramp is) providing access to loaded lighters. A number of small storage and boat sheds were located in the general area of the present parking area opposite the ramp. No remains of any of these structures are evident today.

Early writers discuss in general terms the existence of a number of heiaus in the Laupahoehoe area. Moiapuhi Heiau was on the beach to the south of the point, perhaps in the vicinity of the 1880 sugar warehouse. Another, Papaulekii was the site of the Monarchy's Court House. The lighthouse was built near yet another, Lonopaha. Hakalau Heiau is described as near "the coconut grove at the south side of the settlement," by Kinney (1913:31). Photos taken in the 1880's indicate this would have to have been on the flat, very near the boat landing. This area is without coconuts or old walls now, and is an open grass portion of the County Park used for camping and ballplaying. None of the heiaus remain today.

b. Natural Resources

(1) Biological Resources.

(a) The terrestrial biota is characteristic of coastal parklands, and consists of common introduced and native species. Flora consists principally of ironwood (Casuarina equisetifolia), naupaka (Scaevola taccada), beach morning glory (Ipomoea pes-caprae), coconut palm (Cocos nucifera) and common strandplants and lawn grasses. The fauna includes common introduced species of birds, and mammals such as feral cats, dogs and the mongoose (Herpestes auropunctatus).

(b) Offshore the study site harbors a surprising abundance of invertebrates and fishes. The report of the US Fish & Wildlife Service (FWS) lists the organisms observed during a reconnaissance visit to the site by FWS and Corps biologists in June 1982 (Appendix F). Based on the report of Sunn, Low, Tom and Hara, 1974, it is believed the diversity and abundance of reef corals and associated fauna is greater within the project area than on the northern side of the peninsula. During the June 1982 survey, nine species of coral and fifty-two species of fish were observed. Since a one-time survey may only identify less than 50 percent of the fish species present, there may actually be over 100 species present.

(c) The endangered Humpback Whale (Megaptera novaeangliae) is present in the coastal waters of the Hamakua coast during the months of December through May, generally within the 100-fathom isobath (less than 600 feet). During this period they breed and give birth. The threatened Green Turtle (Chelonia mydas) is also common along this coastline, foraging for food, however there are apparently no areas suitable for nesting.

(2) Esthetic Values. The proposed project site offers a tranquil and unobstructed view of the ocean. There is a small knoll with an ironwood tree seaward of the old launch ramp which is used by picnikers and sunbathers, principally because of the view. Although the present parking area and dilapidated dock and boat ramp detract from the esthetic value, it is still a lovely area, and popular with local residents for just gazing out to sea.

5. ENVIRONMENTAL EFFECTS

5.1 PHYSICAL EFFECTS

a. The proposed project will have no effect on the general wave climate of the area, but will have a significant impact on waves at the launch ramp. It is estimated approximately 256 launch days will result from the project.

b. Natural Hazards

(1) The frequency or severity of tsunamis will not be affected by any of the proposed plans. The facilities proposed to be constructed may be damaged or destroyed if a tsunami occurred similar to the 1946 disaster. The effect would be similar for all the plans.

(2) Volcanic activity will not be affected by any of the plans and it is very unlikely that the project could be affected by such activity.

(3) Seismic activity is a threat to any structure built on the Island of Hawaii; however, the project will be designed to reduce or prevent damage to the facilities in the event of an earthquake. None of the plans will have an effect on seismic activity, and with proper design, such activity should not have a significant effect on the proposed project.

c. Water Quality

No significant degradation of water quality is expected in the project area; however all the plans may increase slightly the amount of petrochemicals entering the water. There may also be increased fish related pollutants if fishermen clean their catches at or near the facility. Most fish of all is biodegradable, and the small quantity (compared to that generated at a larger facility, such as a typical tuna processing plant) should not stress the ecosystem, particularly considering the strong wave climate which provides good oxygenation of the coastal waters, as well as rapid dilution. During construction activities turbidity and siltation will increase; however the material to be dredged, excavated and used for the breakwater is mostly basalt, therefore turbidity and siltation will be minimal. To further reduce construction related turbidity and siltation, silt retention devices will be used where practical and effective. Plan 3 will require more shoreline excavation and dredging than the other plans.

d. Noise

Noise levels will increase somewhat depending on the amount of increase in vehicle and boat traffic, but will be intermittent as boats use the launch ramp. During construction, noise will increase considerably. Blasting,

earthmoving, equipment exhausts and general construction noise will all contribute to the increase. This increased noise will certainly detract from the esthetic enjoyment of the peaceful rural atmosphere of the park, but will be of short duration.

e. AIR QUALITY

Air quality may be slightly degraded by increased emissions from vehicles and boats using the ramp, and by fish related odors. This project will not include fish processing facilities and the emissions from vehicles and boats will be intermittent while the ramp is being used. These impacts are not considered significant for any of the plans.

5.2 HUMAN ACTIVITIES AND RESOURCES

a. Laupahoehoe Community. The proposed project is not expected to have a significant effect on development in the community or the region. Growth is expected to be similar to that of the last decade. The employment pattern is not expected to change as a result of these navigation improvements, although individual fishermen may increase their profit because of the increase in launch days, and personal income tax revenues may also increase. Property taxes will not be affected.

b. Land Use. The pattern of land use in the project will not be affected. Little park land will be needed for the navigation improvements, and no people, homes, farms or businesses will be displaced. Property values are not expected to change much due to the proposed project.

c. RECREATION

(1) Swimming in the study area would be improved by all three plans. The proposed breakwater would provide an area of reduced wave action for swimming; however caution would be required to avoid injury from boats using the facility.

(2) Diving and snorkeling would not be significantly affected by any of the plans. During construction however, the area may be inaccessible, and turbidity will increase bringing decreased visibility.

(3) Picnicking and camping will not be directly affected by the completed project, although construction activities may indirectly effect this activity because of increased noise, dust, exhaust from equipment and the general activity of a construction site.

(4) Fishing may be improved temporarily by all three plans since construction activities in the water frequently result in bringing more fish into the area to feed on organisms displaced by those activities. The proposed breakwater will provide more places for fishermen to fish, protected some of the time from wave action. This may result in overfishing in the immediate area of the project; however it will have little effect on fishing in other areas of the park shore.

(5) Boating along the Hamakua Coast will be significantly improved by any of the plans. The new facility will provide for safe launching and recovery of boats about 256 days per year. This will result in increased

catches by both commercial and recreational/subsistence fishermen throughout the year. Additionally, the improvement of launch and recovery operations will assist rescue operations by the County Fire Department. They will be able to provide real time rescue service to the area by launching from Laupahoehoe. Other recreational boating activities will be little affected, since the sea conditions will still preclude activities other than fishing most of the time.

d. Historic Resources

No known or identified historic resources remain in the immediate area of the proposed project, or in the adjoining portions of the County Park. Previous improvements, as well as natural events occurring at this long used landing site, have removed all surface indications of earlier prehistoric features and historic period structures. During a reconnaissance survey by the Corps in September 1982, no evidence of historic or prehistoric features were observed at the study site, therefore it is unlikely the project will have any impact on historic or prehistoric resources.

5.3 NATURAL RESOURCES

a. Biological Resources

(1) Terrestrial flora and fauna will not be significantly impacted by any of the plans. Although some vegetation will be destroyed, none of the species in the project area are rare or unique, nor do they provide habitat for rare or unique animals. The animals which might be found in the study area are generally considered pests, or are common introduced species; therefore any impact to them is not considered significant.

(2) The marine ecosystem in the study area is not expected to be adversely impacted to a significant degree. The major effect of construction of any of the plans will be to change the energy level of the near-shore waters inside the breakwater. This reduction of wave energy will probably affect the composition of the biological community, with some groups increasing and some decreasing. There will also be some terrestrial habitat converted to marine habitat, and the breakwater will provide increased habitat for cryptic organisms. Since the turning basin will have a hard substrate, colonization of the new habitat and recolonization of dredged areas by corals and other organisms is expected to be rapid, based on observations made at Honokohau Harbor.

(3) Although the endangered Humpback Whale and the threatened Green Turtle are known to frequent the H k Coast, none of the plans is expected to affect these species, provided blasting is restricted during the months of November through May. This conclusion was concurred in by the National Marine Fisheries Service, the federal agency responsible for the management and protection of these animals (Appendix F).

b. Esthetic Values.

(1) The unobstructed view of the ocean from some angles will be disrupted by the proposed breakwater; however, other vistas will be open and unaffected.

(2) The small rocky knoll seaward of the present ramp and dock will be removed in all three plans. Although this popular feature will be lost, there are many other locations in the park for picnicking, sunbathing and viewing the ocean.

5.4 BLASTING

Blasting will be required to facilitate removing the rock in the entrance channel and turning basin. Prior to blasting, the Contractor will submit a blasting plan which must be approved by the Corps of Engineers Contracting Officer. This plan shall contain the details of the blasting operations. General blasting related impacts are discussed below.

a. **Blasting Noise.** Detonation of the blasting agent will generate noise. This sound level will depend on the amount and kind of explosive used, the burden over the charges and the distance of the observer from the blast. If a detonating cord is used to initiate detonation of the blasting agent, an audible air-shock wave will be created. The Contractor will be required to comply with all applicable State or local noise control regulations.

b. **Ground Vibration.** Ground vibration or seismic motion typically accompanies all detonations. The vibrations may or may not be perceptible depending on several factors, such as the geology of the site; the weight of explosives per delay; and the distance to structures and observers. The seismograph is used universally to measure vibratory motion. According to Corps safety and health requirements, when a blast is planned that would have a scaled distance less than 50, a 3-component seismograph will be required to monitor vibration levels. Scaled distance is a function of the distance from the nearest structure to the blast site and the maximum weight of explosives per delay as follows:

$$S = \frac{D}{W^{1/2}}$$

Where: S = Scaled distance ft/lb^{1/2}

D = Distance from nearest structure to blast site, feet.

W = Maximum weight of explosives per delay in pounds.

This formula will be used to determine the maximum explosive weight allowed per delay. If vibration levels are kept below 2 IPS (inches per second), no damage to structures is anticipated. If below 0.2 IPS negative reactions from nearby residents will be minimized.

c. **Dust and Flyrock.** Dust or flying particles are expected since some of the blasts will be on land. Measures must be taken to prevent damage to nearby structures.

d. **Smoke and Odors.** Smoke and odors from blasting are anticipated, but there will be no significant impact, since there are no residents near the site.

e. Marine Environment. There is coral at the project site, but basalt beds and boulders dominate the substrate. A variety of reef fish and invertebrates are present in this habitat. Some blasting will be done in the water and a number of fish and invertebrates may be killed, but the amount of biomass destroyed will not be significant because large amounts of blasting are not anticipated.

f. Safety. The Contractor will be required to conduct his blasting operations in accordance with the blasting plan approved by the Corps Contracting Officer, Engineer Manual 385-1-1, Safety and Health Requirements Manual, and State Occupational Safety and Health Standards.

5.5 ADVERSE EFFECTS THAT CANNOT BE AVOIDED

a. Turbidity and sedimentation are unavoidable impacts which will result from offshore dredging and blasting activities. Although these activities will not be extensive.

b. Fish, coral and other marine organisms will be killed or displaced by dredging and blasting activities.

c. The open vista of the coast at the project site will be changed by the addition of the breakwater.

5.6 MEANS TO MITIGATE ADVERSE ENVIRONMENTAL EFFECTS

a. Blasting will be prohibited from November through May to avoid impacting humpback whales.

b. A visual inspection will be made immediately before each in-water blast to insure no turtles are in the area.

c. A blasting plan will be submitted to the Corps for approval.

d. Excavated and dredged material not used for the project will be disposed in an upland quarry site.

e. Silt retention devices will be used when practical.

6. PUBLIC INVOLVEMENT

6.1 PUBLIC INVOLVEMENT PROGRAM

The public involvement program has consisted of meetings and workshops with the public at large and with members of Federal, State and County agencies having interest in the proposed project. The public has been very supportive of the project, including the Laupahoehoe Community Association, local fishermen and fishermen from Hilo and other areas of the Island of Hawaii. No environmental concerns were expressed by the public during a workshop held in Laupahoehoe on 26 October 1982 or the 13 December 1983 final public meeting.

6.2 REQUIRED COORDINATION

The following coordination was completed with the indicated agencies.

a. Coastal Zone Management Act. A Federal consistency determination was prepared by the Corps and was forwarded with the DEIS to the State of Hawaii, Department of Planning and Economic Development, Coastal Zone Management Office for their concurrence (Appendix A).

b. National Historic Preservation Act. The State Historic Preservation Officer was provided a copy of the Draft EIS for review, along with a copy of the Corps' reconnaissance report. They have concurred with our finding of no effect on historic resources (Appendix G).

c. Fish and Wildlife Coordination Act. US Fish and Wildlife Service has provided a Section 2(b) report which is included in the final environmental impact statement in Appendix F.

d. Clean Water Act, Section 404 Evaluation. Appendix A contains an evaluation of the effects of the discharge of fill material in accordance with US Environmental Protection Agency requirements for review by Congress prior to authorization of the project. The US EPA has an opportunity to review and comment on the EIS and the 404 evaluation.

e. Clean Water Act, Water Quality. As part of the planning process comments on the draft EIS have been sought from the state Department of Health. This requirement assures the proposed plan has been reviewed by the State agency responsible for water quality.

f. State and County Approvals. The County of Hawaii, Department of Parks and Recreation, is responsible for obtaining all necessary local permits and approvals and satisfying the requirements of Chapter 343, Hawaii Revised Statutes and EIS Regulations. The Federal EIS and CZM consistency determination will discuss the construction impacts and compatibility of the action to local coastal zone management policies.

6.3 STATEMENT RECIPIENTS.

The following agencies and public-at-large were sent copies of the draft environmental statement and survey report, and will be sent copies of the final report.

Federal Government

US Advisory Council on Historic Preservation
Washington DC Office
Western Project Review Office
US Environmental Protection Agency
Office of Environmental Review
Region IX
Pacific Islands Office
US Army Corps of Engineers
Coastal Engineering Research Center
US Department of Agriculture
Washington D.C. Office
Institute of Pacific Islands Forestry
Soil Conservation Service
Hawaii District Office
US Department of Energy

Federal Government (Cont)

US Department of Commerce
Secretary of Environmental Affairs
National Marine Fisheries Service
Southwest Region Office
Pacific Program Office
Office of Coastal Zone Management
US Department of the Interior
Office of Environmental Review
US Geological Survey, Hawaii Volcano Observatory
Secretary Field Representative, Pacific Southwest Region
US Fish and Wildlife Service
Regional Office
Pacific Islands Office
National Park Service
Office of Archaeological and Historic Preservation
Interagency Archaeological Service
Arizona Archaeological Center
Pacific Southwest Region Office Hawaii State Office
US Department of Housing and Urban Development
US Department of Health Human Services
Regional Office
US Department of Transportation
Federal Highway Administration
14th Coast Guard District

State Government

Governor George R. Ariyoshi
Hawaii Congressional Delegation
Department of Planning and Economic Development - Clearinghouse
Department of Health
Office of Environmental Quality Control
International Tsunami Information Center
Department of Land and Natural Resources
State Historic Preservation Officer
Division of State Parks
Division of Aquatic Resources
Forestry and Wildlife
Division Land Management
Division Water and Land Development Division
Conservation and Resources Enforcement Division
Oahu District Land Agent
Board of Land and Natural Resources
Marine Affairs Coordinator
Department of Transportation
Highways Division
Harbors Division
Department of Accounting and General Services
Attorney General
State Department of Agriculture
Board of Agriculture
Hawaii State Library
Oahu Island Branches
Environmental Center, University of Hawaii

County Government

Mayor Herbert T. Matayoshi
Hawaii County Council
Hawaii Legislative Delegation
Department of Parks and Recreation
Department of Planning
Planning Commission
Department of Public Works
Board of Water Supply
Office of Civil Defense
Department of Land Utilization

Organizations

Sea Grant/Marine Advisory Program
Institute of Marine Biology
Life of the Land
Greenspace Foundation
Outdoor Circle
Bishop Museum
Hawaii's Thousand Friends
Western Pacific Fisheries Management Council
Hawaii Audubon Society
Laupahoehoe Community Association

6.4 PUBLIC VIEWS AND COMMENTS.

Letters of comment on the draft EIS were received from Federal, State and local government agencies, private organizations and individuals. Letters containing "No Comment" or statements of support are not included, and some of the comments are paraphrased. All the letters containing substantive comments and the responses are reproduced in Appendix B.

a. Federal Agencies

(1) National Marine Fisheries Service

Comment: Blasting should be restricted during the months of November through May.

Response: Blasting will be so restricted as stated in paragraph 5.7c of the draft EIS.

Comment: The breakwater and turning basin should be aligned to minimize destruction of coral in the project area.

Response: The alignment of the breakwater and turning basin will be designed to minimize destruction of the coral communities as much as practicable.

(2) U.S. Environmental Protection Agency

Comment: The EIS should address plans to deal with fuel spills and other emergency actions which may impact water quality.

Response: Contingency planning like other operational aspects of the proposed protected boat ramp will be the responsibility of the local sponsor. Since there will not be a fuel dock or other facilities which are prone to accidents, we expect emergency plans will be very simple, likely consisting of instructions to call the responsible agency, such as the U.S. Coast Guard, and report the mishap.

Comment: The EIS should address the program to deal with the increased solid waste.

Response: The increase in solid waste is not expected to be significant enough to require a change in the current solid waste disposal procedures.

Comment: Mention should be made of the type of sewage treatment system employed for the existing facilities and any plans for additional or upgraded facilities.

Response: The present facilities are connected to a cesspool. There are no current plans for additional or upgraded facilities.

Comment: The water supply for drinking, washing, and cooking should be addressed.

Response: Potable water is presently available at the park and there are no current plans for modifications to the system because of the project.

(b) State of Hawaii Agencies

(1) Department of Land and Natural Resources

Comment: Sitework should be scheduled for periods of minimal rainfall.

Response: The substrate at the site is primarily rock, so only minimal runoff is expected during rain; however, your suggestion to perform site preparation during periods of minimal rainfall will be considered when developing the construction schedule and plans.

Comment: Fast lands denuded of vegetation should be replanted or covered as quickly as possible to control erosion.

Response: Denuded fast lands will be revegetated to control erosion.

Comment: Petroleum products, wastes, and landscaping and preservative substances should be prevented from entering the ocean.

Response: The construction contract will require the contractor to prevent toxic substances from entering the ocean.

Comment: A visual lookout for sea turtles should be made and cease blasting when turtles are in the area.

Response: The contractor's blasting plan will contain such a requirement.

Comment: Request two copies of the archaeological reconnaissance report be forwarded to the historic sites office.

Response: Copies were provided on 8 December 1983 (Appendix G).

Comment: The proposed boating facility should not be dominated by commercial fishermen.

Response: The facility will be available to the general public as well as commercial fishermen.

(2) Office of Environmental Quality Control

Comment: Blasting should not be conducted during the migratory season of the endangered humpback whale.

Response: Blasting will be restricted during the months of November through May as indicated in paragraph 5.7c of the draft EIS.

(3) Department of Planning and Economic Development

Comment: The EIS should cite appropriate objectives and policies of the Hawaii State Plan and indicate how the project addresses these.

Response: The project is sponsored by the County of Hawaii, Department of Parks and Recreation, which has been actively involved in the planning. The project appears to be in conformance with the objectives and policies of the State Plan. Both the draft and final EIS are submitted to State and local agencies for review.

Comment: Table 2 incorrectly refers to the State Land Use Plan. It should be titled State Land Use Law.

Response: The title has been corrected.

(4) University of Hawaii, Environmental Center

Comment: It is unclear if a trained archaeologist conducted the reconnaissance survey cited on page EIS-20.

Response: The survey was conducted by the Corps' archaeological technician.

Comment: The EIS should indicate that if the project is carried out the use of the tsunami risk area will be increased.

Response: The final EIS will indicate increased use of the tsunami risk area as you suggested.

- c. Hawaii County Agencies. No substantive comments received.
- d. Private Organizations. No substantive comments received.
- e. Individuals. No substantive comments received.

LIST OF PREPARERS

The following people were primarily responsible for preparing this Environmental Impact Statement.

<u>Name</u>	<u>Discipline/Expertise</u>	<u>Experience</u>	<u>Role in Preparing EIS</u>
Teresa H. Bowen	Hydraulic Engineering/Water Resources Planning	BS Civil Engineering; 5 yrs water resources studies with US Army Corps of Engineers.	Study Manager
James E. Maragos	Marine Ecology	BS, Zoology; Ph.D, Oceanography; 2 yrs postdoctoral research; 8 yrs environmental consultant; 9 yrs EIS studies, Corps of Engineers.	Review, overall impact assessment. (NEPA Coordinator)
William B. Lennan	Biology	BA, Zoology; 2 yrs postgraduate studies, University of Hawaii; 3 yrs fishery biologist, USFWS 2 yr environmental biologist Corps of Engineers.	Overall impact assessment.
David G. Sox	History and Culture	BA, MA Geography; 6 yrs research; 9 yrs EIS studies; Corps of Engineers.	Cultural and historical impact assessment.
David W. Cox	Archaeology	BA, Anthropology; 2 yrs postgraduate studies; w/diploma in cultural resources management, EWC; 1 yr EIS studies, Corps of Engineers.	Archaeological/historic sites reconnaissance and impact assessment.
John I. Ford	Limnology	BS MS Zoology; 4 yrs EIS studies, Corps of Engineers; 2 yr, fishery biologist, USFWS	Fish and wildlife assessment.
James Hatashima	Hydraulic Engineering	BS Civil Engineering 10 years Hydraulic Engineer with US Army Corps of Engineers.	Hydraulic Engineering and Design

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**PLAN FORMULATION
CRITERIA AND
COMPLIANCE REPORTS**

Appendix A

APPENDIX A
PLAN FORMULATION CRITERIA
AND
COMPLIANCE REPORTS

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I. STUDY AUTHORITY

Legislative Authority. Section 107 of the River and Harbor Act of 1960, as amended by Section 310 of the River and Harbor Act of 1965, Section 112 of the River and Harbor Act of 1970, and Section 133(a) of the Water Resources Development Act, approved 22 October 1976, states:

- (a) The Secretary of the Army is authorized to allot from any appropriations hereafter made for rivers and harbors not to exceed \$25,000,000 for any one fiscal year for the construction of small river and harbor improvement projects not specifically authorized by Congress which will result in substantial benefits to navigation and which can be operated consistently with appropriate and economic use of the waters of the nation for other purposes, when in the opinion of the Chief of Engineers such work is advisable, if benefits are in excess of the costs.
- (b) Not more than \$2,000,000 shall be allotted for the construction of a project under this section at any single locality and the amount allotted shall be sufficient to complete the Federal participation in the project under this section.
- (c) Local interests shall provide without cost to the United States all necessary lands, easements, and rights-of-way for all projects to be constructed under the authority of this section. In addition, local interests may be required to hold and save the United States free from damages that may result from the construction and maintenance of the project, and may be required to provide such additional local cooperation as the Chief of Engineers deems appropriate. A state, county, municipality, or other responsible local entity shall give assurance satisfactory to the Chief of Engineers that such conditions of cooperation as are required will be accomplished.
- (d) Non-federal interests may be required to share in the cost of the project to the extent that the Chief of Engineers deems that such cost should not be borne by the Federal Government in view of the recreational or otherwise special or local nature of the project benefits.
- (e) Each project for which money is allotted under this section shall be complete in itself and not commit the United States to any additional improvement to insure its successful operation other than routine maintenance, and except as may result from the normal procedure applying to projects authorized after submission of survey reports and projects constructed under the authority of this section shall be considered as authorized projects.

II. PLANNING CRITERIA AND CONSTRAINTS

Institutional Policies. Several institutional policies of the Federal Government affect the design and decisions for local and Federal participation. Executive policies are issued through the Office of Management and Budget (OMB), the Water Resources Council (WRC), and the Council of Environmental Quality (CEQ). Legislative policies are expressed by various legislative enactments of Congress which has developed a body of laws establishing national concerns regarding the nation's natural resources.

Design/Benefit Criteria. In developing justification for Federal participation, technical and economic evaluation policies, standards, principles, and procedures are established in determining a benefit to cost comparison. All projects must have a benefit to cost comparison. Projects must usually have a benefit to cost comparison of one or greater to be eligible for Federal participation.

Regulatory/Environmental Requirements. A number of statutory and regulatory requirements of the Federal Government must be complied with during the planning process. These requirements largely relate to the assessment and evaluation of possible impacts on the environment resources of the project area.

Archaeological and Historic Preservation Act of 1974 (Public Law 93-291), as amended. This act, also known as the Reservoir Salvage Act, provides for the preservation of historical and archaeological data which might be otherwise destroyed by flooding or other alteration of the terrain and authorizes up to one percent of the total amount authorized for appropriation for the project to be spent on recovery, protection, and preservation of data. This act will be utilized only for sites eligible for or listed on the National Register of Historic Places. Applicability of this act to the project is assessed in the EIS.

Clean Air Act, as amended (42 USC 7401 et seq.). As it applies to Corps studies and construction projects, this act requires that all Federal projects must conform to EPA-approved or promulgated state implementation plans. Compliance with this act is addressed in the EIS.

Estuary Protection Act (Public Law 90-454). The act requires that Federal agencies, in planning for use or development of water and land resources, give consideration to estuaries and their natural resources and that if estuaries may be affected, the Secretary of the Interior shall be given an opportunity to evaluate the effects of the project on the estuary. There are no estuaries in the study area.

Federal Water Project Recreation Act (Public Law 89-72, as amended). This act requires that full consideration be given to project opportunities for outdoor recreation and fish and wildlife enhancement; that planning based on coordination for use with existing and planned Federal and local public recreation developments and that the views of governmental agencies concerned with recreation and wildlife, including the USFWS and Heritage Conservation and Recreation Service (HCRS), be included in the report.

Land and Water Conservation Fund Act of 1965 (16 USC 4601-4 et seq.). As it applies to Corps studies and projects, this act requires that Corps recreation planning be coordinated with the State plan developed pursuant to the Act. Moreover, the non-Federal cost for the project may not be paid out of LWCFA funds.

Rivers and Harbors Appropriation Act of 1899, as amended (33 USC 401 et seq.). This statute, which established Corps' regulatory responsibilities and generally prohibited a wide range of actions which might obstruct navigable waters of the United States, does not impose any requirements on projects that are affirmatively authorized by Congress.

Watershed Protection and Flood Prevention Act, as amended (16 USC 1001 et seq.). This statute, which authorized the Soil Conservation Service to construct dams and other works in upstream watersheds, imposes no requirements on Corps projects.

National Environmental Policy Act of 1969 (Public Law 91-190). The National Environmental Policy Act (NEPA) requires an environmental statement in every recommendation or report on proposals for legislation and other major federal actions significantly affecting the quality of the human environment.

Clean Water Act of 1977 (Public Law 95-217). This act was formerly known as the Federal Water Pollution Control Act Amendments of 1972. The requirement is to evaluate discharge effects of dredged or fill materials into waters of the United States.

Coastal Zone Management Act of 1972 (Public Law 92-583). This act requires that the project must comply with the federal law [as well as be consistent with the Coastal Management Program for the State of Hawaii].

Endangered Species Act of 1973 (Public Law 93-205). The implementing agency shall coordinate with the appropriate federal wildlife agency to determine the presence of listed endangered or threatened species or their critical habitat may be present in the area of proposed action. The results of the assessment are contained in the EIS.

Fish and Wildlife Coordination Act of 1958 (Public Law 85-624). This act requires any federal agency proposing to impound, divert, or modify the channel of any stream or other body of water to consult with the Department of Interior, U.S. Fish and Wildlife Service (USFWS), and the head of the state or territorial agency exercising control over fish and wildlife resources, concerning the impacts of such action. The USFWS shall recommend, in a 2(b) report, methods to mitigate impacts of the proposed action and to conserve fish and wildlife resources. The draft 2(b) report is included in Appendix F.

Marine Protection, Research, and Sanctuaries Act of 1972 (Public Law 92-532). This act regulates the evaluation of the need and transportation of dredged material for the purpose of dumping in ocean waters. In the case of this project, there is no specific need to provide an ocean dump site for excess construction materials.

National Historic Preservation Act of 1966 (Public Law 89-635). Section 106 of this act requires that federal agencies shall, prior to the approval of the expenditure of any funds on an undertaking, or prior to the issuance of any license, as the case may be, take into account the effect of the undertaking on any property included in, or eligible for inclusion in, the National Register and shall afford the Advisory Council on Historic Preservation a reasonable opportunity to comment with regard to such undertaking.

Executive Order on Floodplain Management (EO 11988). This order requires that agencies avoid the base floodplain unless it is the only practicable alternative. For potential action in the floodplain, an evaluation of effects on floodplain values, a description of other practicable alternative actions outside the floodplain, and adequate dissemination of the action to the public must be undertaken. This project is not located in a floodplain.

Executive Order on Protection of Wetland (EO 11990). This order requires the agency to analyze potential impacts to existing wetlands and associated values and to give the public early public review of proposed actions.

Wild and Scenic Rivers Act of 1968 (Public Law 90-542). This act requires agencies to identify potential impacts to designated wild and scenic rivers and to coordinate action and obtain concurrence with the U.S. Department of the Interior.

III. EVALUATION OF THE EFFECTS OF THE DISCHARGE OF DREDGED OR FILL MATERIAL, LAUPAHOEHOE NAVIGATION IMPROVEMENTS WATER ACT, SECTION 404(b)(1), FACTUAL DETERMINATION.

1. SPECIAL AQUATIC SITES

- a. Sanctuaries and Refuges. None.
- b. Wetlands. None.
- c. Mudflats. None.
- d. Coral Reefs. None in immediate project area which could be affected by the proposed discharge. Corals are present, but do not form a reef.
- e. Riffle and Pool Complex. None.

2. HUMAN USE CHARACTERIZATION

- a. Municipal Water Supply. None.
- b. Recreation Fishing. Recreational pole fishing present along entire shoreline of Laupahoehoe Point Park, but hazardous. Effect: Recreational fishing values improved with the placement of armor units in the water. The wave absorbers and breakwater will provide habitat for common reef fish, possibly providing new fishing sites.
- c. Commercial Fishing. The open ocean near Laupahoehoe is a popular destination for commercial fishermen. There is no commercial fishing at the project site itself. Effect: Increased access to fishing grounds not likely to result in overfishing. No direct effect from discharge of armor units.
- d. Water Related Recreation. Wading and swimming poor due to hazardous wave conditions. Diving and snorkeling good when wave conditions and visibility permit. Effect: Breakwater will provide protected swimming area inside, provided caution is used to avoid injury by boats using ramp.
- e. Aesthetics. The vista toward the sea from the park is essentially pristine open ocean coastline since from many areas the existing ramp, dock and parking lot are not visible. Effect: Discharge will form a breakwater and wave absorber in the coastal area which will be more visible than the present facilities.

- f. National Monuments. None.
- g. National Seashores. None.
- h. National Wilderness Areas. None.
- i. Research Sites. None.
- j. National Historic Sites. None.

3. PHYSICAL SUBSTRATE DETERMINATION

a. Size Gradation and Coarseness. The discharge site substrate consists of lava rock, either basalt or welded clinker, and of varying elevations. Effect: The discharge is associated protective structures which will cover the substrate, but will not alter its structure, except for elevation.

b. Compaction. Not applicable. The discharge involves the construction of breakwater and wave absorber composed of solid basalt rocks.

c. Bottom Elevation/Contour. See table below.

<u>Base Condition</u>	<u>Plan 1</u>	<u>Plan 2</u>	<u>Plan 3</u>
Water depths before discharge	0 to -20 feet	0 to -20 feet	0 to -20 feet
Elevation after discharge	+15 feet	+15 feet	+15 feet

d. Material Movement. Not applicable. The basalt rock will not erode.

e. Deposition. Not applicable.

4. WATER QUALITY, CIRCULATION, FLUCTION AND SALINITY DETERMINATION

a. Current Velocity, Direction and Pattern. Effect: The placement of basalt rocks to form a breakwater and wave absorber will not have an effect on current velocity, direction or pattern.

b. Downstream Flow. Not applicable.

c. Normal Water Fluctions. There is no tidal gage at Laupahoehoe. The nearest data is from Hilo Harbor, and shows a mean fluction of 2.4 feet.

d. Salinity Gradient/Stratification. Not applicable.

e. Potability. Not applicable.

f. Water Physical Characteristics. Water chemical and physical characteristics are generally oceanic. There are no wastewater discharges near the project site. Effect; None of the plans will affect the chemical or physical characteristics of the water.

g. Pathogens/Biological Content. Fecal coliform concentrations are within the standards for waters in the vicinity of the project area. Effect: None of the plans is expected to have an effect on pathogens/biological activity in the area.

5. SUSPENDED PARTICULATE AND TURBIDITY DETERMINATION

Turbidity in the project site waters is low, except during periods of heavy rainfall, when the entire coast receives runoff of fine terrigenous material. This material is rapidly carried away after the rains, due to the strong wave action along the windward coast. Effect: During construction activities, turbidity and siltation will increase, however the material to be dredged, excavated, and used for the breakwater is mostly basalt, therefore effect on turbidity and siltation will be minimal.

6. CONTAMINANT DETERMINATION

- | | |
|--|--|
| a. Initial Evaluation | All Plans |
| (1) Material proposed for discharge. | Basalt rock |
| (2) Source. | Commercial quarry and some of the stone from the existing revetment. |
| (3) Contaminants can flow into the quarry site? | No. |
| (4) Material previously tested? | No. |
| (5) Can pesticides enter the quarry site? | No. |
| (6) Spills or disposal of contaminants have been documented in the past? | No. |
| (7) Natural desposits of minerals or other substances harmful to man are present at the quarry site? | No. |

d. Findings.

(1) The material proposed for discharge consists of uncontaminated stone and cast concrete.

(2) The material classification for the material is Category 5, discharge without potential for environmental contamination.

7. AQUATIC ECOSYSTEM AND ORGANISMS DETERMINATION

Aquatic Organisms.

a. The aquatic organisms present at the site are all common shallow water varieties and are not abundant. Effect: No significant effect expected.

b. The endangered Humpback Whale and the threatened Green Turtle are known to frequent the Hamakua Coast, including the area offshore from the project site. Effect: None expected, if blasting is restricted during the months of November through May.

8. DETERMINATION

The discharge of clean basalt stone and concrete into the nearshore waters under all plans does not significantly degrade water quality or human use of the water. The stone is not expected to contain contaminants or cause prolonged turbidity problems, nor is it expected to degrade the aquatic environment in any way.

9. MATERIAL PROPOSED FOR DISCHARGE

	<u>Plan 1</u>	<u>Plan 2</u>	<u>Plan 3</u>
Basalt Rock	9,860 tons	10,430 tons	5,540 tons
Concrete	10,132 tons	7,823 tons	5,658 tons



DEPARTMENT OF THE ARMY
PACIFIC OCEAN DIVISION, CORPS OF ENGINEERS
FT. SHAFTER, HAWAII 96858

February 23, 1984

REPLY TO
ATTENTION OF

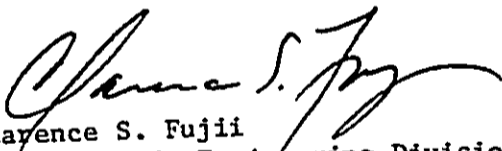
Mr. Charles Clark, Director
Department of Health
State of Hawaii
1250 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Clark:

As part of the procedure for implementing the Navigation Improvements at Laupahoehoe, Hawaii, the Corps has completed an environmental impact statement (EIS) which includes a discussion of the effect of the proposed project improvements on water quality in accordance with the Clean Water Act. We have enclosed for your review a copy of the EIS for the project with an evaluation of the effects of the discharge of dredged or fill material into waters of the U.S. under the Section 404(b)(1) Guidelines promulgated by the U.S. Environmental Protection Agency.

At this time, we request your comments on the EIS. We would appreciate a response on this matter by March 16, 1984.

Sincerely,


Clarence S. Fujii
Acting Chief, Engineering Division

Enclosure

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII



CHARLES G. CLARK
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3378
HONOLULU, HAWAII 96801

March 20, 1984

In reply, please refer to:
EPHSD-SS

Mr. Clarence S. Fujii
Acting Chief, Engineering Division
Pacific Ocean Division, Corps of Engineers
Ft. Shafter, Hawaii 96858

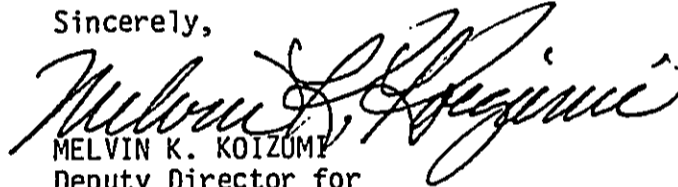
Dear Mr. Fujii:

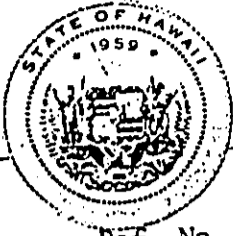
Subject: Request for Comments on Environmental Impact Statement
(EIS) for Laupahoehoe Navigation Improvements,
Laupahoehoe, Hawaii

Thank you for allowing us to review and comment on the subject
EIS. Please be informed that we do not have any comments or objections
to this project at this time.

We realize that the statements are general in nature due to preli-
minary plans being the sole source of discussion. We, therefore, reserve
the right to impose future environmental restrictions on the project
at the time final plans are submitted to this office for review.

Sincerely,


MELVIN K. KOIZUMI
Deputy Director for
Environmental Health



DEPARTMENT OF PLANNING AND ECONOMIC DEVELOPMENT

KAMAMAILU BUILDING, 250 SOUTH KING ST., HONOLULU, HAWAII
MAILING ADDRESS: P.O. BOX 2359 HONOLULU, HAWAII 96804

Ref. No. 8986

March 8, 1984

71
GEORGE R. ARIYOSHI
GOVERNOR
KENT M. KEITH
DIRECTOR
JOHN R. PINGREE
DEPUTY DIRECTOR
MURRAY E. TOWILL
DEPUTY DIRECTOR

DIVISIONS
ECONOMIC DEVELOPMENT DIVISION
ENERGY DIVISION
FOREIGN-TRADE ZONE DIVISION
HAWAII INTERNATIONAL SERVICES AGENCY
LAND USE DIVISION
PLANNING DIVISION
RESEARCH AND ECONOMIC ANALYSIS DIVISION
OFFICES
ADMINISTRATIVE SERVICES OFFICE
HAWAII FILM OFFICE
INFORMATION OFFICE
OCEAN RESOURCES OFFICE
TOURISM OFFICE

Colonel Michael M. Jenks
Honolulu Engineer District
U.S. Army Corps of Engineers
Building 230
Fort Shafter, Hawaii 96858

ATTENTION: Mr. Kisuk Cheung

Dear Colonel Jenks:

SUBJECT: Federal Consistency Determination for the Laupahoehoe
Navigation Improvements Project, Laupahoehoe, Hawaii

This is to inform you that we have reviewed your assessment of the
subject activity's consistency with Hawaii's Coastal Zone Management Program
and concur with your finding that it is consistent.

Your cooperation with the CZM Program requirements is greatly
appreciated.

Very truly yours,

Kent M. Keith
Kent M. Keith



DEPARTMENT OF THE ARMY
PACIFIC OCEAN DIVISION, CORPS OF ENGINEERS
FT. SHAFTER, HAWAII 96858

February 17, 1984

REPLY TO
ATTENTION OF

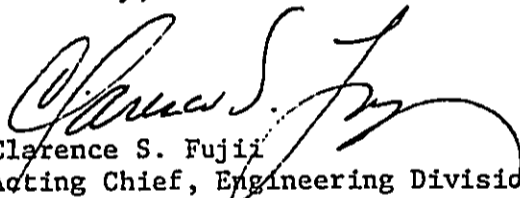
Mr. Kent Keith, Director
Department of Planning and Economic
Development
250 South King Street
Honolulu, Hawaii 96813

Dear Mr. Keith:

In accordance with the National Coastal Zone Management Act of 1972 and 15 CFR Part 930, Federal Consistency with Approved Coastal Management Program, we have prepared a draft environmental impact statement. (Enclosure 1) and a Supplemental Information form (Enclosure 2) for the Laupahoehoe Navigation Improvements Study, County of Hawaii. The proposed project is intended to provide a protected launch ramp for recreational and commercial boaters.

We have determined that the proposed project is consistent with Hawaii's Coastal Zone Management Program, and would appreciate your concurrence by March 16, 1984 so that we may meet our final report preparation schedule.

Sincerely,


Clarence S. Fujii
Acting Chief, Engineering Division

Enclosures

FEDERAL CONSISTENCY
SUPPLEMENTAL INFORMATION FORM

Date: _____

Project/Activity Title or Description: Laupahoehoe Navigation

Improvements

Location: Island Hawaii District 3rd Division

Tax Map Key No. 3-6-02-24

Other applicable area(s), if appropriate _____

Est. Start Date: unknown Est. Duration: Approximately 1 year

APPLICANT

Name & Title Colonel Michael M. Jenks

Agency/Organization Honolulu Engineer District

Address Building 230

Fort Shafter, Hawaii Zip 96825

Telephone No. during business hours:

A/C (808) 438-1091

A/C (808) 438-1069

AGENT

Name & Title Kisuk Cheung, Chief, Engineering Division

Agency/Organization Honolulu Engineer District

Address Building 230

Fort Shafter, Hawaii Zip 96858

Telephone No. during business hours:

A/C (808) 438-9523

A/C (808) 438-1634

CATEGORY OF APPLICATION (check one only)

- I. Federal Activity III. OCS Plan/Permit
 II. Permit or License IV. Grants & Assistance

TYPE OF STATEMENT (check one only)

- Consistency
 General Consistency (Category I only)
 Negative Determination (Category I only)
 Non-Consistency (Category I only)

APPROVING FEDERAL AGENCY (Categories II, III, & IV only)

Agency _____
Contact Person _____
Telephone No. during business hours:
A/C () _____
A/C () _____

FEDERAL AUTHORITY FOR ACTIVITY

Title of Law River and Harbor Act of 1960
Section 107

OTHER STATE AND COUNTY APPROVALS REQUIRED

Agency	Type of Approval	Date of Applic.	Status
DLNR	CDUA	N/A	
Hawaii County Planning Department	Requirement for SMA has not been determined		

CZM 9/79

HAWAII CZM PROGRAM
ASSESSMENT FORMAT

RECREATIONAL RESOURCES

Objective: Provide coastal recreational opportunities accessible to the public.

Policies

- 1) Improve coordination and funding of coastal recreation planning and management.
- 2) Provide adequate, accessible, and diverse recreational opportunities in the coastal zone management area by:
 - a) Protecting coastal resources uniquely suited for recreational activities that cannot be provided in other areas;
 - b) Requiring replacement of coastal resources having significant recreational value, including but not limited to surfing sites and sandy beaches, when such resources will be unavoidably damaged by development; or requiring reasonable monetary compensation to the State for recreation when replacement is not feasible or desirable;
 - c) Providing an adequate supply of shoreline parks and other recreational facilities suitable for public recreation;
 - e) Encouraging expanded public recreational use of County, State, and Federally owned or controlled shoreline lands and waters having recreational value;
 - f) Adopting water quality standards and regulating point and non-point sources of pollution to protect and where feasible, restore the recreational value of coastal waters;
 - g) Developing new shoreline recreational opportunities, where appropriate, such as artificial reefs for surfing and fishing; and
 - h) Encouraging reasonable dedication of shoreline areas with recreational value for public use as part of discretionary approvals or permits by the land use commission, board of land and natural resources, county planning commissions; and crediting such dedication against the requirements of section 46-6.

Discussion:

The project will provide a boat launch ramp which will expand the opportunities for recreational boaters. It will not effect any of the existing recreational facilities of the park.

HISTORIC RESOURCES

Objective: Protect, preserve, and where desirable, restore those natural and man-made historic and pre-historic resources in the coastal zone management area that are significant in Hawaiian and American history and culture.

Policies

- 1) Identify and analyze significant archaeological resources;
- 2) Maximize information retention through preservation of remains and artifacts or salvage operations; and
- 3) Support State goals for protection, restoration, interpretation, and display of historic resources.

Discussion:

There are no historic resources in the project area.

SCENIC AND OPEN SPACE RESOURCES

Objective: Protect, preserve and, where desirable, restore or improve the quality of coastal scenic and open space resources.

Policies

- 1) Identify valued scenic resources in the coastal zone management area;
- 2) Insure that new developments are compatible with their visual environment by designing and locating such developments to minimize the alteration of natural landforms and existing public views to and along the shoreline;
- 3) Preserve, maintain and, where desirable, improve and restore shoreline open space and scenic resources; and
- 4) Encourage those developments which are not coastal dependent to locate in inland areas.

Discussion:

The proposed breakwater will detract from the present unobstructed view.

COASTAL ECOSYSTEMS

Objective: Protect valuable coastal ecosystems from disruption and minimize adverse impacts on all coastal ecosystems.

Policies

- 1) Improve the technical basis for natural resource management;
- 2) Preserve valuable coastal ecosystems of significant biological or economic importance;
- 3) Minimize disruption or degradation of coastal water ecosystems by effective regulation of stream diversions, channelization, and similar land and water uses, recognizing competing water needs; and
- 4) Promote water quantity and quality planning and management practices which reflect the tolerance of fresh water and marine ecosystems and prohibit land and water uses which violate State water quality standards.

Discussion:

Very little blasting or dredging will be required. The proposed breakwater will cover, and therefore kill, benthic organisms including some corals, but will also provide a hard substrate for colonization of other benthic organisms, and the spaces between the armor stones will provide habitat for fish and crustaceans.

ECONOMIC USES

Objective: Provide public or private facilities and improvements important to the State's economy in suitable locations.

Policies

- 1) Concentrate in appropriate areas the location of coastal dependent development necessary to the State's economy.
- 2) Insure that coastal dependent development such as harbors and ports, visitor industry facilities, and energy generating facilities are located, designed, and constructed to minimize adverse social, visual, and environmental impacts in the coastal zone management area; and
- 3) Direct the location and expansion of coastal dependent developments to areas presently designated and used for such development and permit reasonable long-term growth at such areas, and permit coastal dependent development outside of presently designated areas when:
 - a) Utilization of presently designated locations is not feasible;
 - b) Adverse environmental effects are minimized; and
 - c) Important to the State's economy.

Discussion:

The proposed project will provide an estimated 375% more days for launching, allowing fishermen to increase their annual catch and therefore income.

MANAGING DEVELOPMENT

Objective: Improve the development review process, communication, and public participation in the management of coastal resources and hazards.

Policies

- 1) Effectively utilize and implement existing law to the maximum extent possible in managing present and future coastal zone development;
- 2) Facilitate timely processing of application for development permits and resolve conflicting permit requirements; and
- 3) Communicate the potential short and long-term impacts of proposed significant coastal developments early in their life cycle and in terms understandable to the general public to facilitate public participation in the planning and review process.

Discussion:

The proposed project is not expected to have an effect on development in the Laupahoehoe area.

COASTAL HAZARDS

Objective: Reduce hazard to life and property from tsunami, storm waves, stream flooding, erosion, and subsidence.

Policies

- 1) Develop and communicate adequate information on storm wave, tsunami, flood, erosion, and subsidence hazard;
- 2) Control development in areas subject to storm wave, tsunami, flood, erosion, and subsidence hazard;
- 3) Ensure that developments comply with requirements of the Federal Flood Insurance Program; and
- 4) Prevent coastal flooding from inland projects.

Discussion:

The project site is in a high risk area from tsunamis, and is on the border between "major" and "great" risk from earthquakes. The proposed project will have no effect on these hazards.

**PUBLIC
INVOLVEMENT**

Appendix B

APPENDIX B
PUBLIC INVOLVEMENT

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H.R. NO. 659

HOUSE OF REPRESENTATIVES
ELEVENTH LEGISLATURE, 1981
STATE OF HAWAII

HOUSE RESOLUTION



HOUSE OF REPRESENTATIVES
THE ELEVENTH LEGISLATURE
STATE OF HAWAII
HONOLULU, HAWAII 96813
May 19, 1981

ILSENE HARRISON PETERS
DANIEL J. ERHARD
DENNIS R. YAMADA
LAWRENCE STANLEY

ANDREW LEVIN
MATSUO M. MATSUURA
ROBERT A. SEGAWA
YOSHITO TAKAHANE
VICTORIA ISBELL
MARK J. ANDREWS
WILLIAM W. HUNAHAN
HEBERT I. HONDA
ALBERT P. TAITANI
ROBERT D. DROSS
DORIS R. ALDA
BRYANNA MARIKOTO
FREDERICK WILLIAM RUMELING
HOD I. OHIRIKA
CALVIN A. Y. SAY
REN J. HIRAIWA
KENNETH KUBAYASHI
KIMU BOYD KAWAII
PAUL L. LACY, JR.
HARVEY K. HIRAKAWA
HARVEY K. HIRAKAWA
CAROL JUNGSTADT
BRIAN T. TOMOVICH
KATHLEEN STAMLEY
BYRON BAKER
MICHAEL MORGAN LIO
DENNIS MASARU MAKASAKI
TONY MARVALS
GISELE ALBA
JOHN WARD
CONNOR C. CHUN
TOM OKAURA
CLARENCE Y. HAKAMOTO
LEONARD HIRAIWA YUOGALAN
DANIEL J. KIKIWA
MITSUO SHIHO
HARVEY K. HIRAKAWA
HENRY HIRAIWA
GREGORY L. HIRAIWA
YOSHIO MAKASHIRA
CHARLES T. TUGURUH
JIMMY WIND
WILLIAM T. ANDREWS
PHILIP J. SHIPPIUS
DANIEL J. SAARAKOTO
FREDERICK R. KAWAKAMI
JIMMY T. KAWAKAMI
DENNIS R. YAMADA

Division Engineer
U. S. Army Corps of Engineers
Pacific Ocean Division
Fort Shafter, Hawaii 96858

Dear Sir:

I transmit herewith a copy of House
Resolution No. 659, which was adopted
by the House of Representatives of the Eleventh
Legislature of the State of Hawaii, Regular
Session of 1981.

Very respectfully,

George H. Tamano
George H. Tamano
Clerk, House of Representatives

REQUESTING THE UNITED STATES ARMY CORPS OF ENGINEERS TO CONDUCT A
STUDY ON THE FEASIBILITY OF ESTABLISHING A SMALL BOAT REFUGE
HARBOR NEAR LAUPAHOEHOE POINT ON THE BIG ISLAND.

WHEREAS, there is currently no developed small boat harbor
on the Hamakua Coast of the Big Island; and

WHEREAS, the nearest harbors are the Hilo Harbor at the
southern end of the Hamakua Coast and the Kawaihae Harbor on the
western coast of the Big Island; and

WHEREAS, therefore, a large land area of the Big Island
coastline is without a small boat harbor; and

WHEREAS, fishing and related activities from boats in the
waters off the Hamakua Coast have been increasing in recent
years; and

WHEREAS, these boats are particularly vulnerable to the
storms and turbulent seas which occasionally arise because of
their small sizes make it dangerous to "ride out" storms; and

WHEREAS, there is a need for a small boat harbor somewhere
along the Hamakua Coast to give these boats and their crews
protection and refuge from harsh weather when they are unable to
reach either the Hilo Harbor or Kawaihae Harbor; and

WHEREAS, Laupahoehoe Point may be a feasible location for a
small boat refuge harbor because it is relatively near the middle
of the Hamakua Coast, it has geographical features which may
afford protection for small boats, and the land in the immediate
vicinity is under the jurisdiction of the government; and

WHEREAS, a study is needed, however, to determine whether a
small boat refuge harbor is feasible at Laupahoehoe Point; and

WHEREAS, reportedly, the United States Army Corps of
Engineers is currently considering the need for a small boat
refuge harbor near Laupahoehoe Point; now, therefore,

C June 1951

PORED-PJ

Mr. George H. Takane, Clerk
House of Representatives
The Eleventh Legislature
State of Hawaii
State Capitol
Honolulu, Hawaii 96813

Dear Mr. Takane:

This is regarding House Resolution 659 which requests the U. S. Army Corps of Engineers to conduct a study on the feasibility of establishing a small boat refuge harbor near Laupahoehoe Point on the Island of Hawaii. In February 1950, we prepared a reconnaissance report on this problem under the authority of Section 107, River and Harbor Act of 1950, as amended. We recommended against further study of navigation improvements at Laupahoehoe primarily because no commercial or subsistence fishing benefits had been identified for the area.

Since that time, however, there have been significant changes in boating patterns and commercial fishing landings. Based on our evaluation of the present situation, we believe that there may be sufficient benefits to justify reconsideration of our previous recommendation. We note also that navigation improvements at Laupahoehoe would assist in implementation of the Hawaii Fisheries Development Plan (Department of Land and Natural Resources, 1970) and the Statewide Boat Launching Facilities Master Plan (Department of Transportation, 1972). Improvements would also be consonant with the plans of the Department of Parks and Recreation, County of Hawaii.

Based on workshops held adjunctive to the Hilo Area Comprehensive Study, we believe that the planning concept in Laupahoehoe would require a small breakwater with protected mooring area. This area would be usable for commercial fishing boats or recreational boats to moor temporarily during emergencies or when they needed to put in to off-load fish or pick up ice, fuel or other supplies. We have coordinated with the Division of Harbors and the Department of Parks and Recreation, County of Hawaii, on this matter.

Please inform the Representatives that we will review the previous report in light of the above changes to determine if further detailed studies are warranted.

Sincerely,

ALFRED J. THIEDE
Colonel, Corps of Engineers
Commander and District Engineer

Copy Furn:
HQDA (DAEM-CIP-1), WASH DC 20314
Department of Transportation, State of Hawaii
Department of Parks and Recreation, County of Hawaii

H. R. NO. 659

BE IT RESOLVED by the House of Representatives of the Eleventh Legislature of the State of Hawaii, Regular Session of 1951, that the United States Army Corps of Engineers is requested to provide a report on its study on establishing a small boat refuge harbor near Laupahoehoe Point on the Big Island to the State of Hawaii as soon as possible; and

BE IT FURTHER RESOLVED that Hawaii's Delegation to the United States Congress take the necessary action to expedite the completion and transmittal of the study to the State of Hawaii; and

BE IT FURTHER RESOLVED that certified copies of this Resolution be transmitted to the Chief of Engineers of the United States Army Corps of Engineers, Division Engineer of the United States Army Corps of Engineers, Pacific Ocean Division; the members of Hawaii's congressional delegation; and to the Director of the Hawaii Department of Transportation.

OFFERED BY:

Alfred J. Thiede
Richard M. Whelan
Virginia Lohes

APR 13 1951



DEPARTMENT OF PARKS & RECREATION
 COUNTY OF HAWAII

Herbert Matayoshi, Mayor
 Milton Hakoda, Director

GEORGE R. ARYDOR
 COVENOR



STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HARBORS DIVISION

WAVE J. YAMASAKI
 HARBORS DIVISION

November 2, 1981

Colonel Alfred J. Thiede
 Commander and District Engineer
 U.S. Army Engineer District, Honolulu
 Building 230
 Fort Shafter, Hawaii 96858

SUBJECT: Reconnaissance Study - Proposed Laupahoehoe Harbor,
 North Hilo, Hawaii

In view of the fact that there have been significant changes in the boating patterns, especially in the area of commercial fishing along the North Hilo coastline, we also believe that there may be sufficient benefits to justify the development of the proposed harbor project at Laupahoehoe Point.

We are also aware that your people must first re-do a reconnaissance study of the site and the boating activities therein before a new cost-benefit figure can be developed. As far as the study is concerned, you may be assured that you have our support and we will provide whatever assistance is necessary. This was also previously stated when the Corps of Engineers did its first study of the harbor site.

In an effort to get the project started again, we have set up a meeting with the boaters from that area. The meeting is set for 4:30 p.m., Tuesday, November 17, 1981, and it will be held at the Laupahoehoe Point ramp site. We understand that two of your people will be attending this meeting.

Should you have any questions between now and the meeting date, please do not hesitate to contact us. Thank you very much for your reconsideration of the project.

Milton Hakoda
 Milton T. Hakoda
 Director

MTH:RD:ai

cc: Mayor Matayoshi
 Laupahoehoe Trollers Club
 Laupahoehoe Community Association

November 24, 1981

HAR-EP 166S

NOV 23 1981

Colonel Alfred J. Thiede
 District Engineer
 U. S. Army Corps of Engineers
 Honolulu District
 Building 230
 Fort Shafter, Hawaii 96858

Dear Colonel Thiede:

Request for Study
 Laupahoehoe, Hawaii

As you know, the Hamakua Coast of the Big Island is conspicuously lacking in small craft facilities. The absence of natural embayments and deep near shore waters have compelled efforts to locate a suitable site for a refuge area that could offer a haven for distressed boaters. In addition, a big demand exists for a safe and functional boat launching ramp to serve the boating community.

It appears the existing Laupahoehoe ramp site has the best potential for development into a combination boat ramp and refuge harbor facility. We understand the preliminary results of a recent boating survey conducted by your agency in conjunction with the Hilo Area Comprehensive Study revealed that benefits derived from such an undertaking would far exceed its cost, thus making the project both attractive and justifiable. Commercial fishing interests have also enthusiastically supported improvements to the Laupahoehoe site.

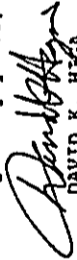
Toward this end, we respectfully request the Corps of Engineers initiate the necessary studies for a project to protect the existing Laupahoehoe ramp site and create a refuge and temporary mooring basin. The studies should include, but not limited to, an assessment of the environmental impacts, a feasibility and economic analysis, and the extent to which the Corps could participate in the actual development costs.

Please note that the boat ramp is currently under Hawaii County's jurisdiction and any costs associated with future improvements that may be required of the facility will be their responsibility. Therefore, we suggest you coordinate and also receive their concurrence on this matter.

In addition, you should be aware that the State Boating Task Force created by the Governor has the mission to oversee the boating program which include boat ramp facilities. Among other things, they recommend priorities for these types of projects and, consequently, play a vital role in the formulation of development schedules. The Task Force membership list for the County of Hawaii is enclosed for your convenience.

Your favorable response to our request would be appreciated.

Very truly yours,


DAVID K. HIGA
Chief

Enclosure

16

County of Hawaii

- Mr. Steve Lambert
c/o Hawaiian Cruises
P. O. Box 1745
Kailua-Kona, Hawaii 96740
- Mr. Glen Strader
President, Hilo Trollers
c/o Fred L. Walston, Inc.
424 Kamelehua Street
Hilo, Hawaii 96720
- Mr. Na'oji Kawamata
P. O. Box 1236
Kamuela, Hawaii 96743
- Mr. Roland Okumura
President
Kona Mauka Trollers
R.R. 1, Box 408
Kailua-Kona, Hawaii 96740
- Mr. William Weber
2405 Kalaniana'ole Street
Apartment 408
Hilo, Hawaii 96720
- Mr. Ronald Okamura
Department of Parks and Recreation
County of Hawaii
Hilo, Hawaii 96720
- Mr. George Parker
P. O. Box 38
Kailua-Kona, Hawaii 96740
- Mr. Francis Ruddle*
P. O. Box 651
Kamuela, Hawaii 96743
- Mr. W. W. Moss*
74-4993 Mauna Laliou Highway
Holualoa, Hawaii 96725
- Mr. Paul T. Matsumoto**
1142 Ainaola Drive
Hilo, Hawaii 96720
- Mrs. Lin McIntosh*
P. O. Box 2086
Kailua-Kona, Hawaii 96740
- Mr. Sid Weinrich
P. O. Box 127
Kailua-Kona, Hawaii 96740



DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
FT. SHAFTER, HAWAII 96858

PODED-PJ

6 April 1982

PUBLIC NOTICE

NOTICE OF STUDY INITIATION
ON NAVIGATION IMPROVEMENTS AT
LAUPAHOEHOE POINT,
ISLAND OF HAWAII

I am pleased to inform you that we have initiated detailed project studies for possible light draft navigation improvements at Laupahoehoe Point, Island of Hawaii. The study is being conducted under the authority of Section 107 of the River and Harbor Act of 1960, as amended.

The study will focus on the feasibility of navigation improvements and the extent of Federal participation. The first phase of the study will include the problems and needs issue, areas of particular concern, and possible alternative plans. As the study progresses, a full range of alternative solutions will be developed and evaluated. The final phase of the study will result in a detailed project report on possible improvements including an environmental statement.

We will be working closely with all interested Federal and local agencies as well as the general public. We will continue to keep you informed of the study progress and welcome your comments or suggestions on any aspect of the study.

Sincerely,

A handwritten signature in black ink, appearing to read "K. E. Sprague".

KENNETH E. SPRAGUE
LTC, Corps of Engineers
District Engineer



United States Department of the Interior

FISH AND WILDLIFE SERVICE
300 ALA MOANA BOULEVARD
P. O. BOX 50187
HONOLULU HAWAII 96850

MAIL ROOM 1532

MAIL ROOM REFER TO:
ES
Room 6307
1-2-82-SP-206

MAY 17 1982

Mr. Kisuik Cheung
Chief, Engineering Division
U.S. Army Engineer District, Honolulu
Ft. Shafter, Hawaii 96858

Dear Mr. Cheung:

This replies to your request of April 29, 1982 for information on endangered or threatened species, listed or proposed, which may be present at the site of the proposed Laupahoehoe Navigation Improvement Study.

To the best of our knowledge, there are no endangered or threatened species, listed, proposed, or candidate for listing present in the proposed project area.

Thank you for sharing our concern for conserving listed species.

Sincerely yours,

William T. Gates
Pacific Islands Administrator

BT
10



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
Western Pacific Program Office
P. O. Box 3830
Honolulu, Hawaii 96812

August 31, 1982

F/SAL/ETS

Mr. Kisuik Cheung
Chief, Engineering Division
U. S. Army Engineer District,
Honolulu
Ft. Shafter, Hawaii 96858

Dear Mr. Cheung:

This is in response to your letter of August 24, 1982, requesting a list of threatened and endangered species present in the Laupahoehoe Navigation Improvement Project Study Area, Island of Hawaii.

Biologists from the U.S. Fish & Wildlife Service, the Corps of Engineers, and the Western Pacific Program Office are presently conducting a site survey at Laupahoehoe. A species list will be forwarded to your office upon completion of the survey.

For future threatened and endangered species list requests we would appreciate at least 10 working days to respond so that we can provide the best available information.

Sincerely yours,

Doyle E. Gates
for Doyle E. Gates
Administrator



Save Energy and You Serve America!



DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
FT SHAFTER HAWAII 96859

FODED-PJ

3 September 1982

PUBLIC WORKSHOP NOTICE
LAUPAHOEHOE NAVIGATION IMPROVEMENTS

An informal public workshop to assist us in plan formulation, and in gathering additional information concerning specific problems, needs, and community desires will be held on:

Tuesday, October 26, 1982
at 7:00 PM

in the Laupahoehoe School Library

Information of particular importance to the study will be solicited during this workshop. They include: (1) Possible alternative harbor sites that should be considered, (2) supporting data showing the amounts and value of catch in the area and (3) any special environmental concerns which should be addressed.

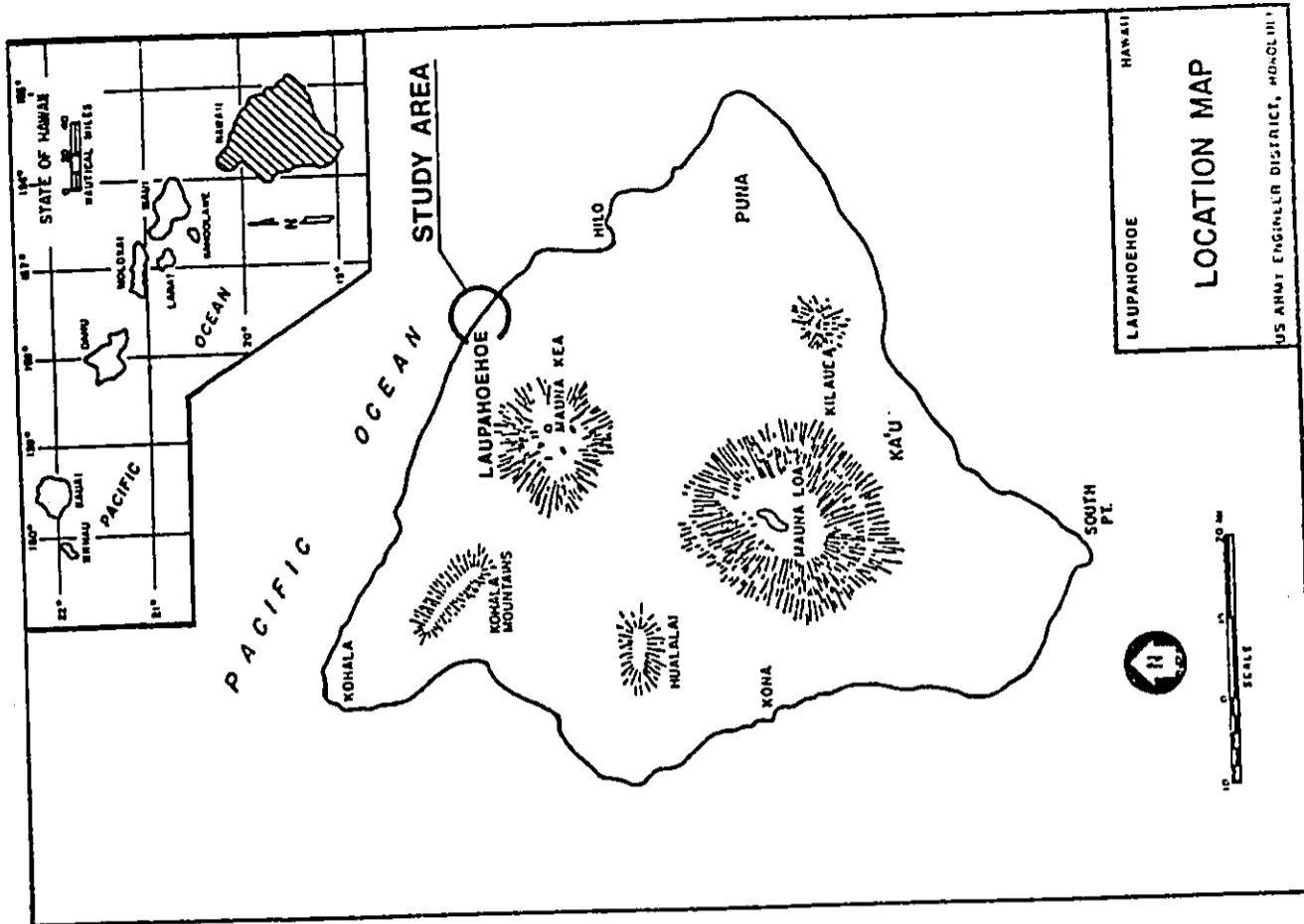
We would also like to discuss with local fishermen and residents projections on the number and size of boats that would use the improved facility.

We look forward to seeing you at the workshop.

Sincerely,

KENNETH E. SPRAGUE
Lt Col, Corps of Engineers
District Engineer

B-9





U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
Western Pacific Program Office
P. O. Box 3830
Honolulu, Hawaii 96812

September 22, 1982 F/SWR1:ETN

Mr. Kiskus Cheung
Chief, Engineering Division
U.S. Army Engineer District,
Honolulu
Ft. Shafter, Hawaii 96858

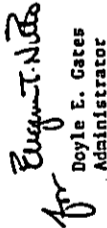
Dear Mr. Cheung:

In further response to your letter of August 24, 1982 requesting a list of threatened or endangered species that may be present in the Laupahoehoe Navigation Improvement Project Study Area, island of Hawaii, the following is provided for your information.

Although no turtles were observed in the immediate project area during a site inspection on August 31, 1982, the threatened green turtle (Chelonia mydas) is commonly found along the Hamakua coast of the island of Hawaii. Also, during the months of December through April or May the endangered humpback whale (Megaptera novaeangliae) is present in the coastal waters of the Hamakua coast, generally within the 100-fathom isobath.

Should you require any further information please contact Mr. Eugene T. Nitta, Marine Mammal & Endangered Species Program Coordinator at 955-8831.

Sincerely yours,


Doyle E. Gates
Administrator



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
300 South Ferry Street
Terminal Island, California 90731

January 4, 1983 F/SWR1:ETN

Mr. Kiskus Cheung
Chief, Engineering Division
U.S. Army Engineer District,
Honolulu
Fort Shafter, Hawaii 96858

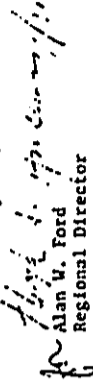
Dear Mr. Cheung:

We have reviewed the Biological Assessment for the Laupahoehoe Navigation Improvements project which was received on December 21, 1982, and find the biological information regarding the green turtle (Chelonia mydas) and the humpback whale (Megaptera novaeangliae) presented in the assessment to be generally accurate.

We further agree with your assessment of no significant affect on the two listed species from the project or subsequent vessel activity associated with the improvements, provided that as stated, blasting will be prohibited between 1 November and 31 May. Further consultation under Section 7 of the Endangered Species Act of 1973, as amended, will therefore not be required, and we consider the consultation process for this project concluded. However, should new or significant information regarding the species involved become available, or should the project plans change significantly, consultation must be reinitiated by the Corps.

Thank you for your cooperation in this matter.

Sincerely yours,


Alan W. Ford
Regional Director

cc: D. Gates, F/SWR1





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX

215 Fremont Street
San Francisco, Ca. 94105

14 December 1982

REPEU-111

Mr. Gerald V. Howard
Regional Director, 5th Region
National Marine Fisheries Service, NOAA
300 South Ferry Street
Terminal Island, CA 90731

OCT 4 1982

Col. Kenneth E. Sprague, District Engineer
Lt. Col., Corps of Engineers
U.S. Army Engineer District - Honolulu
Fort Shafter, HI 96858

Dear Mr. Howard:

This letter forwards the US Army Corps of Engineers biological assessment on the effects of the proposed Lanahohoe Navigation Improvements project on the endangered humpback whale and the threatened green sea turtle. The assessment fulfills the requirements of Section 7 of the Endangered Species Act of 1973, as amended. Based on our biological assessment (Incl 1) we believe that the proposed navigation improvement project at Lanahohoe, Hawaii will not effect the two species, nor result in the destruction or adverse modification of their respective habitats. We request that your office provide us a response to the biological assessment by 15 January 1983 so that we may meet our schedule for completion of the study.

If you have any questions, please contact Mr. William Lennan, Environmental Resources Section at (202) 417-2266.

Sincerely,

1 Incl
As stated

RICK HOFFMANN
Chief, Engineering Division

Dear Colonel Sprague:

The Environmental Protection Agency (EPA) has received and reviewed the Notices of Intent (NOIS) for the PROPOSED NAVIGATION IMPROVEMENTS AT REED'S BAY, LANAHOHOE AND KUMUKAHI POINT SITES 1 OR 2. We have no comments to make at this time.

We appreciate the opportunity to review these NOIS and request four copies of each Draft Environmental Impact Statement be sent to this office at the same time each is filed with our Washington, D.C. Office. We also request notification of any meetings to be held on any of these projects.

If you have any questions regarding our review, please contact me at (415) 974-8191 or FTS 454-8191.

Sincerely yours,

Rick Hoffmann

Rick Hoffmann, Acting Chief
EIS Review Section



DEPARTMENT OF THE ARMY
PACIFIC OCEAN DIVISION, CORPS OF ENGINEERS
FT SHAFTER, HAWAII 96858

November 28, 1983

AMC/DCR



DEPARTMENT OF THE ARMY
PACIFIC OCEAN DIVISION, CORPS OF ENGINEERS
FT SHAFTER, HAWAII 96858

25 November 1983

PODED-PJ

SUBJECT: Draft Detailed Project Report and Draft Environmental Impact Statement: Laupahoehoe Navigation Improvements, Island of Hawaii, Hawaii

CDR USACE (DAEN-CMP-W)
WASH DC 20314

The Corps of Engineers is in the final stages of the Laupahoehoe Navigation Improvements Study to determine the feasibility of providing light-draft navigational improvements at Laupahoehoe, Hawaii.

We are enclosing the Draft Detailed Project Report and Environmental Impact Statement for this study for your review. We would appreciate receiving your comments on the draft report by January 16, 1984 so that we can fully address your concerns in the Final Report and Environmental Impact Statement.

B-12

Asuk Cheung
Asuk Cheung
Chief, Engineering Division

Enclosure

The subject report is submitted in accordance with ER 200-2-2 dated 25 August 1980. Copies of this report are being distributed to all Federal and State agencies in addition to the Environmental Protection Agency and the interested public. Comments have been requested by

16 January 1984.

FOR THE COMMANDER:

1 Incl
as (10 cys)

Michael H. Jenks

for MICHAEL H. JENKS
Colonel, Corps of Engineers
Acting Commander

STEPHEN K. YAMASHIRO
Chairman & President, OIC
SENATOR KAUAI SCHMITTE
Via OIC



COUNTY COUNCIL
County of Hawaii
Hawaii County Building
Honolulu, Hawaii 96720

December 2, 1983

JAMES L. DURBERG
FRANK DE LUE III
TAKASHI YAMANO
TOSUO HIRAI
RILEY H. HALE
WILLIAM KAWAHARA
MERLEN LUI
Council Members

In Reply Refer
To: C-1433

Mr. Kisuk Cheung
Chief, Engineering Division
Department of the Army
Pacific Ocean Division
Corps of Engineers
Ft. Shafter, Hawaii 96858

This is to acknowledge your letter of November 28, 1983, enclosing the Draft Detailed Project Report and Environmental Impact Statement for the Laupahoehoe Navigation Improvements Study.

Please be informed that I have referred your letter to the Council's Committee on Public Works for review and comments.

I will keep you informed of the Council's action.

STEPHEN K. YAMASHIRO
COUNCIL CHAIRMAN

B-13



State of Hawaii
DEPARTMENT OF AGRICULTURE
1425 So. King Street
Honolulu, Hawaii 96814

December 6, 1983

JACK N. SILVA
CHAIRMAN, BOARD OF AGRICULTURE
SUZANNE D. PETERSON
DEPUTY TO THE CHAIRMAN

Mailing Address
P. O. Box 22159
Honolulu, Hawaii 96822

MEMORANDUM

To: Mr. Kisuk Cheung
Chief, Engineering Division
Corps of Engineers, Pacific Ocean Division

Through: Ms. Letitia Uyehara, Director
Office of Environmental Quality Control

Subject: Laupahoehoe Navigation Improvements
Draft Detailed Project Report and Environmental
Impact Statement
Launaloa, Hawaii

The Department of Agriculture has reviewed the subject Draft and does not have any comments to offer.

We do, however, appreciate the opportunity to comment.

JACK N. SILVA
Chairman, Board of Agriculture

CC: OEGC



U.S. DEPARTMENT OF TRANSPORTATION
 FEDERAL HIGHWAY ADMINISTRATION
 REGION NINE
 Hawaii Division
 Box 50206
 Honolulu, Hawaii 96850

MAJOR GENERAL ALBERT T. LUM
 DIRECTOR OF CIVIL DEFENSE

December 8, 1983
 IN REPLY REFER TO
 HDA-RI

GEORGE R. ARTOSEM
 CC-14-00A
 MAJOR GENERAL ALBERT T. LUM
 DIRECTOR OF CIVIL DEFENSE
 JIM COREY
 VICE DIRECTOR OF CIVIL DEFENSE



STATE OF HAWAII
 DEPARTMENT OF DEFENSE
 OFFICE OF THE DIRECTOR OF CIVIL DEFENSE
 3849 DIAMOND HEAD ROAD
 HONOLULU, HAWAII 96816

Mr. Kiskuk Cheung, Chief
 Engineering Division
 U. S. Army Corps of Engineers
 Pacific Ocean Division, Bldg. 230
 Fort Shafter, Hawaii 96858

Dear Mr. Cheung:

Subject: Laupahoehoe Navigation Improvements Study

We have no comments on your Draft Detailed Project Report and Environmental Impact Statement for the subject study.

We also take this opportunity to inform you of a change in address of our Region Office. (Your No. 236).

Regional Administrator
 Federal Highway Administration
 Region 9
 211 Main Street, Room 1100
 San Francisco, CA 94105

Sincerely yours,

H. Kusumoto
 Division Administrator

B-14

December 7, 1983

HICDFO

Mr. Kiskuk Cheung, Chief
 Engineering Division
 U.S. Army Corps of Engineers
 Pacific Ocean Division
 Building 230
 Fort Shafter, Hawaii 96858

Dear Mr. Cheung:

Reference is made to your letter of November 28, 1983, and Laupahoehoe Navigation Improvements Project Report, October 1983.

We have reviewed the subject document and have no additional comments.

Sincerely,

 JIM COREY
 Vice Director of
 Civil Defense

Letitia H. Uyehara
Interim Director
TELEPHONE NO.
348113



STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
390 WILSON BLVD.
ROOM 301
HONOLULU, HAWAII 96813

December 8, 1983

GEORGE A. ANTONIO
ENGINEER

ALVIN L. LUM
MAJOR GENERAL
ADJUTANT GENERAL
DIVISION OF
GENERAL INVESTIGATION
3001 KALANANOLU BLVD.
HONOLULU, HAWAII 96813

13 DEC 1983



STATE OF HAWAII
DEPARTMENT OF DEFENSE
OFFICE OF THE ADJUTANT GENERAL
249 DULANEY ROAD, HONOLULU, HAWAII 96813

HIENG

Ms. Letitia H. Uyehara
Interim Director
Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Dear Ms. Uyehara:

Laupahoehoe Navigation Improvements, Laupahoehoe, Hawaii
and Kahawaiui Stream

Thank you for providing us the opportunity to review your proposed projects,
"Laupahoehoe Navigation Improvements and Kahawaiui Stream" Environmental
Impact Statements (encl) Drafts.

We have completed our review and have no comments to offer at this time.

Yours truly,

Jerry M. Matsuda
JERRY M. MATSUDA
Major, HANG
Contr. & Engr Officer

Encl

Dear Reviewer:

Attached is the Draft Detailed Project Report and
Environmental Impact Statement for the
Navigation Improvements, Laupahoehoe, Hawaii.

Your comments or acknowledgments of no comments on the
document are welcomed. Please submit your reply to this
office by January 9, 1983.

If you have no further use for this document, please
return it to this office.

Thank you for your participation in the review process.



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. BOX 431
HONOLULU, HAWAII 96809

SUSURU ONO, CHAIRMAN
BOARD OF LAND & NATURAL RESOURCES
LEO L. A. HALELU
DIRECTOR OF THE DEPARTMENT
DIVISIONS:
AGRICULTURE DEVELOPMENT
ADULTIC RESOURCES
CONSERVATION AND
RECREATION DEVELOPMENT
COMPLIANCE AND ENFORCEMENT
LAND MANAGEMENT
STATE PLANS
WATER AND LAND DEVELOPMENT

DEC 21 1993

Mr. Kisuk Cheung
Pacific Division
U. S. Army Corps of Engineers
Ft. Shafter, Hawaii 96858

Dear Mr. Cheung:

Thank you for the opportunity to comment on the final report and the statement of the environmental impact of improvements planned for the Laupahoehoe boat ramp. We have reviewed the report and statement with interest, and would like to express a few concerns.

Aquatic Resources

Construction of the breakwater would unavoidably destroy sedentary marine life, but the breakwater itself would provide new habitat. Blasting would inevitably kill some fishes and invertebrates, but the amount of biomass destroyed should not be substantial since large amounts of blasting are not anticipated.

To minimize impacts adverse to aquatic resource values, we suggest the following precautions:

1. Sitework should be scheduled for periods of minimal rainfall;
2. Fast lands denuded of vegetation should be replanted or covered as quickly as possible to control erosion; and
3. Petroleum products, wastes, and landscaping and preservative substances should be prevented from falling or leaching into the marine environment.

We also recommend a visual lookout for sea turtles be kept during blasting, and that blasting cease whenever turtles are in the blast area.

Conservation District

Inasmuch as work will be performed in the Conservation District, the County of Hawaii will need to apply to this agency for the proposed use.

Mr. Kisuk Cheung
Pacific Division
Army Engrs
Page Two
DEC 21 1993

Historic Sites

We have not yet received the archaeological reconnaissance stated in page 30 of the report/statement. We therefore cannot ascertain whether or not any impacts to unrecorded cultural resources will result from this project. We request that two copies of the reconnaissance report be submitted to our historic sites office for review and comments.

Recreation Concerns

Certain facilities that were constructed at Hawaii County's Laupahoehoe Park were partially financed under the Federal Land and Water Conservation Fund Grant Program. The proposed boating facility should provide the general public with ocean-oriented recreation opportunities and its use should not be dominated by commercial fishermen.

To the extent that our concerns are adequately addressed, we support the proposed project which has as its purpose safe boating and greater recreational and fishing opportunities.

Sincerely,

SUSURU ONO
Chairperson

and

State Historic Preservation Officer

January 6, 1984

Mr. Susumu Ono, Chairman
Department of Land and Natural
Resources
P. O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Ono:

Thank you for your review and comments on the draft environmental impact statement (DEIS) for the Laupahoehoe Navigation Improvements Study. The following paragraphs respond to your specific comments.

The substrate at the Laupahoehoe project site is primarily rock, and therefore only minimal runoff is expected during rain; however, your suggestion to perform site preparation during periods of minimal rainfall will be considered when developing the construction schedule and plans.

Denuded fast lands will be revegetated to control erosion.

If the project is approved for construction, the construction contract will require the contractor to prevent petroleum and other toxic substances from falling or leaching into the ocean.

The contractor will be required to develop a blasting plan and have it approved by the Corps prior to performing any blasting. The plan will contain a requirement for a visual inspection prior to each blast.

The archaeological reconnaissance report was forwarded to the Historic Preservation Officer by letter dated December 8, 1983.

The boating facility proposed for Laupahoehoe will be available to the general public as well as commercial fishermen.

We appreciate your interest in the Laupahoehoe Navigation Improvements Study, and will provide you a copy of the final EIS when it becomes available.

Sincerely,

Kisuk Cheung
Chief, Engineering Division

November 28, 1983



EXECUTIVE CHAMBERS
HONOLULU

GEORGE P. ARIYOSHI
GOVERNOR

December 30, 1983

Honorable George R. Ariyoshi
Governor
State of Hawaii
Honolulu, HI 96813

Dear Governor Ariyoshi:

We are enclosing the Draft Detailed Project Report and Environmental Impact Statement for the Laupahoehoe Navigation Improvements for your information. Comments received during the public review of this report will be considered during the preparation of the final report. We will keep you informed of the study progress.

Sincerely,

Michael M. Jenks
Colonel, Corps of Engineers
District Engineer

Enclosure

Colonel Michael M. Jenks
District Engineer
U.S. Army Corps of Engineers, Honolulu
Building 230
Ft. Shafter, Hawaii 96858

Dear Colonel Jenks:

Thank you for the draft detailed project report and Environmental impact statement for the Laupahoehoe navigation improvements project.

The state has long recognized the need for a safe and useable boat launching ramp at Laupahoehoe. The improvements proposed by the Corps of Engineers will significantly benefit Big Island boaters, particularly from the Hilo area. The state supports your efforts in this important undertaking.

With warm personal regards, I remain,

Yours very truly,

George P. Ariyoshi
George P. Ariyoshi



University of Hawaii at Manoa

Environmental Center
Crawford 317 • 2550 Campus Road
Honolulu, Hawaii 96822
Telephone (808) 948-7361

January 9, 1984
RE:0396

Colonel Alfred J. Thiede
District Engineer
U.S. Army Corps of Engineers
Honolulu District
Building 230
Fort Shafter, Hawaii 96858

B
L
C

Dear Colonel Thiede:

Draft Detailed Project Report and
Environmental Impact Statement
Laupahoehoe Navigation Improvements
Laupahoehoe, Hawaii

The above cited document is a concise and well-written assessment of the potential environmental impacts that can be expected to occur with the development of this project. Our Environmental Center reviewers, Blon Griffin, Anthropology; Jacquelin Miller and Mark Ingoglie, Environmental Center offer the following brief comments for your consideration:

Archaeology

As noted on page EIS-14, "historically (and prehistorically), this point of flat land was the site of an extensive village". In spite of a lack of surface archaeological or historic remains, the potential for subsurface deposits is high. It is unclear if a trained archaeologist conducted the reconnaissance survey cited on page EIS-20, if so it should be noted. If not, a brief reconnaissance survey by an appropriately qualified archaeologist would lend greater credence to the conclusions expressed.

Tsunami

The EIS should indicate that if the project is carried out the use of the tsunami risk area will be increased. However, this should not increase the tsunami hazard to persons because the area should be evacuated when tsunami warnings are issued.

Yours truly,

Doak C. Cox
Doak C. Cox
Director

cc: OEQC
Blon Griffin
Jacquelin Miller
AN EQUAL OPPORTUNITY EMPLOYER



DEPARTMENT OF THE ARMY
PACIFIC OCEAN DIVISION, CORPS OF ENGINEERS
FT SHAFTER, HAWAII 96858

January 19, 1984

ATTENTION

Mr. Doak C. Cox, Director
University of Hawaii at Manoa
Environmental Center
2550 Campus Road, Crawford 317
Honolulu, Hawaii 96822

Dear Mr. Cox:

Thank you for your review and comments concerning the draft environmental impact statement for the Laupahoehoe Navigational Improvements Study contained in your letter dated January 9, 1984. The following paragraphs respond to your specific comments.

The archaeological survey was conducted by the Corps' archaeological technician, as indicated in the List of Preparers on page EIS-26 of the draft EIS.

The final EIS will indicate increased use of the tsunami risk area as you suggested.

We appreciate your continued interest in Corps projects, and will provide you a copy of the final EIS when it becomes available.

Sincerely,

Kisuk Cheung
Kisuk Cheung
Chief, Engineering Division



DEPARTMENT OF THE ARMY
PACIFIC OCEAN DIVISION, CORPS OF ENGINEERS
FT. SHAFTER, HAWAII 96858

January 19, 1984

44-115
21740-27

Mr. Doyle E. Gates, Administrator
National Marine Fisheries Service
Western Pacific Program Office
P. O. Box 3830
Honolulu, Hawaii 96812

Dear Mr. Gates:

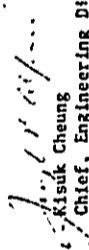
Thank you for your review and comments concerning the draft environmental impact statement for the Laupahoehoe Navigational Improvements Study contained in your letter dated January 10, 1984. The following paragraphs respond to your specific comments.

Submarine blasting will be restricted during the months of November through May.

The alignment of the breakwater and turning basin will be designed to minimize destruction of the coral communities as much as practical.

We appreciate your continued support and assistance, and will provide you with a copy of the final EIS when it becomes available.

Sincerely,


Kisuk Cheung
Chief, Engineering Division

January 10, 1984

F/SWR:JJN

Colonel Michael M. Jenks
District Engineer
U.S. Army Corps of Engineers
Building 230
Fort Shafter, HI 96858

Dear Colonel Jenks:

The National Marine Fisheries Service (NMFS) has received and reviewed the Draft Detailed Project Report and Draft Environmental Impact Statement (DEIS) for the Laupahoehoe Navigation Improvements, Laupahoehoe, Hawaii. The following comments are offered for your consideration.

General Comments

NMFS was consulted during the development of the DEIS, primarily concerning potential impacts on threatened and endangered species in the project area. We have conducted several site inspections of the project area and concur with the expressed need for the construction of a new launching facility protected from tradewind generated swells. An adequate launching ramp along the Hamakua Coast of Hawaii is essential to optimize harvest on the prime fishing grounds off this coast.

Resources for which NMFS bears a responsibility and alternatives to reduce adverse impacts on these resources have been addressed to our satisfaction in the DEIS. We concur with the selection of Plan 3 at Site 1 as the tentative recommended plan and support this alternative, providing all submarine blasting is restricted during the months of November through May. In addition, the breakwater and turning basin should be aligned in such a manner as to minimize destruction of the diverse coral communities found in the proposed project area.

We appreciate the opportunity to comment.

Sincerely yours,

Doyle E. Gates
Administrator

cc: F/SWR, Terminal Island, CA
F/HA, Washington, D.C.

bc: Honolulu District, Corps of Engineers



DEPARTMENT OF THE ARMY
PACIFIC OCEAN DIVISION, CORPS OF ENGINEERS
FT. SHAFTER, HAWAII 96830

January 19, 1984

ATTENTION OF

Letitia N. Uyehara
Interim Director



STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
330 HALEKUANUA STREET
ROOM 201
HONOLULU, HAWAII 96813

January 10, 1984

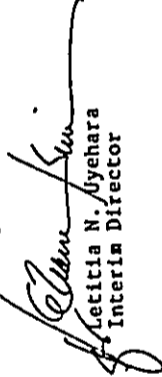
Mr. Kisuk Cheung
Chief, Engineering Division
Pacific Ocean Division
Corps of Engineers
Department of the Army
Fort Shafter, Hawaii 96858

Dear Mr. Cheung:

Subject: Comments to Laupahoehoe Navigational Improvements
Environmental Impact Statement

We understand that there may be some blasting involved during the course of this project. The blasting may have an affect on the endangered humpback whales, therefore we suggest that blasting not be conducted during the migratory season of these whales.

Sincerely,


Letitia N. Uyehara
Interim Director

B-21

Ms. Letitia N. Uyehara, Interim Director
Office of Environmental Quality Control
550 Halekuanua Street, Room 301
Honolulu, Hawaii 96813

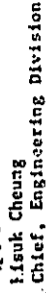
Dear Ms. Uyehara:

Thank you for your review and comments concerning the draft environmental impact statement for the Laupahoehoe Navigational Improvements Study contained in your letter dated January 10, 1984. The following paragraph responds to your specific comment.

Submarine blasting will be restricted during the months of November through May as indicated in paragraph 5.7c of the draft EIS.

We appreciate your continued concern with Corps projects, and will provide you a copy of the final EIS when it becomes available.

Sincerely,


Kisuk Cheung
Chief, Engineering Division



University of Hawaii at Manoa

Water Resources Research Center
Holmes Hall 283 • 2540 Dole Street
Honolulu, Hawaii 96822

January 19, 1984

11 January 1984

Mr. Kisuk Cheung
Chief, Engineering Division
U.S. Army Corps of Engineers
Pacific Ocean Division
Ft. Shafter, Hawaii

Dear Mr. Cheung:

Subject: Draft Detailed Project Report and Environmental Impact
Statement, Laupahoehoe Navigation Improvements, Laupahoehoe,
Island of Hawaii, Hawaii, November 1983

We have reviewed the subject Project Report and EIS and offer the
following comment. On page 11, para.(h). Is it "...waters generally less
than 600 feet deep?"

Thank you for the opportunity to comment. This material was reviewed by
NRRC and affiliate personnel.

Sincerely,

Edwin T. Murabayashi
Edwin T. Murabayashi
EIS Coordinator, NRRC

ETM:jam

Mr. Edwin T. Murabayashi
University of Hawaii at Manoa
Water Resources Research Center
Holmes Hall 283
2540 Dole Street
Honolulu, Hawaii 96822

Dear Mr. Murabayashi:

Thank you for your letter dated January 11, 1984 commenting on
the Laupahoehoe Draft Detail Project Report and Environmental Impact
Statement.

Your comment to add the word "deep" to the last sentence on
page 11, paragraph (h) will be incorporated into the final report.

Sincerely,

Kisuk Cheung
Chief, Engineering Division

December 8, 1983

Mr. Susume Ono
Hawaii State Preservation Officer
Department of Land and Natural Resources
Post Office Box 621
Honolulu, Hawaii 96809

Dear Mr. Ono:

The Corps of Engineers is in the final stages of the Laupahoehoe Navigation Improvements Study to determine the feasibility of providing light-draft navigational improvements at Laupahoehoe, Hawaii.

We are enclosing the Draft Detailed Project Report and Environmental Impact Statement for this study for your comment and review.

In compliance with the National Historic Preservation Act of 1966, as amended, and the Reservoir Salvage Act of 1969, as amended, we undertook a Historic Resources Site Survey of the project area. We enclose a copy of that reconnaissance report for your information.

We would appreciate receiving your comments on the draft report by January 26, 1984 so that we can fully address your concerns in the Final Report and Environmental Impact Statement.

Sincerely,

Kisuk Cheung
Chief, Engineering Division

Enclosures

Copy Furnished:

Pacific Area Director
US Department of the Interior
National Park Service
Box 50165
Honolulu, Hawaii 96850



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P O BOX 821
HONOLULU HAWAII 96803

SUSUMU ONO, CHAIRMAN
BOARD OF LAND & NATURAL RESOURCES
TODD A. WAKESU
DIRECTOR TO THE GOVERNOR
DIVISIONS:
AGRICULTURE DEVELOPMENT
CONSERVATION AND
RECREATION
HUMAN RESOURCES
INDUSTRIAL DEVELOPMENT
LAND MANAGEMENT
PLANNING
WATER AND LAND DEVELOPMENT

Mr. Kisuik Cheung
Page 2
June 11, 1984

This reconnaissance report is in compliance to Section 106 of the National Historic Preservation Act of 1966, as amended, and the Reservoir Salvage Act of 1960, as amended.

We further recommend that in the event that any previously unidentified sites or remains such as artifacts, shell, bone, or charcoal deposits, human burials, rock or coral alignments, pavings, or walls are encountered, please stop work and contact our office at 548-7460 immediately.

Sincerely yours,

Susumu Ono
Chairperson and
State Historic Preservation
Officer

Mr. Kisuik Cheung, Chief
Engineering Division
Pacific Ocean Division
Corps of Engineers
Ft. Shafter, Hawaii 96858

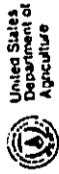
Dear Mr. Cheung:

Subject: Review of Archaeological Reconnaissance
Laupahoehoe Navigation Improvements Study
TRK: 3-6-02:24, Laupahoehoe Park
Laupahoehoe, North Hilo, Hawaii

Thank you for your letter of December 8, 1983, which enclosed a copy of the "Reconnaissance of Historic Resources for the Laupahoehoe Navigation Improvements Project, Laupahoehoe Point, Hawaii" (Corps of Engineers, 1983) for our review and comment.

Our review of the subject reconnaissance has resulted in our concurrence with the recommendations of the report which state:

Previous changes in land use, additions, and improvements to the County and State's property, and natural events have combined to effectively remove all surface indications of any earlier prehistoric features or historic period structures within the immediate area of the proposed project. The planned construction of the breakwater and the excavation and dredging of the protected turning basin will occur almost entirely in the backshore areas near the present ramp, and offshore. This is the area of the lava ridges with tumbled boulder 'beaches', betwcan. Therefore, it is highly unlikely that the construction of the breakwater and other improvements at this location will uncover any subsurface cultural resources, or have any impact on historic or prehistoric features or properties." (Subject Reconnaissance, 1983)



United States
Department of
Agriculture

P.O. Box 50001
Honolulu, Hawaii
96850

December 20, 1983



COUNTY OF
HAWAII

PLANNING DEPARTMENT

25 ALPINE STREET • HILO, HAWAII 96720
(808) 935-2222

HERBERT MATAIOSHI
SIDNEY FUKU
DUANE ANAHA

Mr. Kisuk Cheung
Chief, Engineering Division
Pacific Ocean Division
Corps of Engineers
Ft. Shafter, HI 96858

January 10, 1984

Dear Mr. Cheung:

Subject: Laupahoehoe Navigation Improvements Study
We reviewed the subject Draft Detailed Project Report and Environmental Impact Statement and have no comments to make.

Thank you for the opportunity to review this document.

Sincerely,

Herbert C. H. Lun
FRANCIS C. H. LUN
State Conservationist

Mr. Kisuk Cheung
Chief, Engineering Division
Department of the Army
Pacific Ocean Division, Corps of Engineers
Ft. Shafter, HI 96858

Dear Mr. Cheung:

Laupahoehoe Navigation Improvements
Draft Detailed Project and
Environmental Impact Statement

Thank you for the opportunity to review this study. The County of Hawaii's Department of Parks and Recreation is the local sponsor; as such, we will coordinate our comments and concerns through their office.

Sincerely,

Sidney Fuku
SIDNEY FUKU
Planning Director

RN:emf

cc: Dept. of Parks & Recreation



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
Western Pacific Program Office
P. O. Box 3830
Honolulu, Hawaii 96812

January 10, 1984

F/SMR:JJN

Colonel Michael H. Jenks
District Engineer
U.S. Army Corps of Engineers
Building 230
Fort Shafter, HI 96858

Dear Colonel Jenks:

The National Marine Fisheries Service (NMFS) has received and reviewed the Draft Detailed Project Report and Draft Environmental Impact Statement (DEIS) for the Laupahoehoe Navigation Improvements, Laupahoehoe, Hawaii. The following comments are offered for your consideration.

General Comments

NMFS was consulted during the development of the DEIS, primarily concerning potential impacts on threatened and endangered species in the project area. We have conducted several site inspections of the project area and concur with the expressed need for the construction of a new launching facility protected from tradewind generated swells. An adequate launching ramp along the Hamakua Coast of Hawaii is essential to optimize harvest on the prime fishing grounds off this coast.

Resources for which NMFS bears a responsibility and alternatives to reduce adverse impacts on these resources have been addressed to our satisfaction in the DEIS. We concur with the selection of Plan 3 at Site 1 as the tentative recommended plan and support this alternative, providing all submarine blasting is restricted during the months of November through May. In addition, the breakwater and turning basin should be aligned in such a manner as to minimize destruction of the diverse coral communities found in the proposed project area.

We appreciate the opportunity to comment.

Sincerely yours,

Doyl E. Gates
Doyl E. Gates
Administrator

cc: F/SMR, Terminal Island, CA
F/HA, Washington, D.C.



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
300 South Ferry Street
Terminal Island, California 90731

January 10, 1984

F/SMR1:JJN

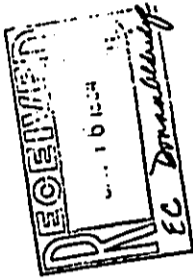
TO: Joyce M. Wood, Director
Ecology and Conservation Division, PF2
J. H. Anderson

FROM: W. Floyd S. Anders, Acting Regional Director
Southwest Region, F/SMR

SUBJECT: Laupahoehoe Navigation Improvements Draft Environmental Impact Statement, Laupahoehoe, Hawaii. (CE).

Attached are comments on the subject DEIS for inclusion in the Departmental response. A copy has been sent to the local Corps of Engineers' office per the NEPA commenting procedures implemented on March 24, 1982.

Attachment



VERLIL L. LI
County Clerk



COUNTY COUNCIL

County of Hawaii
Hawai County Building
Honolulu, Hawaii 96820

January 11, 1984

Mr. Kikus Cheung, Chief
Engineering Division
Department of the Army
Pacific Ocean Division
Corps of Engineer
Fort Shafter
Honolulu, HI 96858

B-27

Re: Laupahoehoe Navigation Improvement Study

Thank you for the opportunity to submit our comments on the Draft Detailed Project Report and Environment Impact Statement of the Laupahoehoe Navigation Improvement Study. The Laupahoehoe community has patiently awaited the much needed improvements to their light-draft launch facility.

Our greatest concern is for the safety of the people we represent, and the boating facility at Laupahoehoe although inadequate is the only launch site between Manukona and Hilo. We would like to impress upon the urgency of this project.

The Public Works Committee would also like to go on record as supporting Alternative Plan 3; estimated project cost of \$2,354,000 with a benefit-cost ratio of 1.2.

Merle K. Lai
Merle K. Lai, Chairwoman
COMMITTEE ON PUBLIC WORKS

xc: North Hilo Community Council
Committee on Public Works



United States Department of the Interior

GEOLOGICAL SURVEY
Water Resources Division
P.O. Box 50166
Honolulu, Hawaii 96850

January 11, 1984

Mr. Kikus Cheung
Chief, Engineering Division
Department of the Army
Pacific Ocean Division, Corps of Engineers
Fort Shafter, Hawaii 96858

Dear Mr. Cheung:

RE: Laupahoehoe Navigation Improvements, Laupahoehoe, Hawaii

The Hawaii District of the U.S. Geological Survey, Water Resources Division, has reviewed the environmental impact statement of the above subject area and has no comments to make at this time.

We appreciate this opportunity in having been allowed to review the above document. We are returning the document for your future use.

Sincerely,

Stanley F. Kapustka
Stanley F. Kapustka
District Chief

Enclosure



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEANIC SERVICE
Washington, D.C. 20230



North Hilo Community Council

Laupahoehoe, Hawaii 96764

January 13, 1984

N/MB2x5:VLS

TO: PP2 - Joyce Wood
FROM: R - Paul H. Wolff
SUBJECT: DEIS 8312.02 - Laupahoehoe Navigation Improvements Study
Laupahoehoe, Hawaii

The subject statement has been reviewed within the areas of the National Ocean Service's (NOS) responsibility and expertise, and in terms of the impact of the proposed action on NOS activities and projects.

Our Office of Ocean and Coastal Resource Management has been in contact with the Hawaii State Department of Planning and Economic Development. That Department will review the DEIS and we will defer to their comments.

B-20

January 11, 1984

Colonel Byron E. Byerle
U. S. Army Corps of Engineers
Honolulu District
Building 230
Fort Shafter, HI 96858

Thank you for your presentation of the Laupahoehoe Navigation Improvement Plans at the Public Hearing held at Laupahoehoe on December 13, 1983.

Although there was strong sentiment for Plan 1 from the community at the public hearing, after listening to the discussion generated at the hearing and meeting by ourselves after the hearing, we concur with the Corps' recommendation to proceed with Plan 3. Therefore, this letter is confirm this community's support of Plan 3.

Thank you for all of your efforts regarding this project and we certainly hope for favorable consideration from all agencies involved in proceeding with the project.

Lucille V. Chung
(Mrs) Lucille V. Chung
President

cc: U.S. Representative Daniel Akaka
State Representative Yoshito Takamine
Mayor Herbert T. Matayoshi
Council Chairman, Stephen Yamashiro
Councilwoman Merle K. Lai
Robert A. Gonsalves, Boating Association of Laupahoehoe





UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Washington, D.C. 20230

OFFICE OF THE ADMINISTRATOR

CONCEAL ANDERSON
DIRECTOR



STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
110 HALELOANUA STREET
ROOM 201
HONOLULU, HAWAII 96813

Letitia N. Uyebara
Interim Director
11/15/84

January 16, 1984

January 16, 1984

District Engineer
Department of the Army
Pacific Ocean Division, COE
Ft. Shafter, Hawaii 96858

Dear Sir (Madam):

This is in reference to your draft environmental impact statement on the Laupahoehoe Navigation Improvements Study, Laupahoehoe Hawaii. Enclosed are comments from the National Oceanic and Atmospheric Administration.

Thank you for giving us an opportunity to provide comments which we hope will be of assistance to you. We would appreciate receiving four copies of the final environmental impact statement.

Sincerely,

Joyce H. Wood
Joyce H. Wood
Chief, Ecology and Conservation Division

Enclosure
JHM:dma

Mr. Kisuk Cheung, Chief
Engineering Division
Pacific Ocean Division
U.S. Army Corps of Engineers
Fort Shafter, Hawaii 96858

Dear Mr. Cheung:

Subject: Comments to the Laupahoehoe Navigational Improvements EIS

We are transmitting for your review and files comments on your proposed Laupahoehoe Navigational Improvements that we have received from State agencies and we ask that they be included in your final EIS.

Sincerely,

Letitia N. Uyebara
Letitia N. Uyebara
Interim Director





**DEPARTMENT OF PLANNING
AND ECONOMIC DEVELOPMENT**

STATE OF HAWAII
DEPARTMENT OF PLANNING AND ECONOMIC DEVELOPMENT
1500 KALANOAU AVENUE, SUITE 200, HONOLULU, HAWAII 96813

GEORGE E. ANTONIO
DIRECTOR
KENT M. KEITH
CHIEF, ENGINEERING DIVISION
JOHN S. PRINGLE
CHIEF, ECONOMIC DEVELOPMENT DIVISION
MURRAY E. KOWAL
CHIEF, PLANNING DIVISION

DIRECTOR
ECONOMIC DEVELOPMENT DIVISION
PLANNING DIVISION
ENGINEERING DIVISION
RESEARCH AND ECONOMIC ANALYSIS DIVISION
ADMINISTRATIVE SERVICES OFFICE
HONOLULU OFFICE
MAUI OFFICE
KAHOOLAWE OFFICE
KAUAI OFFICE
HAWAII OFFICE

Ref. No. 8652

January 16, 1984

Mr. Kisuik Cheung
Chief, Engineering Division
Corps of Engineers
Fort Shafter, Hawaii 96859

Dear Mr. Cheung:

Subject: Laupahoehoe Navigation Improvement Study and EIS,
Island of Hawaii

We have reviewed the subject study and EIS and find that the EIS adequately addresses the probable impacts resulting from the construction of navigational improvements at Laupahoehoe, Hawaii.

Table 2 (Page EIS-3) of the EIS, Relationship of the Plans to Environmental Protection Statutes and Other Environmental Requirements, should include reference to The Hawaii State Plan. The EIS should cite the appropriate objectives and policies of The Hawaii State Plan and indicate the manner in which the project addresses these.

Also, the table incorrectly refers to a State Land Use Plan. This should be titled the State Land Use Law.

Thank you for the opportunity to review the report.

Very truly yours,

Kent M. Keith
Kent M. Keith

cc: Office of Environmental Quality Control



**DEPARTMENT OF THE ARMY
PACIFIC OCEAN DIVISION, CORPS OF ENGINEERS
FT. SHAFTER, HAWAII 96838**

February 27, 1984

ATTENTION

Mr. Kent M. Keith, Director
Department of Planning and
Economic Development
P. O. Box 2359
Honolulu, Hawaii 96804

Dear Mr. Keith:

Thank you for your review and comments concerning the draft environmental impact statement for the Navigation Improvements at Laupahoehoe, Hawaii County. The following paragraphs respond to your specific comments.

The project is sponsored by the County of Hawaii, Department of Parks and Recreation which has been actively involved with the harbor planning, and is supported by the State Department of Transportation. The project appears to be in conformance with the objectives and policies of the State Plan. Both the draft and final EIS are submitted to State and local planning agencies for review.

The Title of the State Land Use Law has been corrected in the final EIS.

We appreciate your continued interest in this project, and will provide you a copy of the final EIS when it becomes available.

Sincerely,

Kisuik Cheung
Kisuik Cheung
Chief, Engineering Division



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IX
215 Fremont Street
San Francisco, Ca. 94105

JAN 23 1984

Kisuk Cheung
Chief, Engineering Division
Department of the Army
Pacific Ocean Division, Corps of Engineers
Ft. Shafter, Hawaii 96858

Dear Mr. Cheung:

The Environmental Protection Agency (EPA) has reviewed the Draft Environmental Impact Statement (DEIS) titled LAUPAHOEHOE NAVIGATION IMPROVEMENTS, LAUPAHOEHOE ISLAND OF HAWAII, HAWAII. We have the enclosed comments regarding this DEIS.

We have classified this DEIS as Category LO-2 (lack of objections - more information needed). The classification and date of EPA's comments will be published in the Federal Register in accordance with our public disclosure responsibilities under Section 309 of the Clean Air Act.

We appreciate the opportunity to review this DEIS. Please send two copies of the Final Environmental Impact Statement (FEIS) to this office at the same time it is officially filed with our Washington, D.C. office. If you have any questions, please contact Loreta Kahn Barsamian, Chief, EIS Review Section, at (415) 974-8188 or FTS 454-8188.

Sincerely yours,

Charles W. Murray, Jr.
Assistant Regional Administrator
for Policy, Technical, and
Resources Management

Water Quality Comments

The FEIS should address the following issues, with regard to water quality impacts.

1. Fuel spills. Development of a contingency plan to deal with fuel spills and other emergency actions which may impact water quality due to the increased numbers of boats and vehicles.
2. Solid waste disposal. Development of a program or upgrading of an existing one, to deal with the proper disposal of solid waste (both garbage and fish refuse) from the increased numbers of park patrons.
3. Public sanitation facilities. Mention should be made of the type of sewage treatment system employed for existing public facilities. Any project related plans for additional or upgraded facilities should be discussed, as well.
4. Water supply. Water supply for drinking, washing, and cooking purposes should be addressed.

B-31

Enclosure (1)



UNITED STATES
DEPARTMENT OF THE INTERIOR

OFFICE OF THE SECRETARY
PACIFIC SOUTHWEST REGION
BOX 36098 • 450 GOLDEN GATE AVENUE
SAN FRANCISCO, CALIFORNIA 94102
(415) 956-8200

ER 83/1539

January 27, 1984

Brigadier General Robert M. Bumker
Division Engineer, Pacific Ocean Division
U.S. Army Corps of Engineers
Building 230
Fort Shafter, Hawaii 96855

Dear General Bumker:

The Department of the Interior has reviewed the Draft Detailed Project Report and Environmental Impact Statement, Laupahoehoe Navigation Improvements Study, Laupahoehoe, Hawaii, and offers the following comments.

Fish and Wildlife Resources

The U.S. Fish and Wildlife Service (Service) provided a Planning Aid letter to your Honolulu District Engineer on September 17, 1982, recommending measures to lessen project-related effects upon fish and wildlife resources. A copy of the Service's Fish and Wildlife Coordination Report should be included as part of the final detailed project report.

Recreational and Cultural Resources

The National Park Service reports that the County's Laupahoehoe Point Park was funded with a development grant through the Land and Water Conservation Fund (LWCF). While there does not appear to be any adverse impact to the park from the proposed project, the final statement and report for this project should document consultation with Mr. Susumu Ono, Chairman, Department of Land and Natural Resources, who is the liaison officer for the LWCF in Hawaii. Mr. Ono and his staff will be able to make the determination of potential impacts and any mitigation measures that may be needed.

Thank you for this opportunity to review and comment on your draft report and statement.

Sincerely,

Patricia A. Fort
Patricia Sanderson Fort
Regional Environmental Officer

cc:
Director, OEPR, w/c inc.
Regional Director, NPS
Regional Director, FWS
FWS/EC, WA., D.C.
FWS/ES-Federal Projects, WA., D.C.



DEPARTMENT OF THE ARMY
PACIFIC OCEAN DIVISION, CORPS OF ENGINEERS
FT. SHAFTER, HAWAII 96858

February 23, 1984

PLEASE TO
ATTENTION OF



DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
FT. SHAFTER, HAWAII 96858

February 16, 1984

Mr. Charles W. Murray, Jr.
Assistant Regional Administrator
for Policy, Technical and Resources Management
EPA Region IX
215 Fremont Street
San Francisco, CA 94105

Dear Mr. Murray:

Thank you for your review and comments on the draft environmental impact statement for the Laupahoehoe Navigation Improvements Study, Laupahoehoe, Hawaii. The following paragraphs respond to your specific comments.

Contingency planning like other operational aspects of the proposed protected boat ramp will be the responsibility of the local sponsor. Since there will not be a fuel dock or other facilities which are prone to accidents, we expect emergency plans will be very simple, likely consisting of instructions to call the responsible agency, such as the US Coast Guard, and report the mishap.

The increase in solid waste due to the project is not expected to be significant enough to require a change in the current solid waste disposal procedures.

The present toilet facilities are connected to a cesspool. There are no current plans for additional or upgraded facilities.

Potable water is presently available at the park for drinking and sanitation facilities. There are no current plans for modifications to the system because of the planned Navigation Improvements.

We appreciate your continued interest in this project, and will provide you with copies of the final EIS when they become available.

Sincerely,

Clarence S. Fujii
Clarence S. Fujii
Acting Chief, Engineering Division

Mr. Charles Clark, Director
Department of Health
State of Hawaii
1250 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Clark:

As part of the procedure for implementing the Navigation Improvements at Laupahoehoe, Hawaii, the Corps has completed an environmental impact statement (EIS) which includes a discussion of the effect of the proposed project improvements on water quality in accordance with the Clean Water Act. We have enclosed for your review a copy of the EIS for the project with an evaluation of the effects of the discharge of dredged or fill material into waters of the U.S. under the Section 404(b)(1) Guidelines promulgated by the U.S. Environmental Protection Agency.

At this time, we request your comments on the EIS. We would appreciate a response on this matter by March 16, 1984.

Sincerely,

Clarence S. Fujii
Clarence S. Fujii
Acting Chief, Engineering Division

Enclosure

GEORGE R. ANTONIO
DIRECTOR



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HONOLULU, HAWAII 96813

January 18, 1984

HAR-EP 2244

WALTER J. HANAUER
DIRECTOR

DIVISION OF

JOHNATHAN K. BOWEN, P.E.
CHIEF, DIVISION OF
MARINE VESSEL
REGISTRATION

Mr. Kisuk Cheung, Chief
Engineering Division
Department of the Army
Pacific Ocean Division
Corps of Engineers
Fort Shafter, Hawaii 96858

Dear Mr. Cheung:

Draft Detailed Project Report and EIS
Laupahoehoe Navigation Improvements Study

After reviewing the subject study, we generally concur with its contents and findings. We also agree that Plan 3 will alleviate much of the boater's concerns by facilitating launchings and retrievals of trailered boats. The hazards associated with the existing facility have hampered Big Island fishermen from fully realizing the potential of the northeast fishing grounds off the Hana coast.

We wish to reiterate our earlier concurrence for this project to provide navigation improvements at Laupahoehoe.

Thank you for this opportunity to provide comments.

Very truly yours,

Walter J. Hanauer
Walter J. Hanauer
Director of Transportation



STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 337
HONOLULU, HAWAII 96811

March 20, 1984

GEORGE R. ANTONIO
DIRECTOR

Mr. Clarence S. Fujii
Acting Chief, Engineering Division
Pacific Ocean Division, Corps of Engineers
Ft. Shafter, Hawaii 96858

Dear Mr. Fujii:

Subject: Request for Comments on Environmental Impact Statement (EIS) for Laupahoehoe Navigation Improvements, Laupahoehoe, Hawaii

Thank you for allowing us to review and comment on the subject EIS. Please be informed that we do not have any comments or objections to this project at this time.

We realize that the statements are general in nature due to preliminary plans being the sole source of discussion. We, therefore, reserve the right to impose future environmental restrictions on the project at the time final plans are submitted to this office for review.

Sincerely,

Melvin K. Koizumi
MELVIN K. KOIZUMI
Deputy Director for
Environmental Health

II. MAILING LIST

418
DISTRICT CONSERVATIONIST
US DEPT OF AGRICULTURE
SOIL CONSERVATION SERVICE
P. O. BOX 1061
HILO, HI 96720

472

MR. BRIAN SUGIYAMA
PO BOX 113
LAUPAHOEHOE, HI 96764

486
MR STEPHEN K. YAMASHIRO
CHAIRMAN
HAWAII COUNTY COUNCIL
25 AUPUNI ST
HILO, HI 96720

489

COUNCILMAN TAKASHI DOMINGO
HAWAII COUNTY COUNCIL
25 AUPUNI ST
HILO, HI 96720

492

COUNCILMAN WILLIAM S. KAWAHARA
HAWAII COUNTY COUNCIL
25 AUPUNI ST
HILO, HI 96720

493

MR. WM CHOY HEE
PO BOX 22
LAUPAHOEHOE, HI 96764

307

HONORABLE CEC HEFTEL
REPRESENTATIVE IN CONGRESS
300 ALA MOANA BLVD, ROOM 4104
HONOLULU, HI 96850

317

HONORABLE RICHARD HENDERSON
HAWAII SENATE, ROOM 217
HONOLULU, HI 96813

339

HONORABLE ANDY LEVIN
HAWAII HOUSE OF REPRESENTATIVE
HONOLULU, HI 96813

377

HONORABLE YOSHITO TAKAMINE
HAWAII HOUSE OF REPRESENTATIVE
HONOLULU, HI 96813

409

HAWAII DISTRICT FORESTER
STATE OFFICE BUILDING
HILO, HI 96720

420
DIRECTOR
DEPT OF CIVIL DEFENSE
COUNTY OF HAWAII
25 AUPUNI ST
HILO, HI 96720

481

MR. PAUL MIURA
PO BOX 3
ODKALA, HI 96774

487

COUNCILMAN JAMES DAHLBERG
HAWAII COUNTY COUNCIL
25 AUPUNI ST
HILO, HI 96720

490

COUNCILMAN TOMIO FUJII
HAWAII COUNTY COUNCIL
25 AUPUNI ST
HILO, HI 96720

493

COUNCILWOMAN MERLE K. LAI
HAWAII COUNTY COUNCIL
25 AUPUNI ST
HILO, HI 96720

496

MR. WALTER ADE
PO BOX 82
PAPAALOA, HI 96780

308

HONORABLE GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII
HONOLULU, HI 96813

328

HONORABLE ALFRED C. LARDIZABAL
HI HOUSE OF REPRESENTATIVES
HONOLULU, HI 96813

362

HONORABLE RICHARD MATSUURA
HAWAII HOUSE OF REPRESENTATIVE
HONOLULU, HI 96813

400

MR. PERRY WHITE
BELT, COLLINS, & ASSOC
606 CORAL STREET
HONOLULU, HI 96813

410

DIRECTOR
DEPT OF PARKS & RECREATION
COUNTY OF HAWAII
25 AUPUNI ST
HILO, HI 96720

462

MR DANIEL WILBUR
PO BOX 110
LAUPAHOEHOE, HI 96764

483

HONORABLE HERBERT T. MATAYOSHI
MAYOR OF THE COUNTY OF HAWAII
25 AUPUNI ST
HILO, HI 96720

488

COUNCILMAN FRANK DE LUZ, III
HAWAII COUNTY COUNCIL
25 AUPUNI ST
HILO, HI 96720

491

MR. SPENCER KALANI SCHUTTE
VICE-CHAIRMAN
HAWAII COUNTY COUNCIL
25 AUPUNI ST
HILO, HI 96720

494

COUNCILWOMAN HELENE H. HALE
HAWAII COUNTY COUNCIL
25 AUPUNI ST
HILO, HI 96720

497

MR. TOM POY
PO BOX 24
LAUPAHOEHOE, HI 96764

313

HONORABLE DANTE K. CARPENTER
HAWAII SENATE
HONOLULU, HI 96813

351

HONORABLE VIRGINIA ISBELL
HAWAII HOUSE OF REPRESENTATIVE
HONOLULU, HI 96813

374

HONORABLE HERBERT A. SEQAWA
HAWAII HOUSE OF REPRESENTATIVE
HONOLULU, HI 96813

403

HAWAII DISTRICT ENGINEER
HIGHWAYS DIVISION
DOT, STATE OF HAWAII
50 MAKAALA ST
HILO, HI 96720

411

DIRECTOR
DEPT OF PLANNING
COUNTY OF HAWAII
25 AUPUNI ST
HILO, HI 96720

LAUPAHOEHOE NAVIGATION
IMPROVEMENTS

II. MAILING LIST (contd)

594		595		596	
POSTAL CUSTOMER PO BOX 53 LAUPAHOEHOE, HI	96764	POSTAL CUSTOMER PO BOX 56 OOKALA, HI	96774	POSTAL CUSTOMER PO BOX 162 PAPAALOHA, HI	96780
597		1303 2-3-18-57		1326 2-3-15-18	
POSTAL CUSTOMER PO BOX 127 OOKALA, HI	96774	MS. TAKIKO INOKUJI 534 KINOOLE STREET HILO, HI	96720	MS. ELAINE CARLSMITH BOX 309 PAAUILO, HI	96776
1329 2-3-15-55		1358 2-3-9-5		1360 2-3-9-3	
MR. LAWSON P. WYLIE P.O. BOX 326 PAAUILO, HI	96776	MS. MITSUE KITAYAMA P.O. BOX 526 PAPAIKOU, HI	96781	MR. THOMAS T. TOGUCHI P.O. BOX 177 NAALEHU, HI	96772
1378 2-3-36-11		1595 MS. JANE BUCHANAN-BANKS GEOLOGICAL SURVEY US DEPT OF THE INTERIOR HAWAIIAN VOLCANO OBSERVATORY HI NATIONAL PARK, HI	96718	1902 2-3-26-51	
HAUNA KEA SUGAR COMPANY P.O. BOX 48 PAPAIKOU, HI	96781			MR. HARVEY A. TEVES 2379 KALANIANOLE HWY HILO, HI	96720
1923 2-3-23-3		1935 2-3-19-32		1936 2-3-19-2,-34	
MR. KAPUAKALANI O. ANDRADE P.O. BOX 362 NAALEHU, HI	96772	MS. ANNIE FERNANDEZ P.O. BOX 43 LAUPAHOEHOE, HI	96764	MS. ISABELLA FERNANDEZ P.O. BOX 43 LAUPAHOEHOE, HI	96764
1938 2-3-19-31		1955 2-3-30-18		1965 2-3-30-31	
MR. MOSES RODRIGUES BOX 51 PAAUILO, HI	96776	MR. TETSUO YANAGIDA 259 ILIWAHAI DRIVE WAIHANA, HI	96786	MS. CHIKAKO FUJIMOTO P.O. BOX 148 NINOLE, HI	96773
498		499		521	
POSTAL CUSTOMER PO BOX 162 PAPAALOHA, HI	96780	MR. JOSEPH K. LAURO, SR. PO BOX 137 PAPAALOHA, HI	96780	MR. ADAM CABRAL PO BOX 68 PAPAALOHA, HI	96780
532		533		535	
MR. KENNETH PETERS PO BOX 135 LAUPAHOEHOE, HI	96764	MS. ENIAS SPENCER GENERAL DELIVERY LAUPAHOEHOE, HI	96764	MR. DAVID MALANI PO BOX 26 LAUPAHOEHOE, HI	96764
537		538		584	
MR. SOLOMON PAID PO BOX 78 OOKALA, HI	96774	MR. PETER SATO PO BOX 163 LAUPAHOEHOE, HI	96764	MR. DALBERT COSTA GENERAL DELIVERY LAUPAHOEHOE, HI	96764
585		586		587	
MR. EDWARD SATA GENERAL DELIVERY LAUPAHOEHOE, HI	96764	MR. STEVEN ONGAIS 179 HAILI STREET HILO, HI	96720	MR. KENNETH KANIHO PO BOX 131 LAUPAHOEHOE, HI	96764
588		589		590	
MS. LUCILLE V. CHUNG PO BOX 127 LAUPAHOEHOE, HI	96764	MR. TSUHARA SUOYAMA PO BOX 113 LAUPAHOEHOE, HI	96764	K. R. MACHIDA PO BOX 142 OOKALA, HI	96774
591		592		593	
MR. BOB GONSALVES PO BOX 51 OOKALA, HI	96774	POSTAL CUSTOMER PO BOX 28 OOKALA, HI	96774	POSTAL CUSTOMER PO BOX 42 LAUPAHOEHOE, HI	96764

LAUPAHOEHOE NAVIGATION
IMPROVEMENTS

II. MAILING LIST (contd)

222
 DIVISION OF NEPA AFFAIRS
 US DEPT OF ENERGY
 1000 INDEPENDENCE AVE. SW
 WASHINGTON, DC 20505

301
 HONORABLE DANIEL K. INOUE
 UNITED STATES SENATOR
 300 ALA MOANA BLVD. ROOM 6104
 HONOLULU, HI 96850

304
 HONORABLE DANIEL K. AKAKA
 HOUSE OF REPRESENTATIVES
 1510 LONGWORTH HOUSE OFC BLDG
 WASHINGTON, DC 20515

124
 MR. ROBERT K. FUKUDA
 MANAGER, HONOLULU AREA OFFICE
 US DEPT OF HOUSING & URBAN DEV
 300 ALA MOANA BLVD. BOX 30007
 HONOLULU, HI 96850

132
 ADJ GEN & DIR OF CIV DEFENSE
 NATIONAL GUARD FORT RUGER
 3949 DIAMOND HEAD ROAD
 HONOLULU HI 96816

146
 DIRECTOR
 DEPT OF HAWAIIAN HOME LANDS
 STATE OF HAWAII
 P O BOX 1079
 HONOLULU, HI 96805

175
 DR. JOHN P. LOCKWOOD
 GEOLOGICAL SURVEY
 DEPT OF THE INTERIOR
 HAWAII VOLCANO OBSERVATORY
 HI VOL NAT PARK, HI 96718

178
 MR. DALLAS JACKSON
 GEOLOGICAL SURVEY
 DEPT OF THE INTERIOR
 HAWAII VOLCANO OBSERVATORY
 HI VOLCANO NAT PARK, HI 96718

201
 DIR, OFC OF ECOL & CONSERV
 NOAA, DEPT OF COMMERCE
 ROOM 3813
 14TH & CONSTITUTION AVE. NW
 WASHINGTON, DC 20230

413
 CHIEF ENGINEER
 DEPT OF PUBLIC WORKS
 COUNTY OF HAWAII
 25 AUPUNI ST
 HILO, HI 96720

206
 CHIEF, WESTERN PROJECT REVIEW
 ADV COUNCIL ON HIST PRESERV
 730 SIMMS STREET
 ROOM 450
 GOLDEN, CO 80401

234
 REGIONAL ADMINISTRATOR
 110 HWY ADMIN. REGION IX
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LAUPAHOEHOE NAVIGATION
 IMPROVEMENTS

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LAUPAHOEHOE NAVIGATION
IMPROVEMENTS

III. FINAL PUBLIC MEETING

ATTENDANCE
AT
PUBLIC MEETING
13 December 1983

Individuals (Cont'd)

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Violet Ishikawa, Ookala, HI 96774
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Richard Kiyota, 262 Anela St., Hilo, HI 96720
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David F. & Lucy H. Meyer, Box 125, Laupahoehoe, HI 96764
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Tsukasa Sugiyama, Box 113, Laupahoehoe, HI 96764
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Federal - Corps of Engineers

LTC Byron E. Byerley, Deputy District Engineer
Teresa Bowen, Study Manager
Harvey Young, Ch. Project Formulation Section
Elsie Smith, Public Affairs
Lyndee Sato, Recorder

Elected Officials

Congressman Daniel K. Akaka, US Representative
Helene Hale, County Council Councilwoman
Merle K. Lai, County Council Councilwoman
Thomas Makahara, Hawaii Island Representative for Congressman Akaka
Yoshito Takamine, State House Representative

State of Hawaii

John W. McDonald, Department of Transportation (Harbors Division),
Boating Branch
Dan Tanaka, Department of Transportation (Harbors Division)

County of Hawaii

Ronald Okamura, Department of Parks & Recreation

Special Interest Groups

Walter Abe, Laupahoehoe Trolling Club
William Choy Hee, North Hilo Community Council
Lucille Y. Chung, North Hilo Community Council
Robert Gonsalves, Laupahoehoe Fishing Club
Wayne Kanemoto, Laupahoehoe School
LaVerne Kantho, Laupahoehoe Community School
Les Wishard, Jr., Theo Davies Hamakua Sugar Co.
Marshall Malani, Laupahoehoe Fishing Club
Hiroshi Shima, North Hilo Community Council
Benjamin Urbanozo, Laupahoehoe Fishing Club

Individuals

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Masami Sam Hara, P. O. Box 56, Papaaloa, HI 96780
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Alfred Ignacio, Papaaloa, HI, Box 119, 96780

LAUPAHOEHOE NAVIGATION IMPROVEMENTS
PUBLIC MEETING
13 December 1983

LTC Byerley: Pleased to see so many of you out on an evening like this. For those of you have been here for awhile and didn't know, it's raining out there. This is as good a place as any. We're going to try to keep the proceedings this evening very informal if you don't mind, but there are few things we need to do for the records so that we can get our blocks checked on our forms and said what we supposed to do in carrying this all the way through to completion. First of all I need to introduce some of our folks. Standing here against the wall is Mr. Harvey Young from our Planning staff. The young lady sitting next to him is Teresa Bowen. She's going to be doing the large portion of the briefing this evening. I think a lot of you know Lyndee Sato who's running the recorder now. What she's doing is very important, because we're required to keep a verbatim record of what goes on here this evening. So, when you stand to speak, when your turn comes, please give your name and if you represent an organization please tell us so that we can get that into the record and make it complete. The lady walking around passing the blue cards is Elsie Smith, our Acting Chief of Public Affairs. If you don't have a card, raise your hand and she'll get you one. Also, on the cards there's a place for you to specify if you want to say something. If you do, check the block and we'll make sure you get called upon. If you decide you don't want to say anything here this evening out later decide you'd like to make a comment for the record, please write to us at the Honolulu District and the address is on there and we'll get that incorporated into the record. You all know Congressman Akaka and we're so pleased to see him this evening. Sir, if you have anything that you'd like to say at anytime please just. That goes for all of you. If you have something you'd like to say or question you'd like to ask, please raise your hand and we'll try to accommodate you. Now, when we come to the formal portion of the when you get a chance to let your thoughts be known, we ask you to limit your comments initially to about 5 minutes. That way, we'll have a chance for everybody to talk and then we'll come back later and give you a chance to relay all that detail for us. I'm going to turn it over to Teresa.

Teresa: (Slide Presentation) Good evening ladies and gentlemen. The Laupahoehoe Point Navigation Improvement Study was initiated following a request by the County Department of Parks and Recreation in November 1981. The Corps completed a preliminary report in January 1982 and that report was approved for detail project studies in March 1982. This meeting tonight describes what we've studied in that report. The purposes of the study were to determine the need for and the feasibility of providing a light-draft navigation improvement in the study area which was limited to North Hilo and Hamakua District. Areas along the remaining coastline were determined to be too far from the northeast fishing grounds which is the favorite fishing grounds of the fishermen in the area. The great distances between the harbors of refuge on the Big Island poses a big problem should mechanical problems occur or in rough sea conditions. Also, the increase in commercial fishing in North Hilo have caused the shores of berthing and launching facilities in the area to accommodate both present and future needs. The facilities within Hilo Bay and a launch ramp at Pohoiki are presently the only protected facilities in east Hawaii for launching and retrieving boats. At our workshop in November 1981, the needs expressed by you people mainly were to reduce the surge in Laupahoehoe Harbor and to eliminate the breaking waves at the launch

ramp and just in general, to improve the navigation conditions in the bay. Also, it was pointed out that the deteriorated condition of the ramp makes all launches extremely hazardous if not impossible. Potential sites in the study area were few due to a few physical constraints, for instance, the rugged coastline of the Hamakua Coast has few national embayments. Also, there's a tradewind exposure and just general rough sea conditions along the whole coastline. Hakalau Bay, 12 miles north of Hilo and 12 miles south of Laupahoehoe was identified as the only other potential alternative to Laupahoehoe. Hakalau was dropped from further consideration because it was determined to be too close to Hilo to fully meet the planning objectives of providing a protected ramp for emergencies and the travel time to the north Hilo fishing grounds would not be reduced significantly by providing a harbor at Hakalau. Also, the offshore conditions at Hakalau are rougher or as rough as Laupahoehoe and there were found to be no advantages of this site over the Laupahoehoe site. Two potential sites for development are identified at Laupahoehoe Point. Site One, on the west side is where the existing ramp is located and Site Two, to the east of that, is located in a small rock forced inlet. The storm wave exposure at Site Two is more direct and a harbor at Site Two could not be used in as many sea conditions as Site One. Also, the topography at Site Two shows extensive blasting and dredging of the entrance channel would be required to provide the same protection as the harbor at Site One. Any impacts through fish and wildlife, therefore, would be greater at Site Two because of the more blasting required and a more extensive breakwater would be required. Further investigations were conducted at Site One where the existing ramp is located in order to evaluate the existing conditions and to prepare a more detailed analysis and design. These investigations include surveys both in the water and on the land to determine the slope of the large or the contours in the area. Geotechnical investigations which included six borings that were taken around the parking lot and the onshore area near the ramp. An archaeological investigation was conducted to determine whether there were any historic properties of value situated within the project area and a fish and wildlife impact assessment was made. Due to the limited area available at the site and the physical constraints posed on, there weren't that many varied alternatives that we could consider. However, we did come out with three plans at Site One. They're mainly a variation on the same plan, the breakwaters are aligned a little differently and they provide a little different amount of protection. All plans were designed to accommodate a design vessel of 27 feet in length, a 7-foot beam and a 3-1/2-foot draft which is determined to be the largest vessel which would use the ramp. Plan 1 consists of a rubble mound breakwater topped with dolos about 285 feet long with crest elevation of 12 feet. We would also provide a wave absorber to dampen the surge in the basin about 50 feet long and at an elevation of 7 feet. The entrance channel would be about 205 feet long, 90 feet wide and 9 feet deep which is determined to be the minimum width and depth for safe navigation for a vessel of that size. The turning basin would be 100 feet by 100 feet and 7-1/2 feet deep which is the size considered safe for launching and retrieving operations in this type of wave climate. Based on an analysis of the wave heights existing at the ramp, this plan would provide safe launch and recovery operations about 75% of the time. Although none of the plans were developed to be a harbor refuge per se, the improvements would provide protection in rough weather although not severe storm conditions. The breakwater would have major overtopping in severe storm weather but it would improve on the existing condition. Costs associated with Plan 1: these are based on October 1983 price levels, benefits are derived from increased commercial fishing catch and reduction in damages at the ramp. They're based on 75% ramp usage time. The total cost is \$3.5 million for this plan, average

annual cost \$300,000, for benefit-to-cost ratio a little under 1. The second plan we developed consists of a 255-foot long breakwater, crest elevation 12 feet, 60-foot long wave absorber, a natural entrance channel of 9-foot wide and 9 feet deep and a 100-foot by 100-foot turning basin 7-1/2-foot deep. The expected usage for this plan is the same as Plan 1, 75%. Costs at Plan 2 are a little under that of Plan 1, \$3.3 million, average annual cost of \$287,000, benefits are \$265,000 for approximately the same benefit-cost ratio of .9. Plan 3 was developed to provide a little bit less protection than Plan 1 and Plan 2--at 70% expected usage, however, the structure length could be reduced significantly and cut down the cost a great amount. This is a 200-foot long breakwater, crest elevation 12 feet, the same wave absorber of 60 feet long and 7 feet high, 100-foot by 100-foot turning basin, 7-1/2-foot deep and again a natural entrance channel 90-foot wide by 9 feet deep. This launch ramp was part of the inland plan that we originally developed, however, the inland plan was too costly to excavate in +20 feet elevation. This is kind of a variation of that inland plan which was suggested at a previous workshop. The boat ramp would be relocated in this plan as all the others. Cost at Plan 3 are quite a bit less than Plan 1 and Plan 2 for a total cost of \$2.4 million. Benefits are reduced slightly because of the 70% expected usage rather than the 75% usage. Benefit-to-cost ratio of Plan 3 is 1.2. In summary, Plan 3 was selected as our tentatively recommended plan because of its favorable benefits and its overall positive contributions to the planning objectives. Plan 3 was the only plan with positive net benefits and a C ratio over 1 which is our criteria for recommending a plan. No significant environmental impacts are expected on either of the plans and no effect on any species of plant or animal which is listed or proposed as candidate for a threatened or endangered species will be affected. During the next stage, a hydraulic model test is recommended due to the highly complex and irregular offshore contours in this area and the many uncertainties associated with designing and engineering a project in such a complex ocean environment. The final alignment of the project, therefore, could alter somewhat after the model test is conducted. That concludes the formal presentation of the draft report and I will turn the meeting back over now to Colonel Byerley and take your comments and questions at this time. Thank you.

LTC Byerley: Before we get to your comments and questions, there's a couple of things that you need to be aware of. You noticed that Teresa said that you're not going to have full protection even with Plan 3 because cost is just prohibitive to give you 100% protection. Seventy percent gives us a plan that we can go forward with, we do not recommend a plan that has a benefit-cost ratio of 1 or less, it has to be one or more. Plan 3 was the only one in the three that you saw that had that benefit-cost ratio. The second thing that you probably are asking is where do we stand now? We're going to give everybody about thirty days to make their formal comments and we'll rap up this draft project report and send it forward to OCE, the Office of Chief Engineers, for approval. At the same time, we need for the local sponsor to sign a letter of intent saying that yes, they will provide the non-Federal share of this project and that's all we require to send this project forward. If that happens on the schedule we'd like for it to happen, that's about in March, we'll give Chief of Engineers Office 3 months or so to study the report, come back to us to any questions they might have and hopefully approve the report by about July. That means we can go to contract, with a contractor, to instruct this facility in or about July or the August timeframe. Add 18 months to that for construction time and we're looking at January 1986 as probably the earliest date that you'd actually be able to launch your boat down here in the new Laupahoehoe Harbor. Congressman, do you have anything you'd like to say before we kick this off?

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Congressman Akaka: Colonel, thank you for the opportunity. Aloha to the folks of Laupahoehoe and North Hilo area. I'm delighted to be here to join the Corps of Engineers people bringing to you the latest developments and designs of the Laupahoehoe Navigation Project. They've covered it very well in detail even up to January 1986 if everything goes on schedule and it can. There's also one word of caution to tell you to follow the schedule as closely as you can. They would like to have whatever comments or statements you have and be sure to get it in in the time that they're asking you to do it so they can proceed and move on with the project. As you can see, much thought was put into this. They've had other workshops that informed you of what has been happening and they have guidelines that they have to apply by and knowing some of that I can see they're following it very closely. I also want to mention the point that the Colonel mentioned about the 70%. We cannot expect a 100% on this and I think that you folks know that right now I don't know what the percentage is with the broken ramp that you have but this will be much, much better than what we have now. You can never expect a 100% and 70% will be considered good and worthwhile for you folks and the people who will be using the ramp. I want to commend the Corps of Engineers for their work towards expediting this. I think that you remember, and I had some, I don't see the person who asked me about that at one time, and I don't blame people for talking like that and one of it was, "gee, we're hearing this all the time--is this real?" I don't want to tell you that this is real. Much money has been put into it already to complete the designs and it is moving along and I want to be back in 1986, January, to see that the first use will be made of it. I want to personally thank you for your interest in this, your participation in it and your general cooperation in bringing this along. I think that you know that the Corps of Engineers has been doing something, not new, but they've been successfully working with communities, so that communities are informed, communities will have an opportunity to say its peace and this is what it's for tonight. So, I hope all of you will make comments either here or in writing and let the Corps of Engineers know how you feel about this. I'm happy to see the progress the Corps has made and as far as I'm concerned it looks good, and our job or my job is to be sure the money is there and the Corps of Engineers have really done a good job in being sure that funds are there for this project. What I want to do is thank you for your interest in what has already been given, I want to thank the Corps of Engineers for their expeditious efforts on this Laupahoehoe Boat Ramp.

LTC Byerley: Thank you. Elsie, do we have some folks who wanted to speak? Mr. and Mrs. Nishiyama? Would you like to say something? This is your time.

Muneo Nishiyama: I'm Muneo Nishiyama and I just joined the Laupahoehoe Community here, I've been in Paauilo all my life and I just joined the Laupahoehoe community and I really appreciate the Corps of Engineers are doing for the community here. I'm fully back of it and I hope that it will continue and get this program going on and then it would finish up in time. What these people do have this place, use this as a safety area for emergency harbor, that's one of the things that we'd like to look forward to.

LTC Byerley: You bring up a very good point there. If you noticed when Teresa was showing the cost-benefit ratio, safety is not something that we can really put a dollar value on, you can't put a dollar value on life but if we can build this harbor that just saves one life, in my view it will pay for itself but that's not something we're able to charge off to the benefits of other projects. It looks like William Choy Hee. Would you like to say something sir?

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William Choy Hee: Well, it's been a long time we've been trying to have the project worked out through the community counsel and of course, the fishing boys really wanted to get into that shore, so we try to pursue this project and we're thankful that the Corps of Engineers started processing it.

LTC Byerley: Thank you very much. Now, as much as we appreciate the compliments ladies and gentlemen, if you have heartburn about any part of this that you seen this evening we want to know about that too because now's your time to tell us what the problems are that you foresee because you've lived here a lot longer than we've been around so if you see a problem with this please let us know because this is the time to get changed, it's much cheaper to incorporate a change now than it is to wait until the project's been designed and the contractor selected and then we tell the contractor wait a minute we want to change something, he says I'm glad you said that because that's going to cost you a little bit more money. So, now's the time to let us know if there's something that you don't like. Robert Gonsalves?

Robert Gonsalves: I represent the Laupahohoe Boating Association. Last night we held a meeting on our own. One of the questions brought up was how much money are you folks allowed to spend on one specific project? Are you folks limited to something like two, three or four million dollars on a project like this?

LTC Byerley: Yes, we are limited. It depends upon the particular section of the particular law but on this one, it's Section 205 and that's two million dollars in Federal investment and anything above the 2 million dollars has to be borne by the local sponsor. Now, I've got to be honest with you, the two million dollars includes this draft project report. So far you folks spent \$158,000 to produce this. Now, that seems like a lot of money for a little book this thick but Teresa Bowen's been over here a lot, we've done some rather detailed offshore and onshore investigations and it adds up and the problem is that that comes off that \$2,000,000. So, that means that that's the non-Federal share that has to be made on this project and the one we're recommended is around 2.3 to 2.4 million, so that means that the non-Federal shares is going to be in the order of \$500,000 to \$600,000.

Robert Gonsalves: That figures you just gave us includes the construction costs?

LTC Byerley: Yes, that's correct.

Robert Gonsalves: After last night's discussion, we, members of the community and the boating association, preferred Plan 1 knowing it costs x number of dollars. We were wondering if it would be possible to go that route, knowing the cost-benefit ratio is less than 1. Looking at the sketch of blueprints, it offers to us the protection and it offers 75% more usage as compared to Plan 3 because 70% usage. Would they consider using the ramp more or going out fishing more to bring in more of a catch than the profits, the money circulation becomes greater. You may have your points, your way of looking at it too.

LTC Byerley: We try to take that into consideration of course. At best it's an estimate on our part, we have some formulas, most of them are imperial formulas so there's no real proof that we're right and you're wrong or the other way around but based upon the quite a number of years of experience throughout the Pacific we arrived at those formulas as to what the benefits

are that accrue to a project of this nature. We'll certainly take that into consideration.

Robert Gonsalves: Right now, you this book that was put together, that's the study now goes to the mainland?

LTC Byerley: Yes, it goes to the Office of Engineers who has the authority to approve this. The only thing we needed to include with this is, of course, the letter of intent from the local sponsors saying yes, we will come up with our share of the money and we'll incorporate all your comments here this evening. What else, Harvey, do we put in here before it goes forward? That's about the size of it.

Harvey Young: That's about it. Plus a complete documentation of public and agency views, including a summary of what's going on tonight.

Yoshito Takamine: State Representative. If we were to suggest Alternative 1, as I understand, because of the cost-benefit ratio that we cannot, we're limited to \$2,000,000, therefore, I think there's no sense in this group submitting Plan 1 or Plan 2. We don't have too much choice because of the cost limitation that we should stick to Plan 3, am I correct?

LTC Byerley: As it stands right now, yes sir. However, we can take any information that you'd give us and we can go back through it again to see if there is a possibility that we can change it. Yes sir?

Representative Akaka: I'm just reiterating what you said that according to act, Federal Government is limited to \$2,000,000, so in this particular case, \$1.8 million is Federal share and as you noticed Plan 1, 2 and 3 is the same for the Federal share. The difference comes in the local share. In plan 3, the local share is down. Plan 1 was \$1.6 million so I know that Plan 1 has 75% usage. It's going to cost more to build but the cost/benefit ratio is what's important now in justifying building. The point I want to make is this meeting tonight is for you to say your peace. If you want Plan 1, say that and maybe why you want Plan 1 but I also want you to know it's going to cost more in the local share. Federal share is the same all the way around in 1, 2, 3.

Robert Gonsalves: Maybe we have to hear from the local, so all the them can see what representation there is.

Yoshito Takamine: I don't know maybe the county, Merle? You want to say a few words first?

Merle Lai: As far as I'm concerned, this project now the military Plan 1, 2 and 3. In plan 1 we definitely, the association has taken a position to support Plan 1 we're going to have problems with funding. We're told that the Corps of Engineers, I'm not sure they can make adjustments, how long are those adjustments are going to take, what are we talking about adjustments. Actually, Representative Akaka, as far as I read what he was saying to us is that we have funding and can the county level make that adjustment if we go to Plan 1. I can say that we're committed to the project, as far as funding there's another story. Let me check with my colleagues. Funding is a problem there's no question about that. Thank you.

LTC Byerley: There's some other folks that are here beside Representative Takamine is Thomas Itakaha, representing Representative Akaka here on the island, Helene Hale.

Helene Hale: I'll call on my public works chairman recommendation of which she does but I too would like to add a voice of caution because I have had many experiences with Corps of Engineers projects. It's been very gratifying to me that this project has moved as fast as it has. I attended a meeting here, I think it was last year sometime or any part of this year and it's not often the Corps of Engineers gets their hooks out this fast. I've seen Projects that the Corps took 30 years to fund like our Hailoa Flood Control. All I'm saying is that maybe it's better for us at this time to consider taking half a loaf rather than the whole thing to get something started. May I ask a question? If something happens to this project, say you build it and the ramp goes or the breakwater goes in a big tsunami or flood, the Corps of Engineers are committed to come in and fix the project, are they not?

LTC Byerley: Under emergency missions we are.

Helene Hale: So with that assurance, which gives us a little bit leeway, whereas if we wait for the \$3,000,000 project under plan 1 we may be waiting a long, long time.

LTC Byerley: John W. McDonald from the State Department of Transportation is here.

John W. McDonald: I didn't want to say anything.

LTC Byerley: Thank you. Dan Tanaka also from the State Department of Transportation, and Ronald Okamura here from the County. Do you have anything you want to say sir?

Ronald Okamura: No.

LTC Byerley: Is there someone else who would like to say anything who has something on their mind they want to talk about. Yes sir?

Kenneth Kaniho: I'm Kenneth Kaniho. I know Plan 1 costs much about \$3,000,000. We using this small boat harbor as safety, for emergency and on Plan 3 we can only use it 70%, what's the sense if we go Plan 3? We stick to Plan 1 anytime, being 75% but get more chance to get that rescue boat out at time of emergency.

Frank Stevens: I'm not a boater but I have a question. If we went ahead on Plan 3, couldn't we at a later date add to that breakwater to make it longer?

LTC Byerley: Yes, engineering wise it's possible.

Frank Stevens: We could add to it at a later date?

LTC Byerley: Yes, it could be done. It's feasible but whether the economics is feasible or not takes some study to see but it could be done.

Teresa: Colonel, could I add something to that Plan 1 versus Plan 3? The main difference between the two plans is the length of the breakwater. Plan 1 is a 285-foot breakwater and Plan 3 is a 200-foot long breakwater, and the reason that we've developed Plan 3 is because the first two plans are not feasible and that is because the depth of the water once you get out past 200 feet beyond that point drops off to 25 to 35 feet. At that depth, it costs about \$10,000 a foot to add on to the breakwater so that the outer

100-foot of breakwater ending up costing a million dollars--just the 100-foot outer portion of the breakwater. That's why we've developed another plan to try and make one feasible. Now, that 70% versus 75% is based on historical wave data at the site, however, there's also some engineering judgment used if you cut off 85 feet of the breakwater--is it going to reduce the usage 5%? 7%? That's engineering judgment, that's not a number that we've calculated in the office. The other thing is once the model test is completed on the plan, there's a possibility that the breakwater could be lengthened 10 feet, 15 feet depending on the model test. This is not completely fixed as it is right now. The alignment could change somewhat once we get good testing in there. When you're dealing with offshore topography that's this rugged, those of you who have snorkeled out there, there are pinnacles down there. When we took our soundings to get the depths, you can miss pinnacles here and there and it's very hard to design a project unless you get data, topography. There's possibility to the alignment still changing in the next plans and specs stage and that 70% versus 75%, it's only 5%, and that's a judgment that we need in the office to estimate the benefits by. Thank you.

LTC Byerley: What's she's trying to say is engineering is an art form as well as a science.

Yosnito Takamine: Could you repeat the when you would meet the letter of intent? Would they coincide about March of next year?

LTC Byerley: We will send forward the detail project report in March.

Yoshito Takamine: You need the letter of intent by March.

LTC Byerley: We need the letter of intent to include that as part of the documentation in the DPR.

Yoshito Takamine: The legislature begins in January. It would be able to answer Councilwoman Lai's question. The County would be sponsor but as to the kind of financing they have and how we can tie with a State agency that may help.

LTC Byerley: There is another step later on sir that it's called the 221 Agreement and that's really actually where you sign your name on the check. All we're asking for now is a letter from you saying yes you intend to.

Yoshito Takamine: When would that 221 come in?

LTC Byerley: I've got that sketch here, it comes in once we get the approval to go with it we start designing plans and specifications, then we get down to what we think is a better, these figures you've seen here are the best estimates at this point. Once we actually draw the detail plans and specifications for the project we'll be able to make a much closer estimate and be able to give you a much better figure as to what actually your share will be. That's when we'd ask you to sign the 221 Agreement.

Congressman Akaka: When do you think that will be?

LTC Byerley: We're hoping to have approval sir in July, if we get an approval from the Chief of Engineers in July we can start to work on the plans and specs right away. Hopefully go to contract late summer, early fall.

Robert Gonzales: This letter of intent, let say it's written up and the money won't be issued at that time, should somehow our County not be able to put up the funds, x number of dollars whatever it may be, does this project get scrapped? Let's say you, Federal government was putting up one, for example, 1.8 million, the County matches it or couple hundred thousand or so, half a million, would you know at that time when you sign that letter of intent that you have the money on hand or in other words do you folks have to know at that time yes they have the money, they're going to put the ramp.

LTC Byerley: Yes, when you sign the 221 Agreement, that's basically a commitment of funds as far as we're concerned.

Merle Lai: I'm very confident that Representative Akaka said don't worry, he'll really help us with the funding and is very confident.

LTC Byerley: Someone else please?

Audience: What would be the cost of the model that you're going to build? What are you going to end up to work with as far as Federal contribution?

LTC Byerley: Teresa, you have an estimate on that?

Teresa: I believe the model would be around \$150,000 and that is included in total project cost so it won't be a non-federal share but because it's over \$2,000,000, local share would pick up anything over \$2,000,000. It is included in that 1.2 B/C.

LTC Byerley: You mean, yes, you're going to pay for it but we've already calculated that in.

Robert Gonzales: One more question. After tonight's meeting, will you be coming to a definite decision as to what plan you're going into or would you recommend or would you rather have us meet with your community, the boating association, meet very soon and respond to you as to what plan we prefer. After tonight's discussion, I think there are some people that might be changing their minds and want 1, 2, or 3.

LTC Byerley: I understand. What we normally do is allow 30 days for your to write to us and give us your comments in writing and that will also included as part of the draft detailed project report. Someone else?

Harvey Young: One point I'd like to make in talking about B/C ratio. Generally, we do not make a recommendation for projects less than a 1.0 B/C ratio. We're not saying that's not possible, it's highly unusual that Washington will approve for a B/C ratio less than 1, that means we're spending a dollar, and in return we're getting less than a dollar. So all of that demonstrate reasons why we make that recommendation, in light of the feasible plan where the B/C ratio is greater than 1.2. It's awfully difficult in getting through. I think recent policy, too, reflects our President Reagan's view--and before, Carter's on what we've been calling as a HED plan, National Economic Development. We would develop projects at a point where we would maximize the return on the dollar and that's the basis for our recommendation.

Helene Hale: If for some reason people here don't like Plan 3 and insisted on Plan 1 and you took it up to Washington as that recommendation and is turned down, what would happen? Would there be any chance for them coming back and revising Plan 3 or would the whole thing go down the drain?

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LTC Byerley: Not necessarily. We tried this before and we haven't had a lot of luck but we realize that the plan that had the best benefit-cost ratio is one plan but the local sponsor prefers the other and they're willing to pay the difference in cost, and we still been told because the National Economic Development Act requirements that we have to maximize those benefits as well as the benefit-cost ratio. We haven't had a lot of luck getting those projects approved.

Helene Hale: That's depending on the local share taking up that extra million.

LTC Byerley: Oh yes, you bet. We're limited to \$2,000,000. Does that generate some more questions? Well ladies and gentlemen, thank you so much, I'm very proud of you for turning out when such numbers on an evening like this. We will incorporate your comments in the official detail project report that goes forward, and we would ask you if you think about this later this evening as you try to go to sleep or some other time during the next few days that you put in on paper and send it to us and we'll assure that it gets incorporated in the official detail project report that goes forward.

Robert Gonzales: One more thing. On behalf of the community and the boaters, we'd like to thank you and your staff, the County, Congressman and thank you very much for a job well done as far as putting that report together. We were really amazed what went into this report, necessary information to have, again thank you very much and now I'd like to see the cash flow.

LTC Byerley: Thank you. That will rap it up than. We'll stick around a few minutes if any of you just want to ask some general questions. Thank you all very much.

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GEOTECHNICAL INVESTIGATIONS

Appendix C

APPENDIX C

GEOTECHNICAL INVESTIGATIONS

APPENDIX C
GEOTECHNICAL INVESTIGATIONS

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GEOTECHNICAL APPENDIX

REGIONAL GEOLOGY

Hawaiian Islands - The Hawaiian Islands, located in the northcentral Pacific Ocean, are a 1,600-mile long chain of volcanic and coral limestone islands, reefs and shoals. The islands are divided into two groups: the major islands consisting of the eight southeastern islands from Niihau and Kauai to Hawaii and the northwestern islands and reefs stretching from beyond Kauai to Midway Island. This report is only concerned with the inhabited southeastern islands although it is noteworthy to mention that the geologic fate of these major islands is illustrated by the geologic history of the northwestern group. The northwest islands have been reduced to their present size and elevation by several million years of erosion and structural deformation.

The major islands of the Hawaiian Islands are, for the most part, basaltic domes often called "shield domes" or "shield volcanoes". The islands are of various ages and stages of dissection. The relative age of each island is based upon the time period when its volcanoes became extinct and not when the initial eruptions began. It has been suggested that all of the islands may have been erupting concurrently in the Tertiary Period, about 7 million years ago. Only the Island of Hawaii, the southernmost and youngest, presently continues to grow because of active volcanism. Initially, all of the Hawaiian Islands were formed from lavas emitted from a fissure or group of fissures in the ocean floor. The islands were later built up along the coasts by coral reefs in the warm tropical waters. The islands' coastlines and land surface above sea level have changed throughout the Pleistocene Epoch as a result of glacio-eustatic sea level changes. Hence, coral reef formations and marine sediments are found on some of the islands at elevations exceeding 1,200 feet and offshore at comparable depths.

Hawaii - The Island of Hawaii, the largest of the Hawaiian Archipelago, covers an area of over 4,000 square miles. The island was formed during the last 800,000 years by the gradual emergence and subsequent coalescence of five volcanoes: Mauna Loa and Kilauea, which are still active; Hualalai, which last erupted in 1801; Mauna Kea, which has been inactive in recent geologic time; and Kohala, which has been extinct for eons. The volcanic mountains are generally dome-shaped. Mauna Loa rises from a base 15,000 feet below sea level to 13,680 feet above sea level. It is the largest active volcano and is considered the biggest, single mountain on earth. Mauna Kea, the tallest volcano with an elevation of 13,784 feet, and Mauna Loa dwarf all other volcanoes on Hawaii. These five mountains have been formed almost entirely by the accumulation of thousands of thin flows of lava, each separate flow averaging less than ten feet in thickness. Nowhere are the lower slopes of the mountains steeper than twelve degrees, with the average slope around six degrees. Gentle, flat slopes extend outward beneath the water to the sea floor.

Although Mauna Kea is the tallest of all Hawaiian volcanoes, it makes up only 22.8% of the island's land surface (919 sq. miles), while neighboring Mauna Loa (2,035 sq. miles) comprises about 50.5%. The slopes and summit area of Mauna Kea are more rugged and irregular than the other volcanoes of this island because of the numerous cinder cones along its three rift zones. Moraines and other glacial features corresponding in age to the Wisconsin

glacial stage (10,000 to 14,000 years ago) have also been reported at elevations above 10,000 feet on Mauna Kea. The lower slopes of the mountain are covered with tan-colored ash deposits consisting of fine-grained, fire-fountain debris from the numerous cinder cones.

Volcanic rocks on Mauna Kea are divided into two series: the Hamakua and the Laupahoehoe. The Hamakua volcanic series is the older (Pleistocene geologic age) and forms the bulk of the volcanic mountain. It consists chiefly of olivine basalts, picrite basalts with olivine and augite phenocrysts and some andesites. The surface of this series is typically covered with 4 to 15 feet of ash which separates this formation from the overlying Laupahoehoe Volcanic Series (Recent geologic age). The Laupahoehoe Volcanic Series is composed mostly of andesine andesites although some olivine basalts are present.

SITE GEOLOGY

The proposed project site lies on the northeast (Hamakua) coast of the Island of Hawaii, northeast of Mauna Kea's summit (Figure C-1). The coastline is characterized by many youthful streams dropping over wave-cut cliffs into the sea. Laupahoehoe Gulch has been cut into the rocks of the Hamakua Volcanic Series and was partly filled by a later flow of the Laupahoehoe Volcanic Series. These lavas flowed through the gulch and entered the sea to form the approximately 10.5-acre, delta-like peninsula. Figure C-2 shows the distribution of rock around Laupahoehoe Point.

The proposed project site is located on the lava peninsula which protrudes approximately 1,200 feet into the sea beyond the cliffed Hamakua coastline. The shape and orientation of the peninsula offers some wave protection for the existing boat landing on the south (lee) side of the peninsula.

Along the shore, the topography of the peninsula consists of small lobes or tongues of lava extending out into the ocean which form a series of smaller peninsulas with adjacent coves on both sides. These ridges or tongues along the shore are irregular, jagged, sharp-edged masses of lava basalt and welded clinker rock that drop from elevations between 12 and 16 feet into the ocean. It is unknown whether the lobes or tongues of lava are tributary flows (finger flows) from the primary flow or are strong rock masses which resisted wave erosion while the inter-ridge or inter-tongue area (coves) represent weaker rocks which have been eroded. It is likely that the irregular shape of the shoreline resulted from a combination of those processes. The area is difficult to map and show actual detailed topography because of the extreme variation in relief over very short distances. Small depressions (± 10 feet deep) near the shoreline form tidal basins that are filled with wave-washed, smooth, partly-rounded fragments of basalt and andesite ranging in size from gravel to boulders. These deposits cover about 50% of the shoreline. Rock exposed at the surface of the site consists of welded clinkers (often called "flow breccia" or "volcanic agglomerate") and makes up the remaining 50% of the shoreline's land surface. The surface texture of the rock outcrops along the shoreline is rough and irregular (typical clinker texture) even though it is wave-cut and highly eroded.

The land surface of the backshore areas also consists of rough and irregular outcrops of moderately-hard lava basalt, andesite, and soft to moderately-hard welded clinker. Approximately 30% of the ground surface of

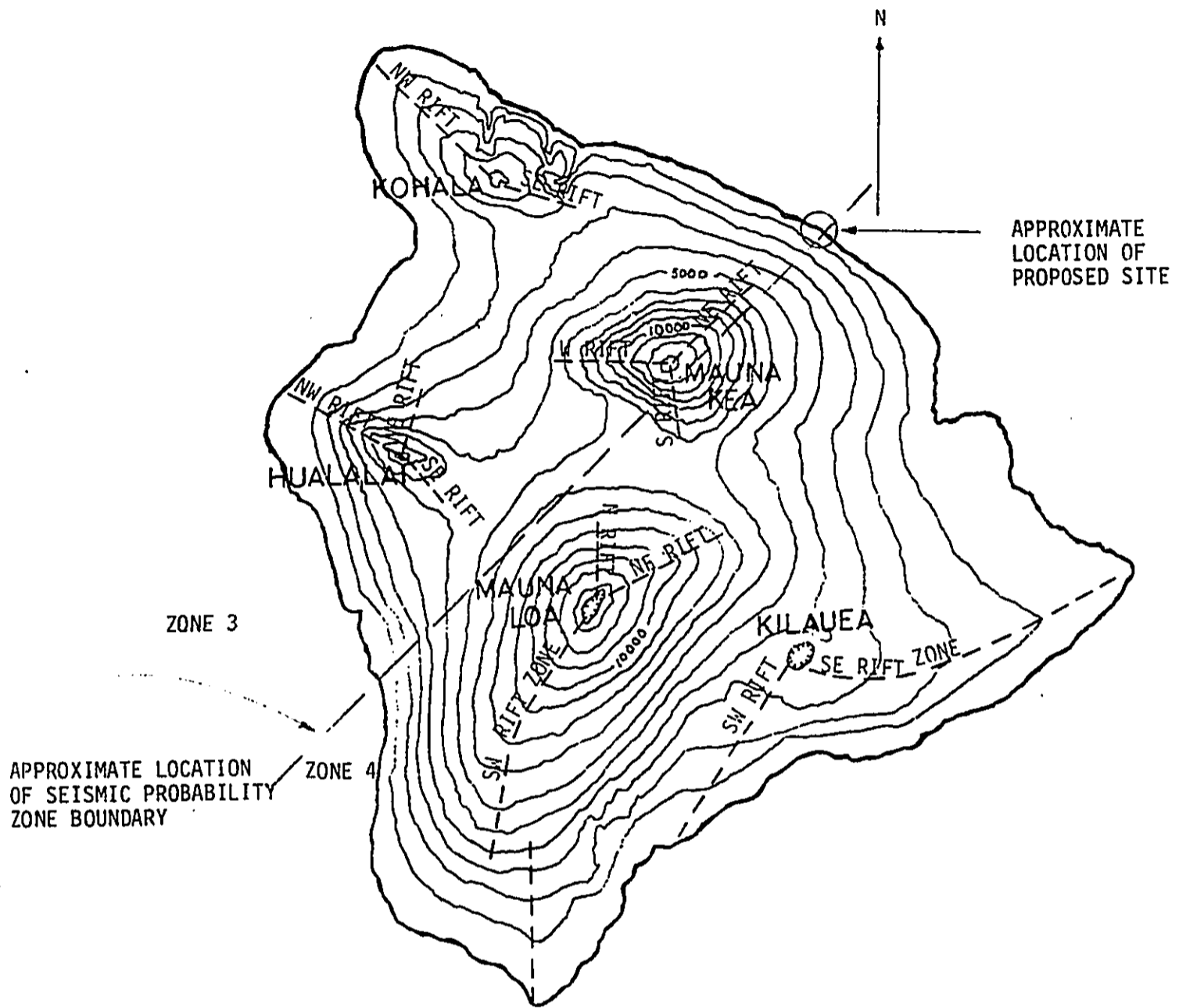
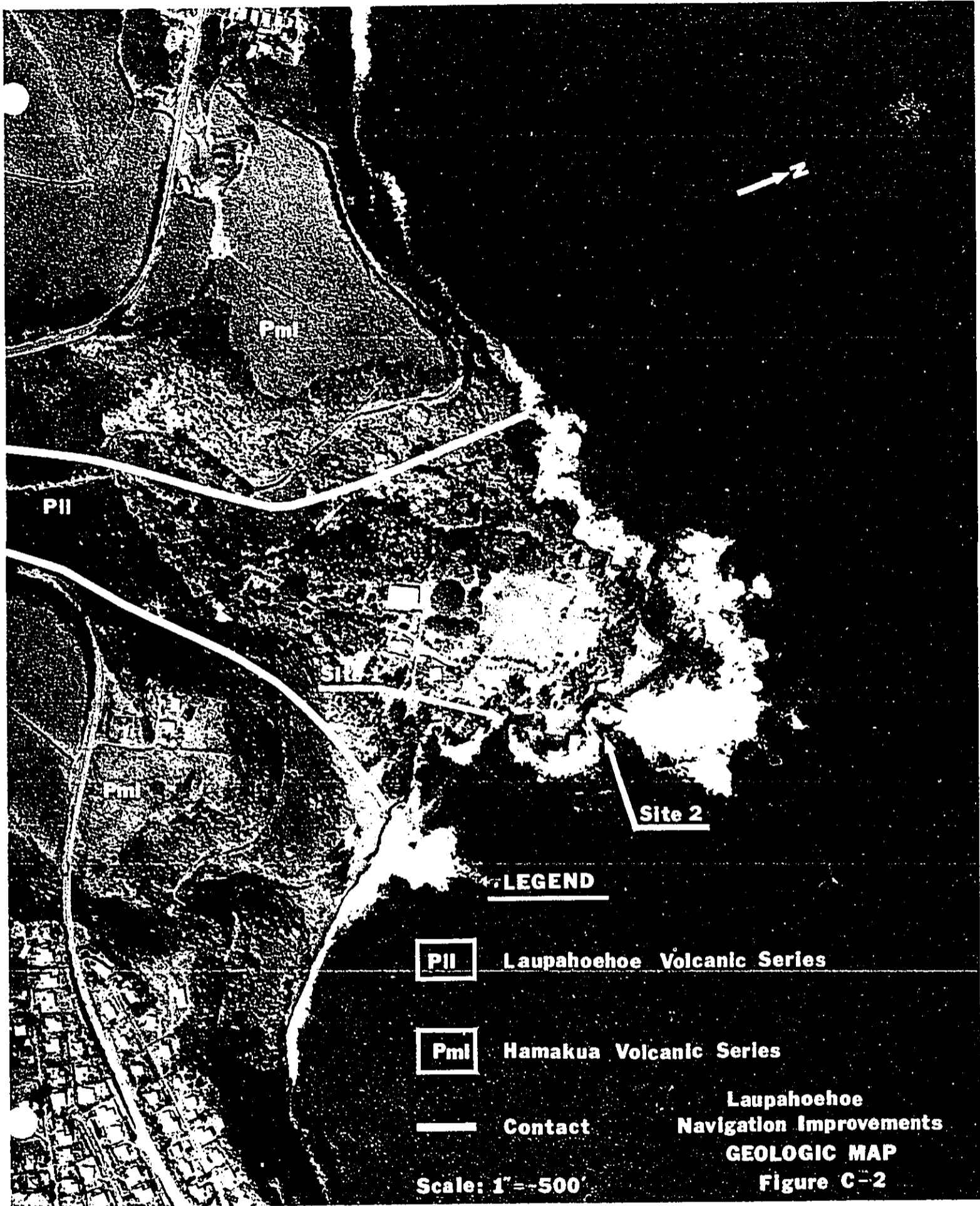


Figure C-1. Map of Hawaii Showing Principal Volcanoes with Respective Rift Zones and Seismic Probability Zones.



the backshore area of the site is covered by a loose deposit of sand, gravel, cobbles, and small boulders. Although vegetation exists on these deposits, it is sparse. Additionally, about 30% of the backshore area is generally elevated from 4 to 10 feet above the shoreline with a small area in the north corner of the proposed turning basin area rising above 16 feet in elevation. The ground surface of the backshore area is not rugged and jagged as it is along the shoreline. Extreme variations in relief over very short distances are generally not greater than 2 feet.

The topography of the area offshore from the peninsula consists of rugged ridges and depressions with near-vertical walls which rise from 4 feet to 15 feet from the floor. The maximum water depth approaches 25 feet within the area of the proposed entrance channel. A 4- to 70-foot deep channel has been dredged to the existing concrete ramp. The bottom in the proposed turning basin and breakwater areas are free of sediments (sand and gravels) because of strong wave action in these areas. The vertical ridges and depressions are covered with a thin veneer of tan, calcareous algae. When chipped with a rock-hammer, gray, hard lava basalt and andesite with an occasional lens or pocket of welded clinker is exposed. There are many small (approx. 1-foot diameter) coral colonies (heads) attached to the lava basalt ridges and outcrops. In the existing concrete ramp area, the wave action dissipates enough to allow a thin (approx. 2 feet thick) buildup of basalt gravel and coarse sand mixed with and underlain with cobbles.

SEISMICITY

Hawaii has the highest density of earthquakes (occurrence rate of magnitude 2 and greater earthquakes per unit area) in the United States. During the past 18 years, about 48,000 earthquakes in Hawaii have been located and their magnitude determined. Of these, more than 30,000 events were of magnitude 3.0 to 7.2; magnitude 2.0 is generally the threshold of felt earthquakes.

Possibly the strongest earthquake in historic time in the islands occurred on April 2, 1868, and was centered along the south coast of the Island of Hawaii. The earthquake had Richter magnitude of about 7.5 and caused serious damage across the entire island, even stopping clocks in as far away as Honolulu. Practically all earthquakes on the Islands of Hawaii and Maui are associated with intermittent volcanic activity. However, potential earthquakes in the islands can also be caused by deep-seated, tectonic forces and not from the indirect action of volcanic activity. A Richter magnitude 7 earthquake on January 23, 1938, had an epicenter 25 miles north of Pauwela Point on the north shore of Haleakala, Maui. Recent explorations using geophysical methods show that faults and rift zones cut through the major islands and these faults are branches of a gigantic fracture system known as the Molokai Fracture Zone.

Another major earthquake felt on Oahu occurred on April 26, 1973. The tremor registered 6.2 on the Richter scale and was centered offshore about twelve miles northeast of Hilo, Hawaii, and about 35 miles deep. A 7.2-magnitude earthquake centered near Kalapana on November 29, 1975, was felt at Laupahoehoe with a Modified Mercalli (1931) earthquake intensity between V and VI. The maximum acceleration for this earthquake at the site was 0.09 g.

The project lies on the border of seismic risk Zones 3 and 4, as shown on Figure C-1 and in the Army Technical Manual TM 5-809-10 (February 1982), for design considerations.

SUBSURFACE INVESTIGATIONS

Six borings were taken in August 1983 in the vicinity of the proposed boat harbor sites. Borings were made with a portable Concore drill rig with "NX" core barrel and standard penetration samplers to determine the type, quality and extent of subsurface materials existing within the proposed harbor site. Boring locations and logs are shown on Figure C-3. Groundwater level encountered in these borings was identical to the ocean sea level and fluctuates with the tide accordingly.

A dive team made a visual reconnaissance of the nearshore ocean bottom on 28 July 1982. Within the proposed limits of the offshore work, the ocean bottom consists of a worn but highly-irregular basalt flow. Basalt ridges and pinnacles 6- to 12-feet high generally spaced about 25 feet apart protrude above the ocean floor. The rough terrain at the water's edge is typical of the underwater condition in the vicinity of the proposed entrance channel and breakwater. The underwater basalt ridges and pinnacles are covered with a thin veneer of algae and occasional coral growth.

LABORATORY TESTING

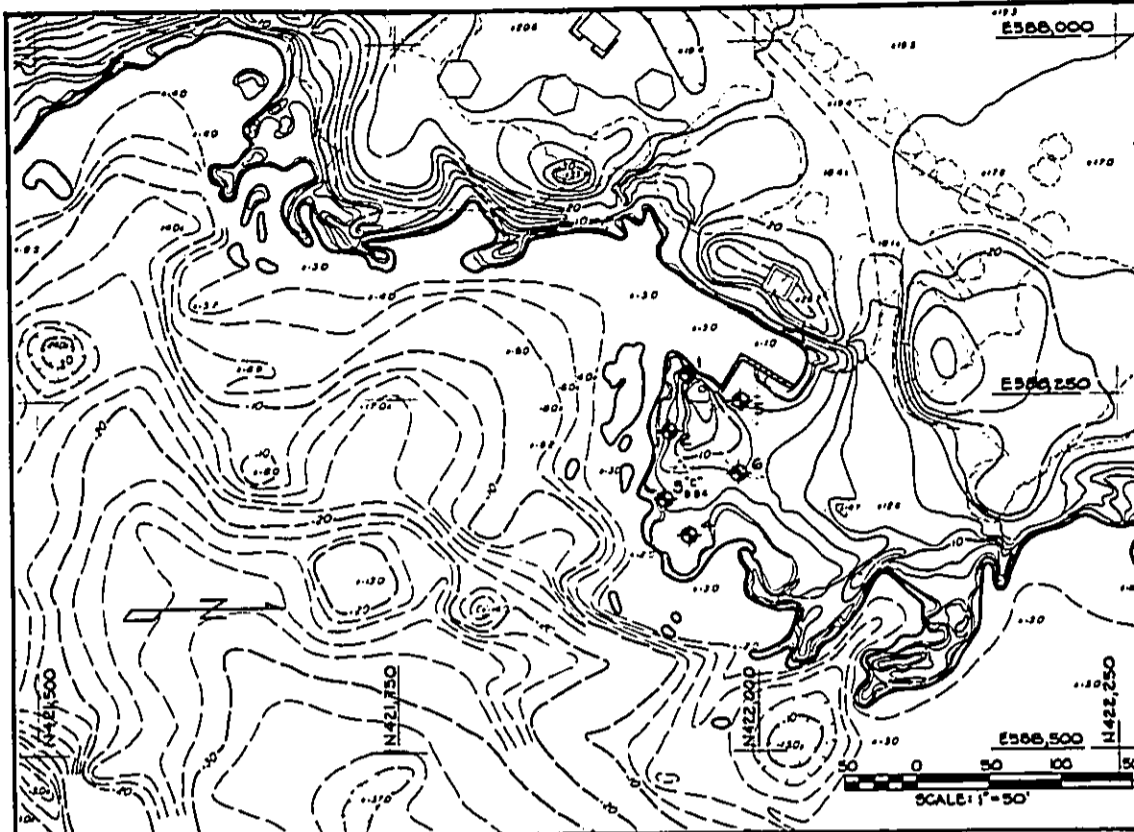
Routine laboratory tests were performed on rock samples to determine characteristics of in-situ materials. Testing included specific gravity, absorption and unconfined compression tests on both welded clinker lava basalt and hard solid lava basalt. The test results are indicated on the respective boring logs on Figure C-3. The average specific gravities (BSSD), average absorption, and average unconfined compressive strengths are shown on the table below:

	Average Specific Gravity, Bulk SSD Relative to Fresh Water	Average Absorption	Average Unconfined Compressive Strength
Welded Clinker Lava Basalt	2.36	8.3	4,140 psi
Solid Hard Lava Basalt	2.67	2.1	14,430 psi

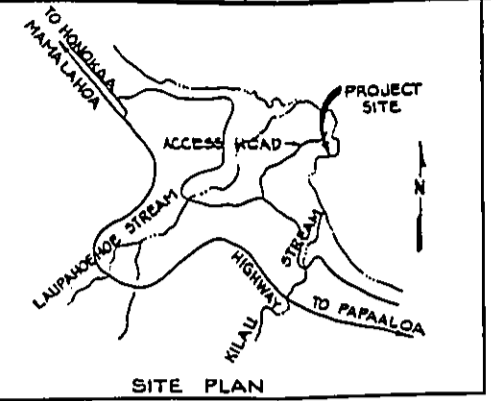
Abrasion testing was not performed; however, based on visual examination and above test results, solid hard lava basalt from the required project excavation appears suitable for use as armor stone.

SUBSURFACE CONDITIONS

The turning basin area for Plans 1, 2, and 3 will require the bulk of the excavation. About half of the channel and basin area is offshore, where the underwater topography is as rough and rugged as the onshore terrain. The offshore portion has been incessantly battered by waves leaving a harder, more competent rock in the form of ridges and pinnacles which has been covered by a thin veneer of algae. By underwater observations, the south edge of the shoreline drops vertically to at least -5 elevation. Excavation will require blasting and removal of pinnacles, ridges and small islands.



BORING LOCATION PLAN



SITE PLAN

HOLE NUMBER	FLEV.	DEPTH	DESCRIPTION	N (BLOWS)/FOOT	SPECIFIC GRAVITY	ABSORPTION
N 921, 953	F 588, 253	13.0	SP 0.5			
		11.0	SP 2.1			
		8.5	SP 5.5			
		6.5	SP 8.8			
		4.5	SP 10.8			
		2.5	SP 12.8			
		0.5	ROCK 13.8			
		0.0	ROCK 14.8			
			ROCK 16.8			
			ROCK 18.8			
			ROCK 20.8			
			ROCK 22.8			
			ROCK 24.8			
			ROCK 26.8			

HOLE NUMBER B-3-R3						
N 921, 957		F 588, 322				
DATE 12 AUG 83		ELEV. 3.0				
FLEV.	DEPTH	DESCRIPTION	N (BLOWS)/FOOT	SPECIFIC GRAVITY	ABSORPTION	
				BULK	STD	APP
+2.0	GP 1	GRAVEL GRAY				
	2					
0.0	SP 4	SAND, BASALT, FINE TO COARSE, TRACE GRAVEL, TRACE SILT, GRAYISH-BROWN				
-3.2	6.2	LAVA BASALT CLINGER WELDED, VUGGY, MODERATELY HARD, BROWNISH GRAY	2.37	2.53	2.82	6.8
	8					
-7.0	ROCK 10	CORE PIECES 0.5', 0.8', 1.2', 1.8', 1.2'				
	12	LAVA BASALT ROCK, SOLID, HARD TO VERY HARD, BLUISH GRAY				
	14	CORE PIECES 0.6', 1.9', 1.7'				
-13.0	16					
* U.C. 3,185 PSI						

HOLE NUMBER B-4-R3						
N 921, 953		F 588, 347				
DATE 10 AUG 83		ELEV. 4.0				
FLEV.	DEPTH	DESCRIPTION	N (BLOWS)/FOOT	SPECIFIC GRAVITY	ABSORPTION	
				BULK	STD	APP
+2.0	2	LAVA BASALT CLINGER WELDED, VUGGY, SOFT, GRAY				
0.0	4	LAVA BASALT ROCK SOLID, PASSIVE MODERATELY HARD TO VERY HARD, DARK GRAY TO BLUISH GRAY, JOINT SPACING AVERAGES 2' ON CENTER				
	6	CORE PIECES 1.7', 1.5', 0.9', 0.9', 3.4', 1.4', 1.9', 0.8', 0.8', 0.8', 1.0', 2.2'	2.48	2.57	2.72	3.6
	8					
	10					
	12					
	14					
	16			2.63	2.69	2.77
	18					
	20					
	22					
	24					
-17.0	21					
*1 U.C. 11,140 PSI						
*2 U.C. 14,325 PSI						

HOLE NUMBER B-5-R3						
N 921, 989		F 588, 253				
DATE 3 AUG 83		ELEV. 8.0				
FLEV.	DEPTH	DESCRIPTION	N (BLOWS)/FOOT	SPECIFIC GRAVITY	ABSORPTION	
				BULK	STD	APP
+3.6	0.4	CONCRETE PAVEMENT 4"				
	2	FILL GRAVEL AND FINE TO COARSE SAND, TRACE SILT GRAY WITH BOULDER AT 5.8' DEPTH	32			
0.0	SP 4		21			
	6		72			
-3.2	7.2	HOLE CASED TO DEPTH OF 6'	94/8"			
	8	LAVA BASALT CLINGER WELDED, FINE-GRAINED TEXTURE, TIGHT FRACTURES, MODERATELY HARD, CORE PIECES 2.7', 1.2'		2.02	2.25	2.61
	10					
	12			2.20	2.39	2.70
	12.5					
-8.5	ROCK 14	LAVA BASALT ROCK SOLID, MODERATELY HARD TO HARD, CORE PIECES 0.5', 0.8', 0.8', 0.8', 0.8', 2.4', 0.8', 1.9', 0.9', 0.8'				
	16					
	18			2.76	2.79	2.83
	20					
	22					
	24					
-21	25					
* U.C. 2,865 PSI						



HOLE NUMBER R-1-R3

N 821.953 F 588.217
DATE 9 AUG 83 ELEV 13.5

ELEV.	DEPTH	DESCRIPTION	N (BLOWS) /FOOT	SPECIFIC GRAVITY			ABSORPTION
				BULK	STD	APP	
0.0	0.5	SAND WITH TOPSOIL, DARK BROWN, ORGANIC	24				
0.0	2.5	SAND, SILTY, BASALTIC, FINE TO COARSE, SOME GRAVEL, GRAY	148				
0.5	4	50/R° LAVA BASALT CLINKER BROKEN					
0.5	5	LAVA BASALT CLINKER, WELDED					
0.5	6	VUGGY, MODERATELY HARD, DARK GRAY, CORE PIECES 3.1', 0.5', 0.5', 3.1'					
	10			2.10	2.33	2.73	11.1
0.5	13	ROCK LAVA BASALT ROCK, SOLID MASSIVE, HARD, BLuish GRAY, CORE PIECES 4.9', 3.9', 0.7', 1.2'					
0.0	14						
	16			2.60	2.66	2.76	2.3
	18						
	20						
	22			2.69	2.72	2.78	1.4
-10.5	24						
-11.5	25	LAVA BASALT CLINKER, WELDED VUGGY, MODERATELY HARD, DARK GRAY CORE PIECE 0.5'					

* U.C. 17,825 PSI

HOLE NUMBER R-2-R3

N 821.980 F 588.279
DATE 8 AUG 83 ELEV 8.0

ELEV.	DEPTH	DESCRIPTION	N (BLOWS) /FOOT	SPECIFIC GRAVITY			ABSORPTION
				BULK	STD	APP	
	SP						
	-2	SAND BASALT, FINE TO COARSE GRAINED, SOME GRAVEL, CORPES	31				
5.0	-3	ROULERS, GRAY	23				
	-4	LAVA BASALT MOSTLY CLINKER					
	-6	SOFT TO MODERATELY HARD, VUGGY, WEATHERED WITH OCCASIONAL 1/2" ZONES OF SOLID, HARD, BLuish-GRAY, LAVA BASALT					
	-8						
	-10			2.23	2.31	2.41	3.5
	-12						
	-14						
	ROCK -16						
	-18	SET CASING TO 18.5' DEPTH					
	-20						
	-22						
-16.0	-24						

* U.C. 6,370 PSI

BORING NOTES

- 1 - BORINGS WERE MADE WITH A CONCRETE PORTABLE DRILL RIG WITH A "HX" CORE BARREL AND STANDARD PENETRATION SAMPLERS.
- 2 - N - RESISTANCE TO PENETRATION OF STANDARD 2" OD SAMPLING BARREL DRIVEN 1 FOOT WITH A 140 POUND WEIGHT FALLING 30 INCHES.
- 3 - ALL DEPTHS ARE MEASURED IN FEET.
- 4 - ELEVATIONS ARE REFERENCED TO MEAN LOWER LOW WATER (MLLW = 0 ELEVATION) DATUM IN FEET.
- 5 - COORDINATES ARE BASED ON STATE PLANE COORDINATES.
- 6 - FIELD CLASSIFICATIONS ARE IN ACCORDANCE WITH MIL-STD-619A, UNIFIED SOIL CLASSIFICATION SYSTEM. ROCK CLASSIFICATION - DESCRIPTIONS ARE GENERALLY BASED ON EM 1110-1-1806 APPENDIX 1.
- 7 - SPECIFIC GRAVITY AND ABSORPTION TESTS WERE DETERMINED IN ACCORDANCE WITH ASTM C127-81.
- 8 - GROUNDWATER LEVEL IN EACH HOLE VARIED WITH DAILY TIDAL FLUCTUATIONS.
- 9 - DRILLING WATER CIRCULATION WAS LOST IN EACH HOLE DUE TO SEEPAGE THROUGH ROCK JOINTS.
- 10 - CORE PIECES OF LESS THAN 0.5' LENGTH ARE NOT RECORDED IN THE LOGS.
- 11 - UNCONFINED COMPRESSION (U.C.) TEST RESULTS TAKEN ON 2" CORES WITH LENGTHS OF 4 TO 6 INCHES AT DEPTHS INDICATED BY ***.

	N (BLOWS) /FOOT	SPECIFIC GRAVITY			ABSORPTION
		BULK	STD	APP	
TO SILT GRAY DEPTH	37				
DEPTHS	21				
DEPTHS	72				
DEPTHS	98/8°				
DEPTHS		2.02	2.25	2.61	11.3
DEPTHS		2.20	2.39	2.70	8.6
DEPTHS					
DEPTHS		2.76	2.79	2.83	1.0

HOLE NUMBER R-5-R3

N 821.987 F 588.309
DATE 5 AUG 83 ELEV 2.0

ELEV.	DEPTH	DESCRIPTION	N (BLOWS) /FOOT	SPECIFIC GRAVITY			ABSORPTION
				BULK	STD	APP	
0.0	2	SAND, BASALT, FINE AND COARSE, SOME GRAVEL, TRACE SILT, DENSE, GRAY	44				
5.0	4		24				
	5						
	6	LAVA BASALT CLINKER WEATHERED, WITH OCCASIONAL 1/2" ZONES OF HARD BASALT					
	8						
8.4	ROCK -10.4						
	-12.4	LAVA BASALT ROCK SOLID, HARD, GRAY CORE PIECES 0.5', 1.3'					
	-12.6	LAVA BASALT CLINKER, FRIABLE, HARDLY WEATHERED					
	-14.4	LAVA BASALT ROCK SOLID, HARD, BLuish GRAY, CORE PIECE 1.1'					
	-16.4	ROCK CAVING - SET CASING TO 18'					
	-18.4						
	-20	LAVA BASALT CLINKER WELDED, SOFT TO MODERATELY HARD, GRAY					
	-22	CORE PIECES 0.7', 1.2', 0.7'					
	-24						
	-25						

LAUPAHOEHOE
NAVIGATION IMPROVEMENTS
ISLAND OF HAWAII

**BORING LOCATION PLAN AND
BORING LOGS**

U.S. ARMY ENGINEER DISTRICT HONOLULU

FIGURE C-3

Should the contractor elect to perform the excavation of the entrance channel and turning basin using land based equipment, construction of temporary causeways will be required to provide access for construction equipment. To minimize turbidity and to provide a stable working platform, the causeways should be constructed of coarse, clean, granular material free of fines. All temporary causeways will be removed upon completion of the project. Use of the new breakwater section as a temporary causeway, even at a partially completed stage, is not recommended in view of the large stone sizes which comprise the underlayer and armor layer. Placement of a temporary levelling course over the underlayer or armor layer to provide a smooth surface for construction equipment should be avoided since it will contaminate the stone protection and be difficult, if not impossible, to remove. In addition, it will decrease the porosity of the armor layers and wedging of finer materials between the armor stones may contribute to future instability of the breakwater.

The onshore overburden material is predominantly SP sand material, fine to coarse, with some gravels and occasional cobbles and boulders. This material is found in large quantities (to -3 elevation) along the northern edge of the proposed basin. Sands are susceptible to scouring and shifting due to wave action.

Borings B-2-83 and B-6-83 located near the center of the proposed turning basin were noteworthy because of the lack of hard, massive or large layers of welded types of rock within the proposed depth of excavation (El. -7.5). These holes revealed sands underlain by weathered, non-welded clinker rock with occasional thin, hard lava basalt zones (1'). However, hard rock, ranging from moderately hard to very hard, can be expected on both the eastern and western perimeters.

The hardest and thickest excavation is expected on the small hill near the western perimeter. On this hill, welded clinker lava basalt can be expected from elevation +8.5 to elevation +0.5 with hard, solid lava basalt below (see boring logs Figure C-3, Borings B-1-83 and B-5-83).

On the eastern perimeter, Boring B-3-83 shows welded clinker from elevation -3 to -7 with hard lava basalt below. If the proposed excavation were shifted more to the east (toward Boring B-4-83), extensive hard rock would be encountered from elevation +2 to the full depth of excavation. Accordingly, relocation of the turning basin eastward should be avoided.

DESIGN CONSIDERATIONS

(a) Excavation and Dredgeability

For removal purposes, the materials fall into two categories. The first category includes much of the near surface materials consisting of sands, gravels, cobbles and "loose" clinker rock. These materials can be removed with a backhoe or an ordinary clamshell dredge. The second category includes rock, in the form of either welded clinker lava basalt or hard, solid lava basalt. The excavation of these rock materials will require either a pneumatic hammer, drilling/blasting or comparable effort.

(b) Excavation Slopes

Based on rock joint patterns and the integrity of the welded clinker lava basalt, an excavation slope of 1V on 1H is stable for all rock faces on the east and west perimeters of the turning basin. Weathered clinker rock, which is expected along the northern perimeter, will require a slope of 1V on 1-1/2H for temporary stability. Armor stone protection should be provided for wave action. The loose surface sands, gravels and cobbles may be excavated on a slope of 1V on 2H, provided it is recognized that wave action may eventually flatten excavation slopes in sand to 1V on 5H or flatter without stone protection.

To preclude slope failures due to surcharge loading of the adjacent breakwater, all loose sand and weathered clinker rock should be removed to the welded clinker or hard basalt rock and a minimum berm width of 10 feet should be maintained between the top of excavation and the toe of all breakwater structures.

(c) Breakwater and Wave Absorbers Slopes

A side slope of 1V on 1-1/2H or flatter is adequate for both the breakwater and the wave absorber revetment.

CONSTRUCTION CONSIDERATIONS

High surf will seasonally hamper or close down the offshore and nearshore work. The ideal work period occurs from April through October; historically, the best month being September. A construction contract should be advertised in a timely fashion to take advantage of the seasonally good summer sea conditions.

CONSTRUCTION MATERIAL SOURCES

(a) Rock Materials

Selected rock materials from the project excavation would be appropriate for use as armor or underlayer material. However, excavated materials would account for only a small percentage of the suitable rock needed for the breakwater. Most of the rock excavated will be welded clinker which is not acceptable as armor or underlayer stone. These materials could, however, be used as core material for the interior of the breakwater.

All excavated materials may be used for grading the site provided they are broken down to appropriate sizes to facilitate placement. Sands and other suitable materials should be used as fill material under pavements or as overlot grading material.

Possible sources for revetment rock on the Island of Hawaii are as follows: stream boulders in Laupahoehoe Gulch, the Theo H. Davies Hamakua Sugar Co. (Waipunalei) quarry, Hilo Coast Process Co. (Onomea) quarry, the Hilo quarries (Glover and Yamada & Sons), quarry test Areas A and B in Hilo, and Honokahau Harbor stockpile.

Laupahoehoe Gulch is the closest source for rock. Probably sufficient rock of required size and quantities is present; however, it is scattered and unsorted. The area, zoned "Conservation" by the State, is politically sensitive and would require special permits or variances from the local or State governments to obtain rock. Furthermore, boulders from Laupahoehoe Gulch are subangular to subrounded in shape, which adversely impacts the revetment's stability.

The Waipunalei quarry is the second closest potential rock source to the project site (located only about 2 miles from Laupahoehoe Point). It is owned and operated by Theo H. Davies Hamakua Sugar Co. for the purpose of providing only base course materials for sugarcane haul roads and is not a commercial source. Approximately 10,000 pieces of 3- to 4-foot diameter basalt rock are currently stockpiled and somewhat segregated at the quarry.

The Onomea quarry is another sugar plantation quarry with an identical purpose as the Waipunalei quarry. It is located about 10 miles from the project site and is owned and operated by the Hilo Coast Process Co. No other information is presently known concerning this quarry.

The Glover quarry in Hilo (23 miles from the project site) is able to furnish all sizes and quantities required except for sizes above 5 tons.

Yamada and Sons rock quarry in Hilo (23 miles from site) collects large rock as a by-product of its quarrying operation for building materials, i.e., sand, gravel, and masonry stone. More than enough 3- to 5-ton size rock is available. Five- to 8-ton sizes are not currently available but can be quarried from this source by selective drilling and blasting procedures. Revetment rock in excess of 8 tons is available from another Yamada & Sons quarry at Mountain View (trucking distance 40 miles from Laupahoehoe).

Quarry test Areas A and B for the Tsunami Protection and Navigation Improvement Project, Hilo (DM No. 2, 1967), are located in Hilo on State-owned land leased to the County of Hawaii for a landfill dump. These areas consist of ramps excavated by the U.S. Army Corps of Engineers which revealed quality quarry rock in adequate quantities. However, these areas would be prohibitively expensive to develop when other operating quarries in the immediate area are able to furnish rock at more competitive prices.

Stockpiles or excess rock from the construction of the Honokahau Harbor on the Kona Coast of the island is located the farthest from the proposed project site. Although there may be sufficient sizes and quantity of required rock, it is unsorted and would be considerably more expensive to recover and ship to the site than obtaining rock from the Laupahoehoe Gulch, Waipunalei, or Hilo quarries.

Poured concrete shapes (tribars, dolos, tetrapods, etc.) should be considered as an alternative revetment material to armor stone when armor stone size requirements are in excess of 5 tons. Poured concrete shapes for the 2- to 12-ton size are constructed upon demand and are easier to fit into the breakwater. The cast shapes can be either poured in Hilo and trucked the distance of approximately 23 miles to the project site or cast on site. Obtaining natural rock in excess of 5-ton size would require extensive excavation to recover the required rock size such that the poured concrete shapes may prove to be more economical.

(b) Concrete Materials

The Concrete dolosse and ribs for this project will require approximately 2,500 to 4,200 cubic yards of concrete, depending upon the plan ultimately selected for implementation. In addition to sea water exposure, the dolosse and ribs will be subjected to impact and abrasion as a result of movement due to wave action. In view of sea water exposure conditions, Type II cement and a water-cement ratio not exceeding 0.45 will be specified in the construction contract specifications in accordance with EM 1110-2-2000, Standard Practice for Concrete.

Pacific Ocean Division's experience with concrete tribar and dolos armor units indicates that a small percentage of the armor units are damaged by improper handling during placement or by impact forces while in service on the completed breakwater. To minimize damage to the armor units, a minimum compressive strength of 5,000 psi at 28 days will be specified in accordance with Pacific Ocean Division's design practice on concrete armor units.

There are no cement manufacturers located on the Island of Hawaii. However, cement is available from two local manufacturers, Kaiser Cement and Gypsum Corporation and Cyprus Hawaiian Cement Corporation, located on the Island of Oahu. These two manufacturers have been producing high quality cement meeting the requirements of ASTM C 150 for more than 15 years. The cement produced by both manufacturers typically meets the requirements of both Type I and Type II cement.

Two concrete aggregate producers, Jas W. Glover, Ltd. and Y & S Rock Company, located in Hilo are capable of supplying concrete aggregates conforming to ASTM C 33. Aggregates from both producers have been used successfully on previous Corps of Engineer projects located on the Island of Hawaii. Accordingly, both producers will be included under paragraph "Listed Aggregate Sources" of the contract Special Provisions. Concrete coarse aggregate in maximum nominal sizes of 1-1/2-inch (Size 467), 1-inch (Size 57), and 3/4-inch (Size 67) are available from both producers. In view of the proposed dimensions of the ribs and dolosse, a maximum nominal size of 1-1/2-inch (Size 467) will be specified for concrete coarse aggregate on this project.

ENGINEERING,
DESIGN
AND COST

Appendix D

APPENDIX D
ENGINEERING, DESIGN AND COST ESTIMATES

APPENDIX D
ENGINEERING, DESIGN AND COST ESTIMATES

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APPENDIX D
DESIGN ANALYSIS

SECTION I:

WAVE EXPOSURE AND RAMP USAGE

1. Laupahoehoe Point is exposed to deep water waves approaching from N 52° W clockwise to E 38° S (Figure D-1). Laupahoehoe is directly exposed to wave attack from the east and indirectly exposed from the north. The indirect exposure from the north can produce large waves as a result of north Pacific storm waves. The majority of waves affecting Hawaii are easterly tradewind-generated waves. Deep water waves approaching Laupahoehoe can be expected to be less than 6 feet in height about 75 percent of the time, Table 1.

TABLE 1. ANNUAL PERCENT OF OCCURRENCE OF WAVE HEIGHTS VERSUS DIRECTION^{1/}

Wave Ht (Feet)	<u>N</u>	<u>NE</u>	<u>E</u>	<u>SE</u>	<u>TOTAL</u>
1	0.7	0.8	1.4	0.4	3.3
1-2	1.8	4.1	10.0	2.1	18.0
3-4	2.6	7.0	19.1	3.2	31.9
5-6	1.5	4.5	13.9	1.5	21.4
7	0.7	2.1	6.2	0.6	9.6
8-9	0.3	0.9	3.0	0.1	4.3
10-11	0.1	0.2	0.9	0.1	1.3
12	0.1	0.1	0.4	0.1	0.7
13-16	-	-	0.2	-	0.2
17-19	-	-	0.1	-	0.1
TOTAL	7.8	19.7	55.2	8.1	90.8

^{1/} The Summary of Synoptic Meteorological Observation (SSMO) by National Climatic Center. Period of record 1963-1970.

2. The launching ramp usage of 75 percent for Plans 1 and 2 is based on Table 1, Annual Percent of Occurrence of Wave Heights Versus Direction. Reduction of ramp usage to 70 percent for Plan 3 is due to greater wave action expected at the ramp area.

REFRACTION ANALYSIS

3. A detailed computer-aided refraction analysis was performed for wave attacks for the eastern exposure regime. Results of the refraction analysis were used to locate wave energy convergence zones and determine critical wave crest alignment at the proposed entrance channel. Critical wave direction is used in wave diffraction analysis discussed later.

4. Examination of the eastern exposure regime indicated a range of possible deep water wave attacks from N 22.5° E to due east. Wave refraction analyses were performed for waves approaching from N 22.5° E, N 45° E, and due east with periods ranging from 8 to 14 seconds. A computer program from the U.S. Army Engineer Waterways Experiment Station was employed. Results of the refraction analysis indicated that waves from due east appeared to cause critical wave attacks (Figure D-2).

WAVE DIFFRACTION ANALYSIS

5. Theoretical wave diffraction analyses, Figures D-3, D-4, and D-5, were conducted for the three plans. Incident wave direction was determined from the refraction analysis described previously. Angle of approach at the entrance channel mouth was determined to be from east. Diffraction analyses were performed in accordance with procedures, techniques, and diagrams described in the CERC Shore Protection Manual (SPM).

6. The theoretical wave incident to the breakwater opening at the channel mouth is assumed to be a non-breaking wave of 6 feet, based on 6-foot wave being the maximum allowable for safe launching and retrieving operations. Lines of equal diffraction coefficient are plotted and labeled on diffraction diagrams. Wave height at any point within the entrance channel/turning basin is determined by multiplying the diffraction coefficient by the incident wave height (6 feet).

STILLWATER LEVEL

7. The stillwater level (SWL) is defined as the level of water above the elevation datum plane when no waves are present. Components of the SWL are astronomical tide level (S_a), wave setup (S_w), atmospheric pressure induced level (S_p), and storm surge (S_s). Stillwater level components are calculated as follows:

a. Astronomical tide level, S_a : Maximum astronomical tide expected is estimated to be about 0.3 foot above the mean higher high water level of 2.4 feet. Total astronomical tide level is $2.4 + 0.3' = 2.7$ feet.

b. Wave setup, S_w : Wave setup is estimated to be 0.5 foot.

c. Atmospheric pressure induced level, S_p : The following storm parameters were used in calculating S_p : A 1-inch central pressure drop of mercury (Hg), a 20-mile radius of maximum wind, and a distance of 35 miles to the storm center. The resulting water level rise is calculated to be 0.5 foot.

d. Storm surge, S_s : Storm surge is estimated rather than calculated because of difficulty in assessing values for complex hydrographic conditions. The estimated storm surge of 0.5 foot is used.

Therefore,

$$\begin{aligned} \text{SWL} &= S_a + S_w + S_p + S_s \\ &= 2.7' + 0.5' + 0.5' + 0.5' \\ &= 4.2 \text{ feet} \end{aligned}$$

ENTRANCE CHANNEL AND TURNING BASIN DESIGN

8. Design Vessel. The entrance channel and turning basin are designed to provide safe navigation for vessels up to lengths of 27 feet, 7-foot beam, and 3.5-foot draft. These dimensions are characteristic of fishing boats to use this boating facility.

9. Entrance Channel Design. The minimum width and depth of the entrance channel were computed as follows:

Width: The required entrance channel width of 90 feet was calculated based on a boat entering the channel with a yaw of 40° , $5 \times \sin 40^\circ \times 27' = 87$ feet. Use 90 feet.

Depth:

Draft	3.5 feet
Bottom clearance trim and squat	2.5 feet
Wave Allowance	2.0 feet
Minimum Tide Below MLLW	<u>1.0 feet</u>
Total Channel Depth	9.0 feet

10. Turning Basin Design. The length, width and depth of the turning basin were computed as follows:

Length and Width: A minimum 100-foot by 100-foot basin size is required for safe boat launching and retrieving operations.

Depth:

Draft	3.5 feet
Bottom Clearance trim and squat	2.0 feet
Wave Allowance	1.0 foot
Minimum Tide Below MLLW	<u>1.0 feet</u>
Total Basin Depth	7.5 feet

DESIGN WAVE HEIGHT

11. The breakwater head section is designed based on wave height of 24 feet, maximum wave expected at the site. The breakwater trunk section was designed based on depth-controlled breaking wave criteria which determines the maximum wave height to which the structure might be subjected. The design wave height is based on depth at the structure toe, wave period, and slope (m) seaward of structure toe. The diffraction diagram was used to compute the design wave height for the wave absorber design.

12. The design wave height for the breakwater trunk section (dolos) was computed based on depth at the structure toe, d_s , of 15.7 feet, 15-second wave period and slope of $m = 0.04$. From the Coastal Engineering Research Center's Shore Protection Manual (SPM), Figure 7-4,

$$\frac{H_b \text{ (design wave height)}}{d_s \text{ (depth)}} = 1.15$$

$$\begin{aligned} \text{Design Wave Height} &= 15.7' \times 1.15 \\ &= 18.0 \text{ feet} \end{aligned}$$

13. The design wave height for the breakwater trunk section (stone) was computed based on depth at the structure toe, d_s , of 5.7 feet, 15-second wave period and slope of $m = 0.04$. From SPM, Figure 7-4,

$$\frac{H_b \text{ (design wave height)}}{d_s \text{ (depth)}} = 1.22$$

$$\begin{aligned} \text{Design Wave Height} &= 5.7' \times 1.22 \\ &= 6.9 \text{ feet} \end{aligned}$$

14. The design wave height for the wave absorber was computed based on a diffraction coefficient of $K' = 0.4$ and a wave height of 24 feet at the breakwater head.

$$\begin{aligned} \text{Design Wave Height} &= 24' \times 0.4 \\ &= 9.6 \text{ feet} \end{aligned}$$

15. Table 2 shows the design wave heights obtained for the applicable structures.

TABLE 2. Design Wave Heights

<u>Structure</u>	<u>Design Wave Heights (Feet)</u>
Breakwater Head (Dolos)	24
Breakwater Trunk (Dolos)	18.0
Breakwater Trunk (Stone)	6.9
Wave Absorber	9.6

DESIGN FACTORS

16. The Coastal Engineering Research Center's Shore Protection Manual (SPM) design formulas were used to determine the weight and the thickness of the structure layers. Table 3 shows the design factors used in computing the armor layer design.

17. Breakwater Head Design. Dolos concrete armor unit size and armor layer thickness for the breakwater head section were computed as follows:

$$\begin{aligned} \text{Dolos size, } W &= \frac{W_r H_b^3}{K_d (S_r - 1)^3 \text{Cot } \theta} \\ &= \frac{(145) (24)^3}{(8.3) (2.27-1)^3 (2)} \\ &= 30 \text{ Tons} \end{aligned}$$

$$\begin{aligned} \text{Armor layer thickness, two layers} &= nK \frac{(W)}{(W_r)}^{1/3} \\ &= (2) (1.0) \frac{(60000)^{1/3}}{(145)} \\ &= 14.9 \text{ feet} \end{aligned}$$

$$\text{No. of units per 1000 sq. feet} = nK (1-P) \frac{(W_r)^{2/3}}{(W)}$$

where P = Porosity = 63%

$$\begin{aligned} &= (2) (1) (1-.63) \frac{(145)^{2/3}}{(60000)} \\ &= 13.3 \text{ units} \end{aligned}$$

18. Breakwater Trunk Design. Dolos concrete armor unit size and armor layer thickness for the breakwater trunk section were computed as follows:

Dolos size,

$$\begin{aligned} W &= \frac{(145) (18.0)^3}{(15) (2.27-1)^3 (2)} \\ &= 6.8 \text{ Tons} \end{aligned}$$

Use: 6.5 Tons

$$\begin{aligned} \text{Armor layer thickness, two layers} &= (2) (1.0) \frac{(13000)^{1/3}}{(145)} \\ &= 9.0 \text{ feet} \end{aligned}$$

$$\begin{aligned} \text{No. of units per 1000 sq. feet} &= (2) (1) (1-.63) \frac{(145)^{2/3}}{(13000)} \\ &= 36.9 \text{ units} \end{aligned}$$

19. Breakwater Trunk Design. Armor stone size and armor layer thickness for the breakwater trunk section were computed as follows:

Armor stone size,

$$\begin{aligned} W &= \frac{(156) (6.9)^3}{(3.5) (2.44-1)^3 (2)} \\ &= 2,400 \text{ lbs} \end{aligned}$$

Range of armor stone size

$$= 1-3 \text{ tons}$$

Armor layer thickness, two layers

$$\begin{aligned} &= (2) (1.15) \frac{(4000)^{1/3}}{(156)} \\ &= 6.8 \text{ feet} \end{aligned}$$

20. Wave Absorber Design. Armor stone size and armor layer thickness for the wave absorber section were computed as follows:

$$\begin{aligned} \text{Armor stone size,} & \quad W = \frac{(156) (9.6)^3}{(3.5) (2.44-1)^3 (3)} \\ \text{Increase stone size by 1.5 times} & \\ \text{to increase absorption and stability} & \quad = 4,400 \text{ lbs} \\ \text{Range of armor stone size} & \quad = 3-5 \text{ tons} \\ \text{Armor layer thickness, two layers,} & \quad = (2) (1.15) \frac{(8000)^{1/3}}{(156)} \\ & \quad = 8.5 \text{ ft.} \end{aligned}$$

21. A summary of the required concrete armor/stone sizes and layer thickness for the structures is shown in Table 4.

TABLE 4. Concrete/Stone Weight and Layer Thickness

	<u>Armor Layer</u>		<u>Underlayer</u>		<u>Core</u>
	<u>Weight</u>	<u>Thickness</u>	<u>Weight</u>	<u>Thickness</u>	<u>Weight</u>
Breakwater Head (Dolos)	30 tons	14.9 ft.	1-3 tons	6.8 ft.	100#-600#
Breakwater Trunk (Dolos)	6.5 tons	9.0 ft.	1000#-2000#	4.9 ft.	50#-200#
Breakwater Trunk (Stone)	1-3 tons	6.8 ft.	200#-600#	3.2 ft.	spalls-100#
Wave Absorber	3-5 tons	8.5 ft.	N/A	N/A	N/A

CREST ELEVATION

22. Wave runup and required crest elevation for the head and trunk sections of the breakwater were based on a 6-foot wave at the head of the breakwater. It is assumed that the ramp would not be used when wave heights at the breakwater exceed 6 feet. Based on estimated runup factors of 1.1 for dolos and 1.2 for stone, the required crest elevation for nonovertopping by a 6-foot wave = runup factor x 6 feet + 4.2 feet (SWL). Factors used in computing the breakwater runup and crest elevation are as follows:

CORRECTION

THE PRECEDING DOCUMENT(S) HAS
BEEN REPHOTOGRAPHED TO ASSURE
LEGIBILITY
SEE FRAME(S)
IMMEDIATELY FOLLOWING

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$$\begin{aligned} \text{Armor layer thickness, two layers} &= nK \frac{(W)}{(W_r)}^{1/3} \\ &= (2) (1.0) \frac{(60000)^{1/3}}{(145)} \\ &= 14.9 \text{ feet} \end{aligned}$$

$$\text{No. of units per 1000 sq. feet} = nK (1-P) \frac{(W_r)^{2/3}}{(W)}$$

where P = Porosity = 63%

$$\begin{aligned} &= (2) (1) (1-.63) \frac{(145)^{2/3}}{(60000)} \\ &= 13.3 \text{ units} \end{aligned}$$

18. Breakwater Trunk Design. Dolos concrete armor unit size and armor layer thickness for the breakwater trunk section were computed as follows:

$$\begin{aligned} \text{Dolos size,} \quad W &= \frac{(145) (18.0)^3}{(15) (2.27-1)^3 (2)} \\ &= 6.8 \text{ Tons} \end{aligned}$$

Use: 6.5 Tons

$$\begin{aligned} \text{Armor layer thickness, two layers} &= (2) (1.0) \frac{(13000)^{1/3}}{(145)} \\ &= 9.0 \text{ feet} \end{aligned}$$

$$\begin{aligned} \text{No. of units per 1000 sq. feet} &= (2) (1) (1-.63) \frac{(145)^{2/3}}{(13000)} \\ &= 36.9 \text{ units} \end{aligned}$$

19. Breakwater Trunk Design. Armor stone size and armor layer thickness for the breakwater trunk section were computed as follows:

$$\begin{aligned} \text{Armor stone size,} \quad W &= \frac{(156) (6.9)^3}{(3.5) (2.44-1)^3 (2)} \\ &= 2,400 \text{ lbs} \end{aligned}$$

Range of armor stone size = 1-3 tons

$$\begin{aligned} \text{Armor layer thickness, two layers} &= (2) (1.15) \frac{(4000)^{1/3}}{(156)} \\ &= 6.8 \text{ feet} \end{aligned}$$

TABLE 3. Design Factors

Structure	Unit Weight of Armor Stone/ Concrete W_r	Specific Gravity of Armor Stone/Concrete S_r	Stability Coefficient K_D	Side Slope Cot θ	Layer Thickness n	Layer Coefficient K	Design Wave Height H_b
Breakwater Head (Dolos)	145 lbs/ft ³	2.27	8.3	1:2	2	1.00	24 feet
Breakwater Trunk (Dolos)	145 lbs/ft ³	2.27	15.0	1:2	2	1.00	18.0 feet
Breakwater Trunk (Stone)	156 lbs/ft ³	2.44	3.5	1:2 (Seaward) 1:1.5 (Basin)	2	1.15	6.9 feet
Wave Absorber	156 lbs/ft ³	2.44	3.5	1:3	2	1.15	9.6 feet

20. Wave Absorber Design. Armor stone size and armor layer thickness for the wave absorber section were computed as follows:

Armor stone size,	$W = \frac{(156) (9.6)^3}{(3.5) (2.44-1)^3 (3)}$
Increase stone size by 1.5 times to increase absorption and stability	= 4,400 lbs
Range of armor stone size	= 3-5 tons
Armor layer thickness, two layers,	$= (2) (1.15) \frac{(8000)^{1/3}}{(156)}$ = 8.5 ft.

21. A summary of the required concrete armor/stone sizes and layer thickness for the structures is shown in Table 4.

TABLE 4. Concrete/Stone Weight and Layer Thickness

	Armor Layer		Underlayer		Core Weight
	Weight	Thickness	Weight	Thickness	
Breakwater Head (Dolos)	30 tons	14.9 ft.	1-3 tons	6.8 ft.	100#-600#
Breakwater Trunk (Dolos)	6.5 tons	9.0 ft.	1000#-2000#	4.9 ft.	50#-200#
Breakwater Trunk (Stone)	1-3 tons	6.8 ft.	200#-600#	3.2 ft.	spalls-100#
Wave Absorber	3-5 tons	8.5 ft.	N/A	N/A	N/A

CREST ELEVATION

22. Wave runup and required crest elevation for the head and trunk sections of the breakwater were based on a 6-foot wave at the head of the breakwater. It is assumed that the ramp would not be used when wave heights at the breakwater exceed 6 feet. Based on estimated runup factors of 1.1 for dolos and 1.2 for stone, the required crest elevation for nonovertopping by a 6-foot wave = runup factor x 6 feet + 4.2 feet (SWL). Factors used in computing the breakwater runup and crest elevation are as follows:

<u>Parameters</u>	<u>Head and Trunk (Dolos) (Without concrete ribs) Sections</u>	<u>Trunk Section</u>
H	6.0 ft.	5.6 ft.
$\frac{R_u}{H}$	1.1 ft.	1.2 ft.
Ru	6.6 ft.	6.7 ft.
SWL	4.2 ft.	4.2 ft.
Crest Elevation = Ru + SWL	10.8 ft.	10.9 ft.
USE	+11.0 ft. +12.0 ft. w/concrete ribs	12.0 ft.

23. Under storm wave conditions, there will be major overtopping of the breakwater. A 3-foot high concrete rib will be constructed on the breakwater crest to buttress the seaward dolosse units. The concrete ribs will also help to stabilize the breakwater crest stones.

24. Wave runup and resulting crest elevation for the wave absorber were based on a 6-foot wave at the head of the breakwater. The diffracted wave height at the wave absorber is estimated to be about 3.0 feet. Assuming a runup factor of 1.0, the crest elevation for nonovertopping by a 3-foot wave = runup factor x 3 feet + 4.2 feet (SWL), = 7.2 feet. Use: 7.0 feet.

HYDRAULIC MODEL STUDY

25. The bathymetry offshore of the project site is highly complex. Due to uncertainties associated with complex bathymetry, a hydraulic model study is recommended. The final selected plan will be model tested. Hydraulic model test results will be used to evaluate/modify the engineering features of the selected plan.

SECTION II: COST ESTIMATES

A. Basis of Estimates

Cost estimates are based on October 1983 price levels.

B. Plan 1

Project First Cost

<u>Item</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Subtotal</u>	<u>Total</u>
<u>FEDERAL</u>				
Mobilization & Demobilization	1 Job	--	\$200,000	
Dredging				
Marine	900 CY	\$80	72,000	
Land	2000 CY	33	66,000	
Breakwater				
0+00 - 1+30				
Core SP-100#	240 T	45	10,800	
Underlayer 200#-1000#	640 T	48	30,700	
Armor 1-3 Ton	1350 T	56	75,600	
Cap Stone 3-5 Ton	230 T	56	12,900	
6.5 Ton Dolos	30 EA	135	40,500	
1+30 - 2+85				
Core 100#-600#	1600 T	79	126,400	
Underlayer 200#-1000#	3400 T	98	333,200	
Cap Stone 5-7 Ton	1300 T	103	133,900	
30 Ton Dolos	260 EA	3570	928,200	
Concrete Ribs	190 CY	860	163,400	
Wave Absorber 2-3 Ton	1100 T	56	61,600	
			<u>2,255,200</u>	
Contingency (25%)			<u>563,800</u>	
Total Direct Federal Construction Cost				\$2,819,000
Plans & Specifications	--	--	80,000	
Engineering during Construction	--	--	10,000	
Supervision & Administration	--	--	<u>169,000</u>	
Total Engineering & Design Cost ^{1/}				<u>\$259,000</u>
TOTAL FEDERAL FIRST COST ^{1/}				\$3,078,000
<u>NON-FEDERAL</u>				
Boat Ramp 80' x 30'	1 Job	--	85,000	
Contingencies (25%)			<u>21,000</u>	
TOTAL NON-FEDERAL FIRST COST				\$106,000
<u>U.S. COAST GUARD AIDS TO NAVIGATION</u>				20,000
TOTAL PROJECT FIRST COST				\$3,204,000

^{1/} Excludes pre-authorization study costs of \$307,500

C. Plan 2

Project First Cost

<u>Item</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Subtotal</u>	<u>Total</u>
<u>FEDERAL</u>				
Mobilization & Demobilization	1 Job	--	\$200,000	
Dredging				
Marine	0	--	--	
Land	2900 CY	\$33	95,700	
Breakwater				
0+00 - 1+40				
Core SP-100#	280 T	45	12,600	
Underlayer 200#-1000#	680 T	48	32,600	
Armor 1-3 Ton	1470 T	56	82,300	
Cap Stone 3-5 Ton	230 T	56	12,900	
6.5 Ton Dolos	50 EA	1350	67,500	
1+40 - 2+55				
Core 100#-600#	1630 T	79	128,800	
Underlayer 200#-1000#	3060 T	98	299,900	
Cap Stone 5-7 Ton	1080 T	103	111,200	
30 Ton Dolos	240 EA	3570	856,800	
Concrete Ribs	150 CY	860	129,000	
Wave Absorber 3-5 Ton	2000 T	56	112,000	
			<u>2,141,300</u>	
Contingency (25%)			534,700	
Total Direct Federal Construction Cost				\$2,676,000
Plans & Specifications	--	--	80,000	
Engineering during Construction	--	--	10,000	
Supervision & Administration	--	--	<u>160,000</u>	
Total Engineering & Design Cost ^{1/}				\$250,000
TOTAL FEDERAL FIRST COST				<u>\$2,926,000</u>
<u>NON-FEDERAL</u>				
Boat Ramp 80' x 30'	1 Job	--	85,000	
Contingencies (25%)			<u>21,000</u>	
TOTAL NON-FEDERAL FIRST COST				\$106,000
<u>U.S. COAST GUARD AIDS TO NAVIGATION</u>				20,000
TOTAL PROJECT FIRST COST				\$3,052,000

^{1/} Excludes pre-authorization study costs of \$307,500

D. Plan 3

Project First Cost

<u>Item</u>	<u>Quantity</u>	<u>Unit Cost</u>	<u>Subtotal</u>	<u>Total</u>
<u>FEDERAL</u>				
Mobilization & Demobilization	1 Job	--	\$200,000	
Dredging	--	--	--	
Marine	4100 CY	\$33	135,300	
Land				
Breakwater				
0+00 - 1+40				
Core SP-100#	280 T	45	12,600	
Underlayer 200#-1000#	680 T	48	32,600	
Armor 1-3 Ton	1470 T	56	82,300	
Cap Stone 3-5 Ton	230 T	56	12,900	
6.5 Ton Dolos	50 EA	1350	67,500	
1+40 - 2+00				
Core 100#-600#	360 T	79	28,400	
Underlayer 200#-1000#	970 T	98	95,100	
Cap Stone 5-7 Ton	590 T	103	60,800	
30 Ton Dolos	150 EA	3570	535,500	
Concrete Ribs	100 CY	860	86,000	
Wave Absorber 2-3 Ton	1760 T	56	98,600	
			<u>1,447,600</u>	
			<u>361,400</u>	
Contingency (25%)				
Total Direct Federal Construction Cost				\$1,809,000
Plans & Specifications	--	--	80,000	
Engineering during Construction	--	--	10,000	
Supervision & Administration	--	--	<u>108,000</u>	
Total Engineering & Design Cost				<u>\$198,000</u>
TOTAL FEDERAL FIRST COST				\$2,007,000
<u>NON-FEDERAL</u>				
Boat Ramp 80' x 30'	1 Job	--	85,000	
Contingencies (25%)			<u>21,000</u>	
TOTAL NON-FEDERAL FIRST COST				\$106,000
<u>U.S. COAST GUARD AIDS TO NAVIGATION</u>				20,000
TOTAL PROJECT FIRST COST				\$2,133,500

1/ Excludes pre-authorization study costs of \$307,500

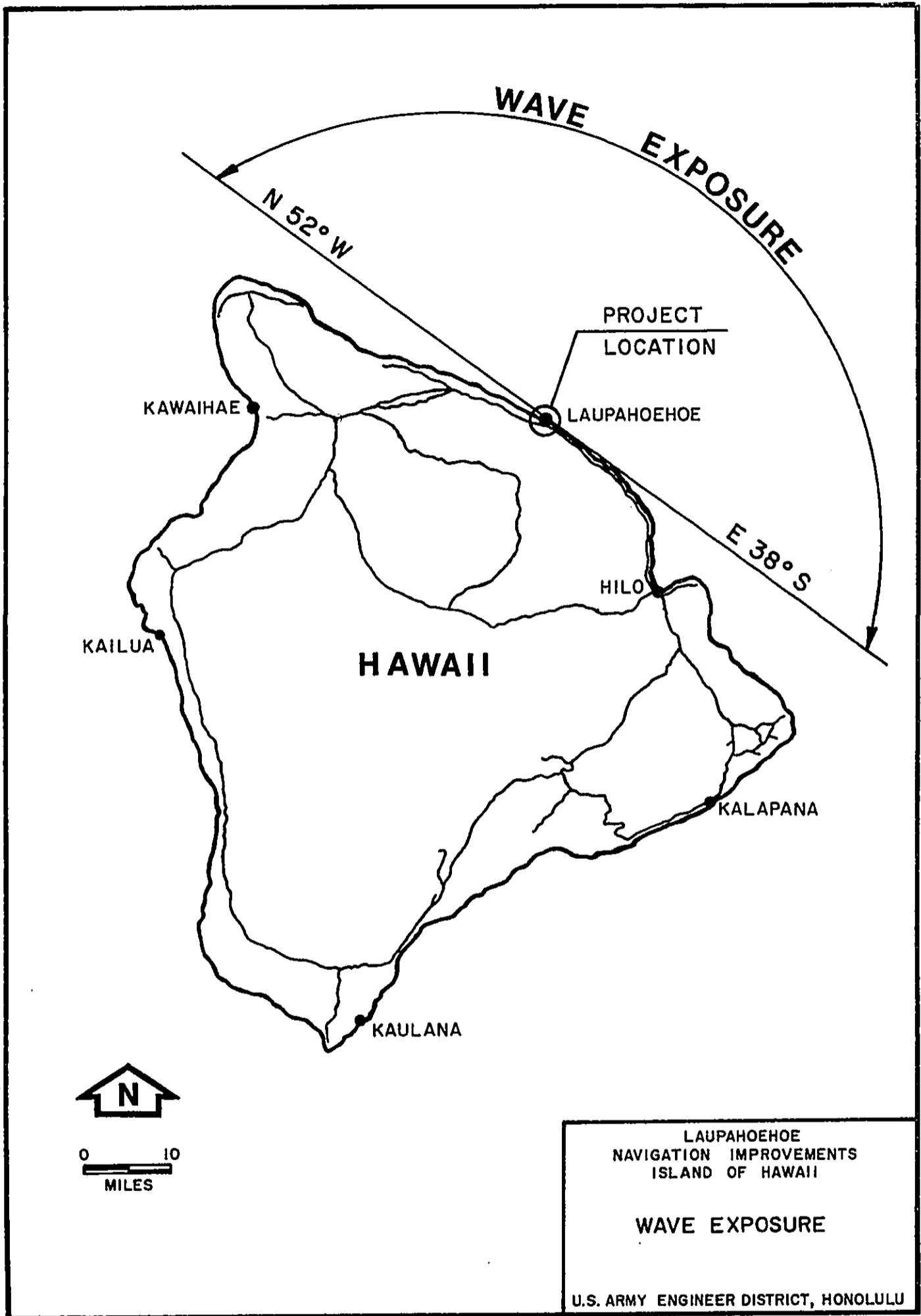


FIGURE D-1

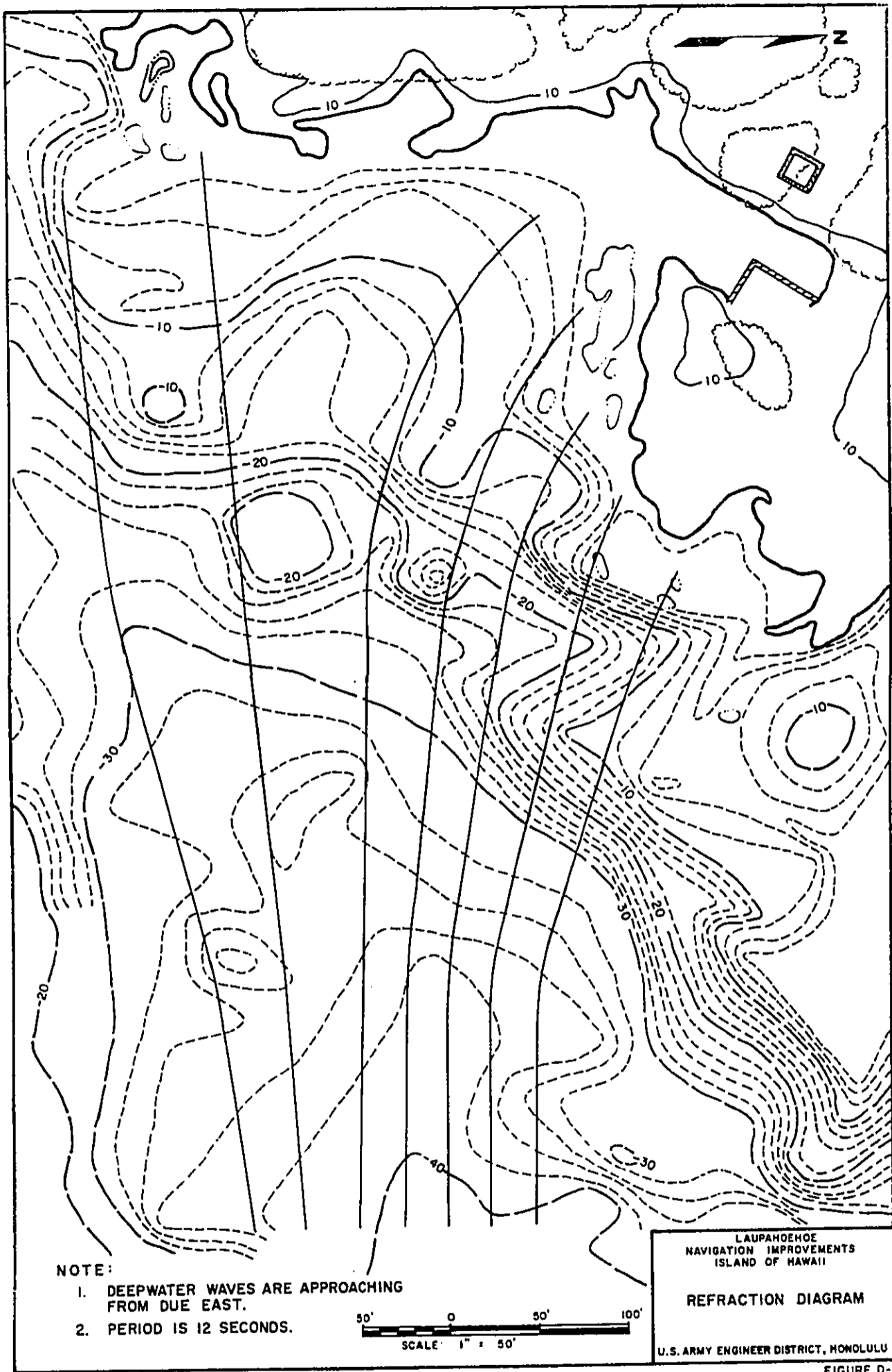
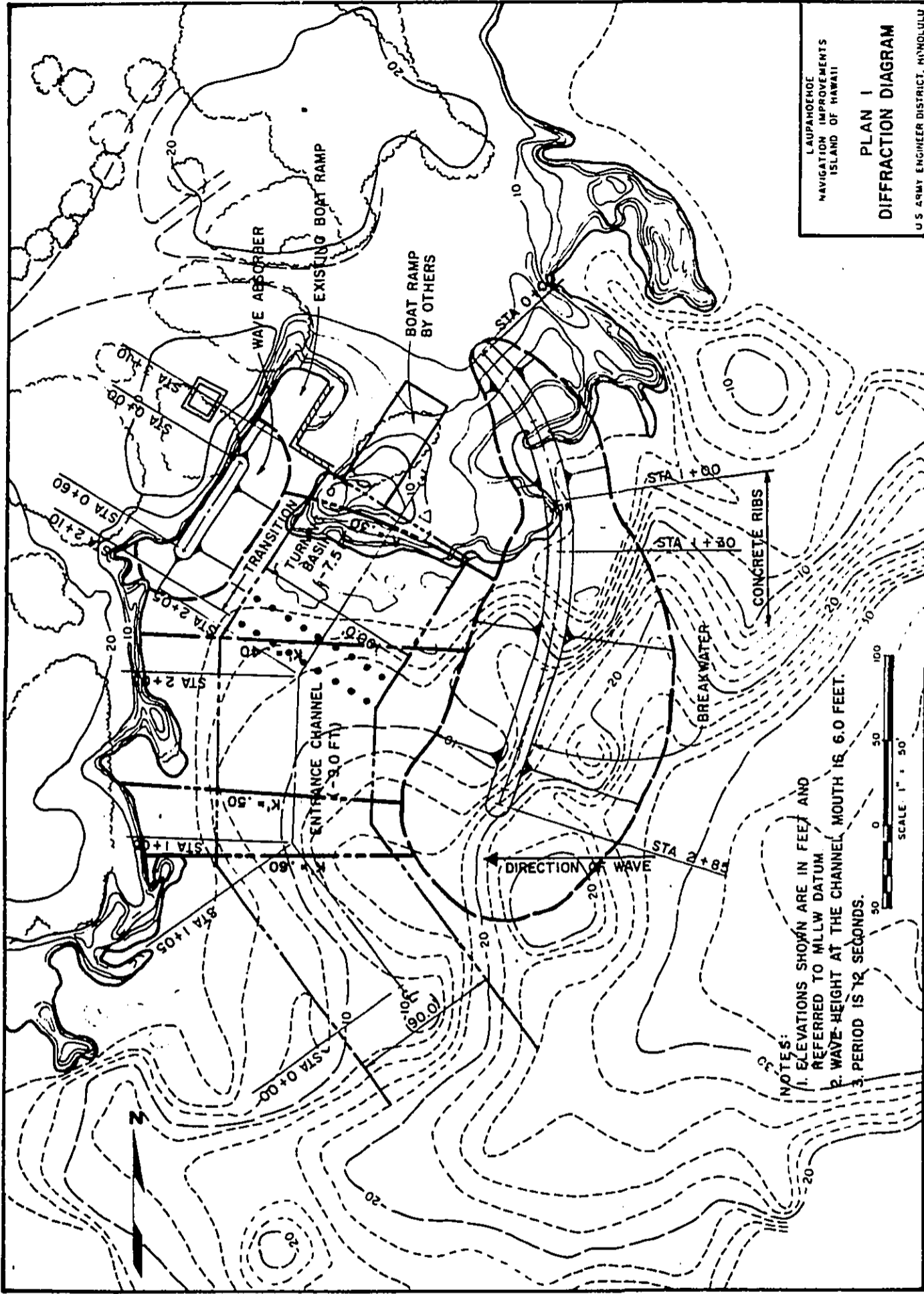


FIGURE D-2



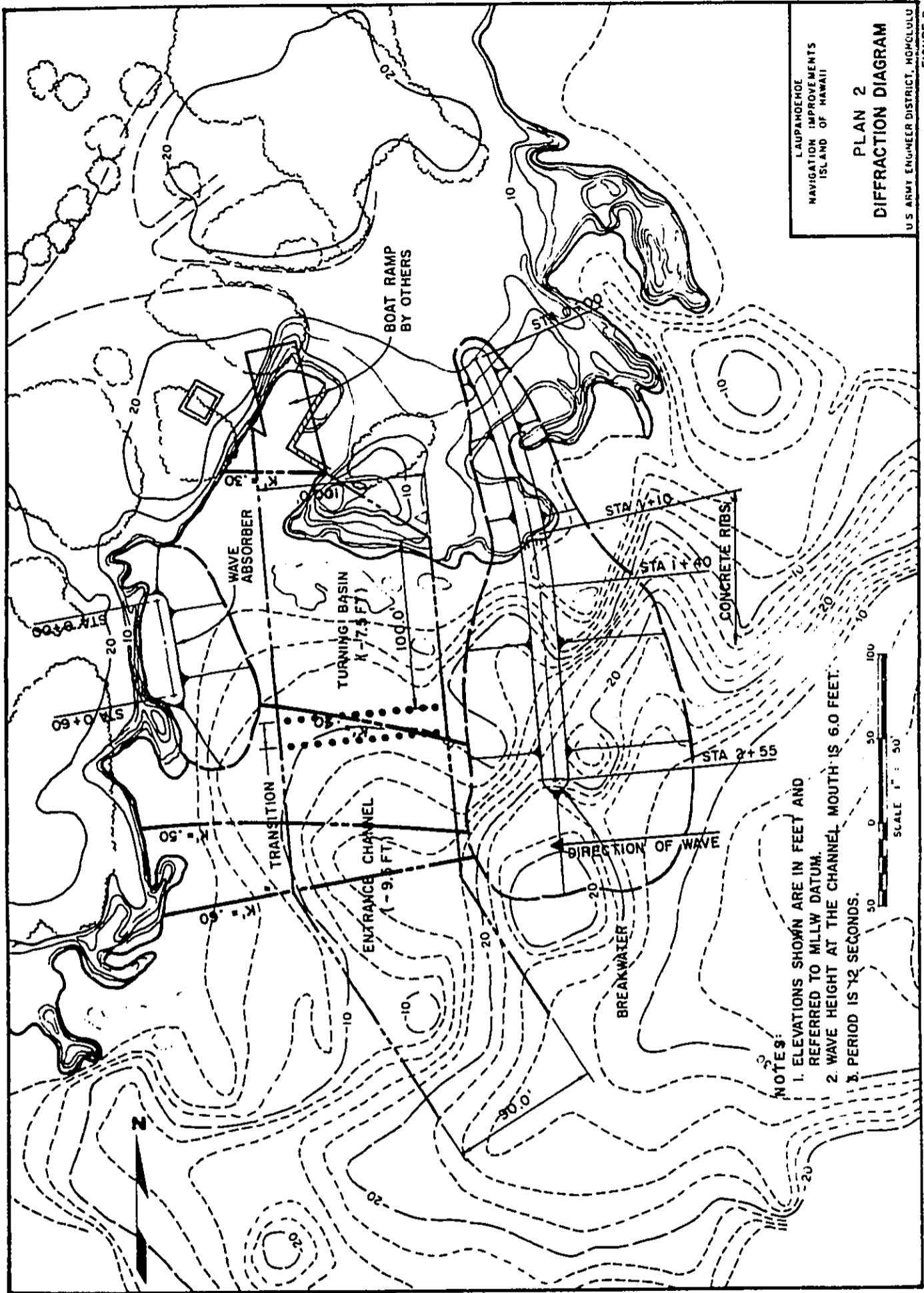
LAUPAHOEHOE
 NAVIGATION IMPROVEMENTS
 ISLAND OF HAWAII

PLAN 1
DIFFRACTION DIAGRAM

U.S. ARMY ENGINEER DISTRICT, HONOLULU

NOTES:
 1. ELEVATIONS SHOWN ARE IN FEET AND REFERRED TO MLLW DATUM.
 2. WAVE-HEIGHT AT THE CHANNEL MOUTH IS 6.0 FEET.
 3. PERIOD IS 12 SECONDS.

FIGURE D-3



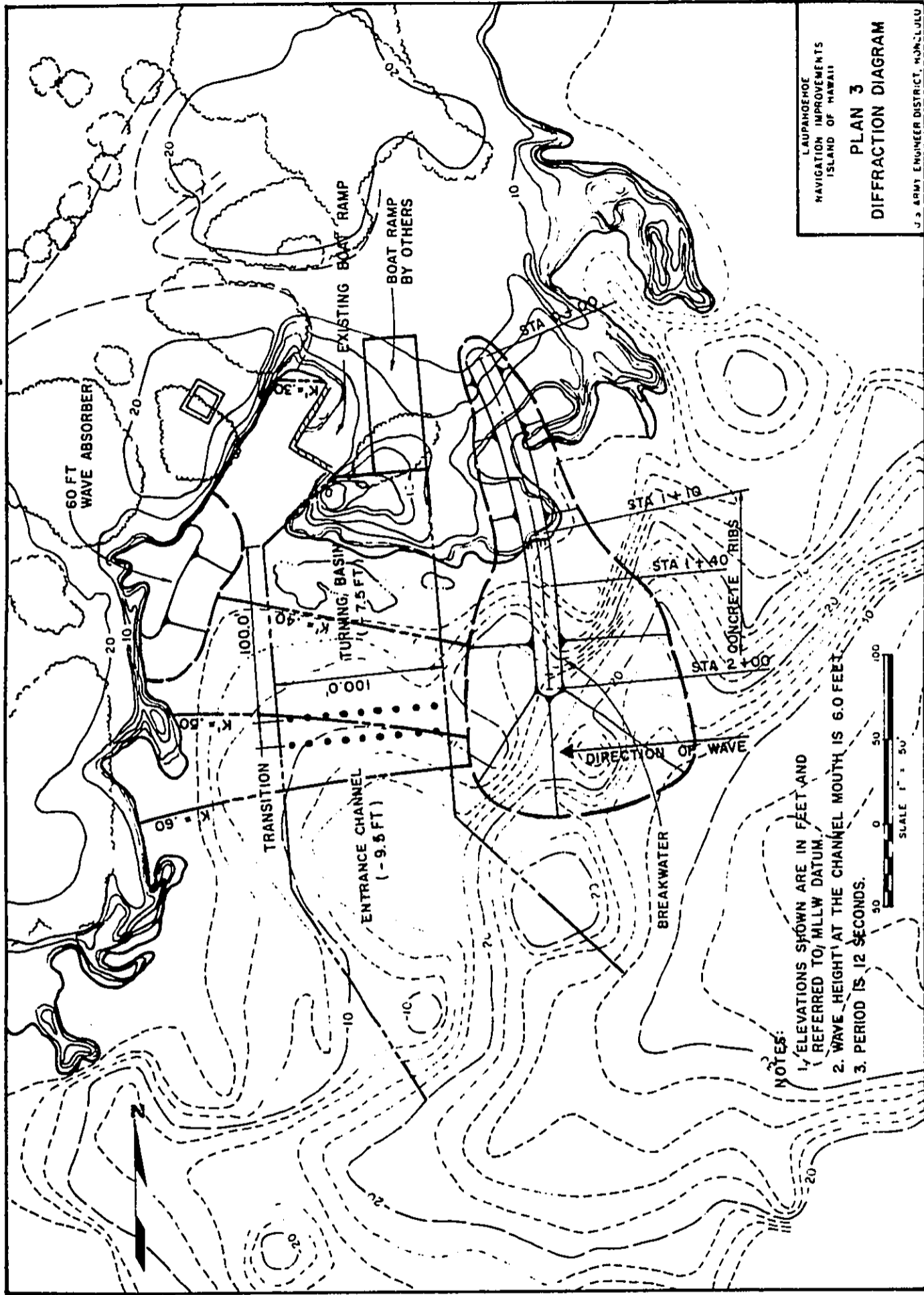
LAUPAEOHOLE
 NAVIGATION IMPROVEMENTS
 ISLAND OF HAWAII

PLAN 2
 DIFFRACTION DIAGRAM

U.S. ARMY ENGINEER DISTRICT, HONOLULU

FIGURE D-4

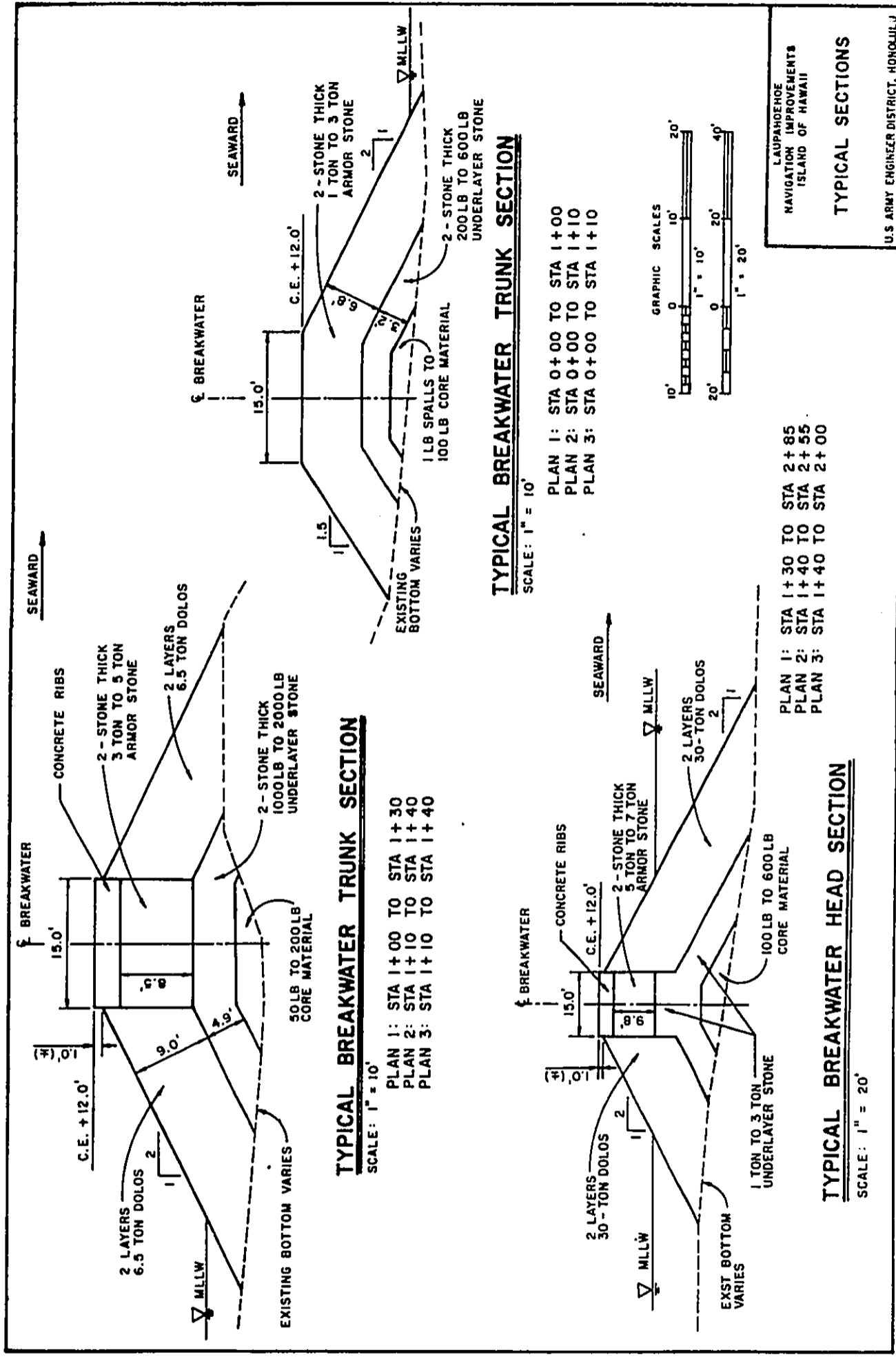
- NOTES:
1. ELEVATIONS SHOWN ARE IN FEET AND REFERRED TO MLLW DATUM.
 2. WAVE HEIGHT AT THE CHANNEL MOUTH IS 6.0 FEET.
 3. PERIOD IS 12 SECONDS.



LAUPAHOEHOE
 NAVIGATION IMPROVEMENTS
 ISLAND OF HAWAII
 PLAN 3
 DIFFRACTION DIAGRAM
 U.S. ARMY ENGINEER DISTRICT, HONOLULU

- NOTES:
1. ELEVATIONS SHOWN ARE IN FEET AND REFERRED TO MLLW DATUM.
 2. WAVE HEIGHT AT THE CHANNEL MOUTH IS 6.0 FEET.
 3. PERIOD IS 12 SECONDS.

FIGURE D-5

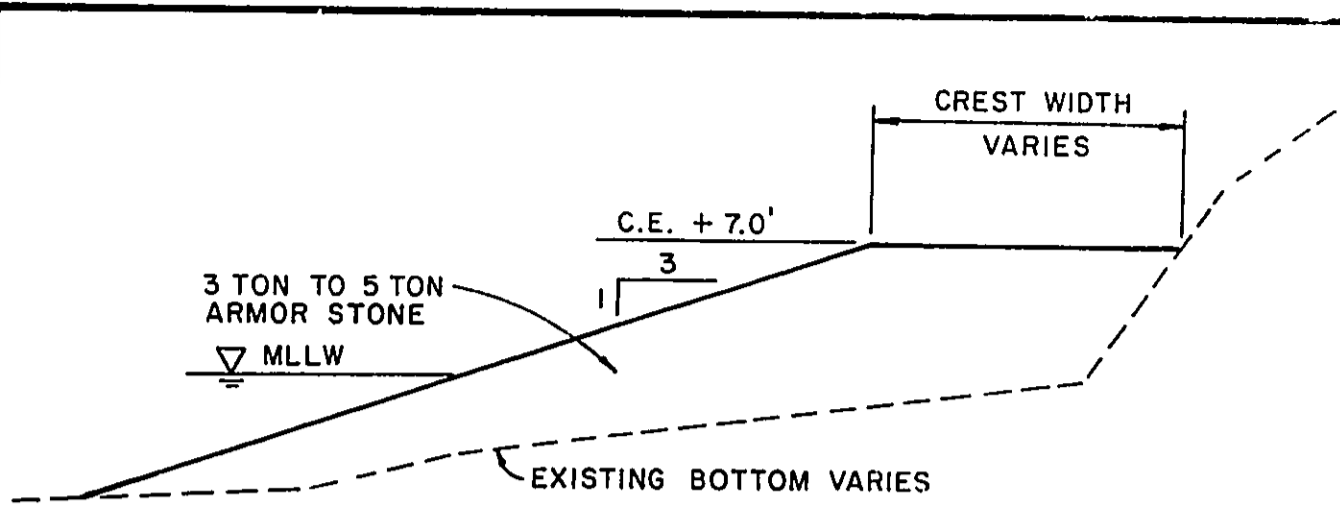


LAUPAHOE
 NAVIGATION IMPROVEMENTS
 ISLAND OF HAWAII

TYPICAL SECTIONS

U.S. ARMY ENGINEER DISTRICT, HONOLULU

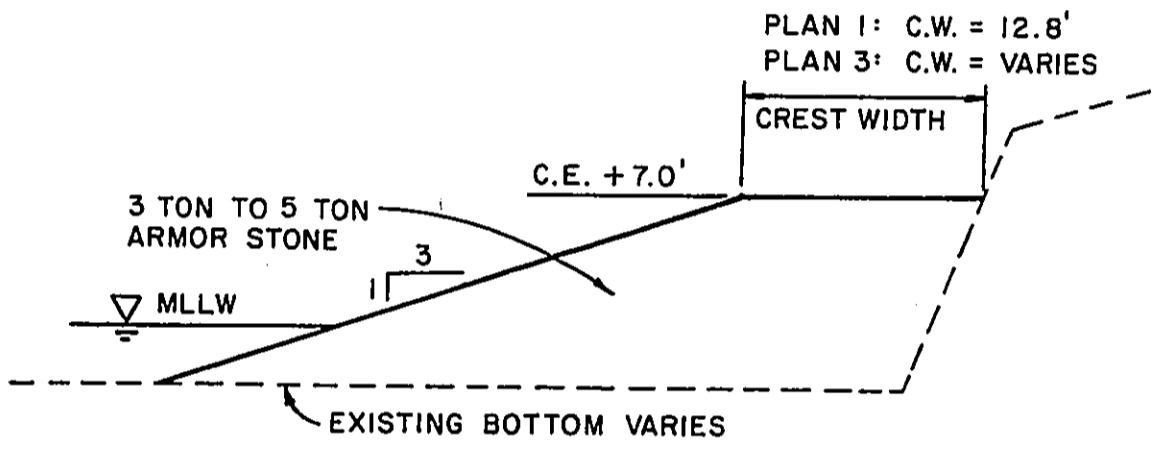
FIGURE D-6



TYPICAL WAVE ABSORBER SECTION

SCALE: 1" = 10'

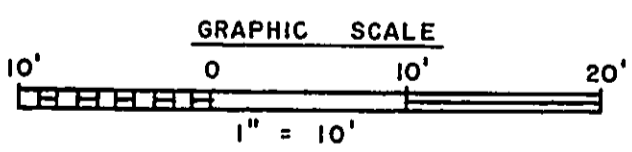
PLAN 2: STA 0+00 TO STA 0+60



TYPICAL WAVE ABSORBER SECTION

SCALE: 1" = 10'

PLAN 1 & 3: STA 0+00 TO STA 0+60



LAUPAHOEHOE
 NAVIGATION IMPROVEMENTS
 ISLAND OF HAWAII

TYPICAL SECTIONS

U.S. ARMY ENGINEER DISTRICT, HONOLULU

FIGURE D-7

ECONOMICS

Appendix E

APPENDIX E

ECONOMICS

ECONOMICS
LAUPAHOEHOE NAVIGATION IMPROVEMENTS

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ECONOMICS

1. GENERAL

This section analyzes the benefits for light draft navigation facility at Laupahoehoe. The benefits derived consist of an increase in the net value of fish catch, and a saving in emergency costs. Computations are based on an 8-1/8 percent interest rate, a 50-year project life, 1984 price levels, and a base year of 1985.

2. METHODS OF ANALYSIS

Data used in the evaluation process was obtained from field investigations; interviews with public and private interests; and Federal, State, and local reports, newspaper articles, and periodicals. A primary source of data was the State of Hawaii Boat Owner Survey, March 1980, Pacific Ocean Division, Corps of Engineers; and "A Survey of Small Craft Fleet Parameters and Use Patterns, Hilo, Hawaii Tributary Area," December 1979, POD, Corps of Engineers.

3. SMALL BOAT HARBORS

As population and income increase, the demand for available boating facilities in Hawaii County becomes more apparent. Twenty years ago, in 1962, there were only 4 principal harbors for small craft on the island. Total berthing capacity of 212 crafts was insufficient. In 1980, the number of harbors increased to seven but total berthing capacity increased only 55 percent to 329 berthing spaces. Boat registration since 1970 has increased 106 percent in the County.

Table 1 lists the small boat harbors in Hawaii County and their berthing capacities. Three of the harbors are located in the Hilo area. They are Wailoa River, Radio Bay, and Reeds Bay.

The Wailoa River site is located in central Hilo and is part of the Wailoa State Park. The facility has approximately 54 berthing spaces, a 2-lane ramp, a loading dock, parking for 20 cars with trailers, restrooms, picnic areas, boat wash area, and freshwater faucets.

Radio Bay small boat harbor is located just east of the Hilo deep draft harbor facilities. The bay has approximately 11 berths plus anchor mooring in the middle of the bay for 10 more craft. It is popularly used for moorage of transient boats. Commercial fishing boats that travel from Kona to fish along the Hilo-Hamakua coastline will usually moor in this bay.

Reeds Bay is a small inlet on the eastern side of Waiakea Peninsula next to the hotel district. It has long been considered a potential site for development of a small craft facility. Existing facilities in the bay include anchor moorings for approximately 16 sailboats, restrooms, and a picnic area. The boat-mooring needs for the Hilo area are expected to be partially met by the construction of a Federally-authorized small boat harbor in Reeds Bay and a proposed commercial fishing harbor at Cape Kumukahi.

TABLE I.
PRINCIPAL HARBORS FOR SMALL CRAFT
HAWAII COUNTY

Harbor	Number of Berthing or Mooring Facilities	
	1962	1981
West Hawaii County		
Honokahau	0	164
Kawaihae	27	58
Kailua-Kona	49	91/
Keauhou	612/	16
East Hawaii County (Hilo Area) ^{3/}		
Wailoa River	754/	544/5/
Keeds Bay	0	16
Radio Bay	0	12

- 1/ The number of moorings have been reduced because the Bay is a high risk area for mooring. Honokahau now provides refuge and permanent, all-weather wet storage for the area.
- 2/ Includes mooring capacity by anchor in middle of bay. (Area considered high risk today.)
- 3/ Field investigation survey indicated there were 110 moored craft in the Hilo area in 1980. The State Harbors Division reported available berthing capacity of 82 for the same period.
- 4/ Includes Wailoa Sampan Basin that had 12 berthing spaces in 1981.
- 5/ The decrease in number of berthing spaces is because commercial fishing boats no longer moor side-by-side across sampan basins.

Source: "Report on Survey of the Coasts of the Hawaiian Islands for Light-Draft Vessels," June 1967, Honolulu District, Corps of Engineers;
"Hawaii Water Resources Plan," January 1979, Hawaii Water Resources Regional Study, Board of Land and Natural Resources, State of Hawaii;
"Small Craft Mooring Facilities Utilization Report," December 1981, State of Hawaii, Department of Transportation.

4. BENEFITS

a. Benefit Categories. The proposed improvements will permit safe navigation for commercial fishermen utilizing the Laupahoehoe Ramp facilities during periods when the Hamakua coastline is navigable by small boats. Benefits are the measured difference between conditions with and without the plan of improvement and are expressed as an equivalent annual value. Those benefits accruing to commercial fishing include the following:

- (1) Increase in net value of fish catch; and
- (2) Saving in emergencies.

Pleasure boating in the rough waters off the Hamakua Coast is not considered a rational activity and is not discussed as a benefit category.

b. Fishing Fleet. There are some 38 boats in Laupahoehoe of which 8 are over 20-foot long; the remaining 30 range from 16 to 19 feet. Because of current restrictions, none of the boats launch at Laupahoehoe facilities. An average of 30 of the 38 boats would go out fishing per week. The entire fleet does not go out to fish every week because of full-time job commitments.

There are over 200 trailer-launched boats in the Hilo area that fish in grounds at and beyond the Laupahoehoe area. If proper facilities were available at Laupahoehoe, they would be willing to launch and retrieve from there as well as stop over just to unload fish and refuel.

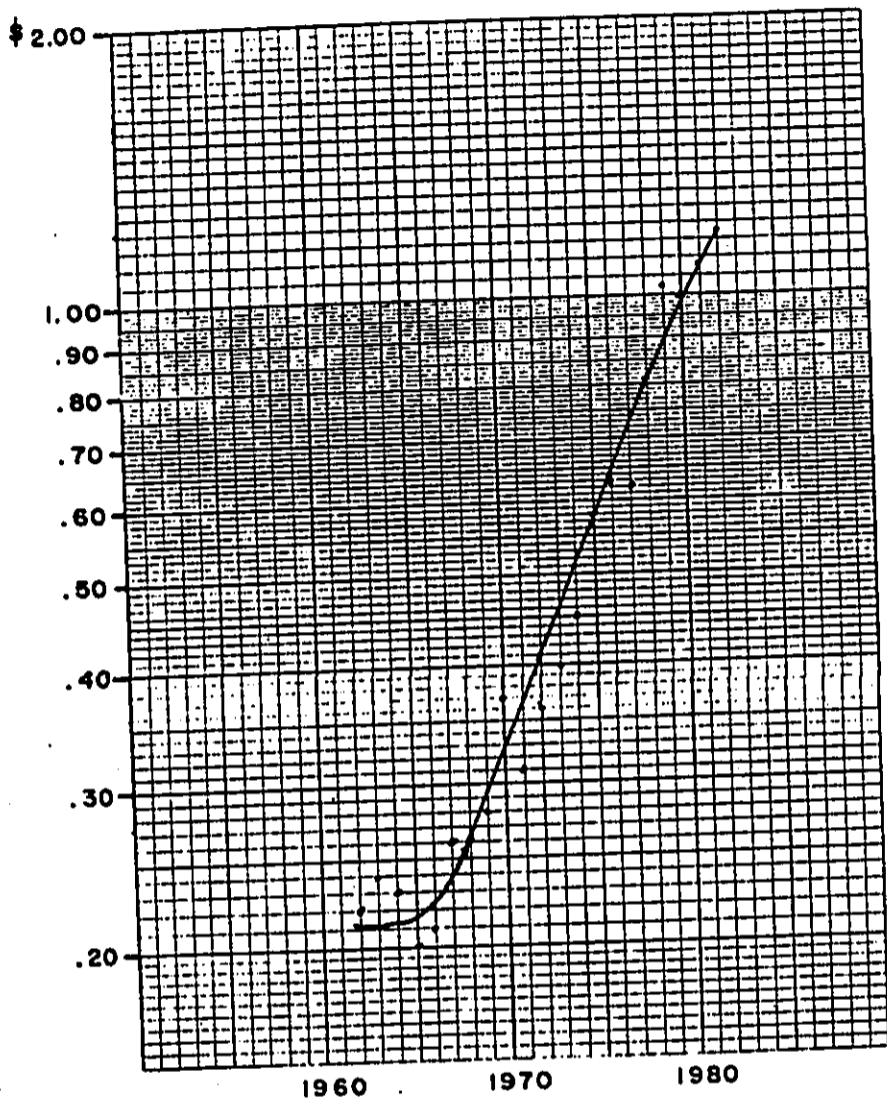
c. Fishing Information. Data used in computing benefits are based on recent interviews with fishermen at Laupahoehoe and on results of a recent survey of small craft fleet parameters and use patterns of the Hilo, Hawaii tributary area. It should be noted that the information from Laupahoehoe fishermen is based on conditions before the ramp was officially closed for public use. Information from the above sources is used in the computations and is listed in Table 2.

The following is a summary of the results of the survey. Numbers used in Table 2 may differ slightly due to further refinement and rounding of figures.

Full-Time Fishing Craft

The surveys of fishing craft operators of full-time moored craft indicated that each craft averages 285 trips per year. Each craft catches an average of 380 pounds of seafood per trip with an average selling price of \$1.46 per pound. The \$1.46 per pound figure (see Figure E-1) is derived from the 1980 boating survey conducted by POD and updated to 1983 price levels by the consumer price index. The historic trend from 1967 to 1982 for pounds caught and value to primary producers as recorded by the Hawaii State Division of Aquatic Resources also supports this figure (see Figure E-1). Expenses including wages, depreciation, fuel, gear, supplies, maintenance and repair, and other came to \$30,697 per craft. A salary of \$31,200 per year based on returns to occupations requiring comparable skill and training was imputed to the owner/operator to yield total expenses of \$61,897 per craft. Thus, the average full-time moored commercial fishing craft yielded a net catch value of \$96,221.

Analysis of full-time trailered fishing craft returns indicated that the average number of trips per year for this group is 235, with a catch of 258 pounds per trip selling at an average of \$1.46 per pound. Expenses of \$11,648



✓SOURCE: HAWAII STATE DEPARTMENT OF LAND AND NATURAL RESOURCES, DIVISION OF AQUATIC RESOURCES, COMMERCIAL FISH LANDINGS FOR FISCAL YEAR (ANNUAL), AS REVISED, AND RECORDS.

LAUPAHOEHOE
 NAVIGATION IMPROVEMENTS
 ISLAND OF HAWAII
 HAWAII STATE, PRICE PER POUND
 FOR PRIMARY PRODUCER FOR
 COMMERCIAL FISH CATCH ✓
 U.S. ARMY ENGINEER DISTRICT, HONOLULU

FIGURE E-1

TABLE 2.
LAUPAHOEHOE AREA FISHING INFORMATION

Average Occasion per Boat	Full-Time Trailered Comm Hilo Fishermen <u>1/</u>	Part-Time Trailered Comm Hilo Fishermen <u>1/</u>	Laupahoehoe Fishermen <u>2/</u>
<u>Per Year</u>			
Trips per Year	235	105	7
Gross Catch Value per Year	\$89,139	\$13,175	\$1,030
Operating Expense and Operator Salary per Year	43,148	11,570	771
Net Catch Value per Year	\$45,991	\$1,605	\$259
<u>Per Trip</u>			
Net Catch Value per Trip (All Expense)	\$196	\$15	\$37
Gross Catch Value per Trip	\$379	\$125	\$147

SOURCE: 1/ "State of Hawaii Boat Owner Survey," March 1980, Pacific Ocean Division, Corps of Engineers; and "A Survey of Small Craft Fleet Parameters and Use Patterns Hilo, Hawaii Tributary Area," December 1979, POD, Corps of Engineers.

2/ Data based on conditions before ramp was permanently closed for public use. Information gathered during series of meetings with fishermen at Laupahoehoe Town.

were determined. A salary of \$31,200 per year was imputed to the owner/operator to yield total expenses of \$42,848 per craft. Thus, the average full-time trailered commercial fishing craft yielded a net catch value of \$45,672. (Table 2 figure \$45,991.)

Part-Time Fishing Craft

The State-Wide Boating Survey of part-time fishing craft operators included part-time moored craft and part-time trailer-mounted craft. Analysis of part-time moored fishing craft returns indicated that the average number of trips is 130 with a catch of 109 pounds per trip selling at an average of \$1.40 per pound. Expenses totaled \$3,536. A salary of \$12,480 was imputed to the operator (130 trips x 8 hrs. x \$12/hr.). Thus, the average part-time moored commercial fishing craft yielded a net catch value of \$3,822.

Analysis of part-time trailered fishing craft returns indicated that the average number of trips per year for this group is 105, with a catch of 89 pounds per trip selling at an average of \$1.40 per pound. Expenses totalled \$1,410. A salary of \$10,080 was imputed to the operator (105 trips x 8 hrs. x \$12/hr.). Thus, the average part-time trailered commercial fishing craft yielded a net catch value of \$1,593. (Table 2 figure \$1,605.)

Laupahoehoe Fishermen

Analysis of fishing patterns for Laupahoehoe were based on interviews with fishermen in the Laupahoehoe community during a series of workshop meetings.

d. Reduction of Damages. Local fishermen indicate that over the previous 10 years an annual average of \$13,800 in damages was sustained at the ramp. These damages were attributed to the unsafe launching and recovery conditions at Laupahoehoe Ramp and the lack of a safe mooring area for loading and unloading equipment and supplies. The \$13,800 includes \$5,700 damages in boat hull repair, bent and broken propellers, and loss of fishing equipment; and \$8,100 in damages to trucks and trailers. During the past year, no boat damages at the ramp were reported by the fishermen. There is a reason for no damages being reported. Continued wave action has severely damaged the lower end of the ramp, exposing reinforcement bars, and has created pockets or holes. Because of these conditions, the county posted a "Boat Ramp Closed, Do Not Use," sign a year ago. As a result, no one is allowed to use the ramp. In this report, it is assumed that there are no current damages because no one is allowed to use the ramp. Therefore, no benefits from reduction of damages are estimated.

e. Increase in Fish Catch. Under current conditions, launching and recovery at Laupahoehoe Ramp is not possible. With proper facilities, the fishermen indicated that they would go out whenever conditions otherwise permit. The proposed improvement would permit safe launching and recovery an estimated 70 percent of the time. As part-time fishermen, they would go out to fish from 2 to 7 days a week or an average of 4.5 times per week. Since there are no trips made under without improvement conditions, the net changes in trips are 4,914 additional trips as computed below:

With Improvement:	$30 \times 52 \times 4.5 \times .70$	=	4,914 trips
Without Improvement:		=	<u>0</u> trips
Additional trips			4,914

The net catch value per trip is \$37 (Table 2). The net benefit based on the 4,914 additional trips is \$182,000 as computed below:

With Improvement:	$4,914 \times \$37$	=	\$181,800
Without Improvement:		=	<u>0</u>
Net value of fish caught			\$182,000

The fishermen from Laupahoehoe now own boats 16 to 19 feet in length and indicated that they would change to boats exceeding 20 feet and fish in deeper waters. With larger boats, they estimate they can increase their catch by 10 to 20 percent. The estimated value of the net increase in annual catch with the increase in boat size is based on a 15 percent increase, amounting to:

$$\$182,000 \times .15 = \$27,000$$

Hilo boats make about 425 trips fishing from Hilo to Area 1 (Figure E-2) annually. If facilities are available at Laupahoehoe they can unload fish, refuel, pick up ice, and continue an additional 2 hours of fishing. An average trip is about 8 hours. Gross catch value per trip for part-time fishermen trailered from Hilo is \$125 and for full-time is \$379. Some 16 percent of Hilo trailered fishing boats are full time and 84 percent are part time. The weighted average gross value per trip of fish catch is \$165.64 for these craft. Gross catch per hour is \$20.71. Extra fuel expenses at \$4.75 per hour total \$9.50. This yields a net extra fish catch of \$31.92 per trip for the 2 extra hours of fishing. Net benefits with the ramp operational 70 percent of the time with the plan of improvement are an estimated \$9,496, or \$9,000 rounded to the nearest thousand.

Hilo boats make about 1,278 trips fishing from Hilo to Area 2 (Figure E-2) annually. If facilities are available at Laupahoehoe the fishermen would prefer to haul their boats to Laupahoehoe and launch. Travel time by sea is 2 hours and by road, 1/2 hour, with a saving of one and 1/2 hours, or 3 hours per round trip. Assuming the operating costs by sea and by hauling on the road are the same, then there is no saving in travel cost. However, there are 3 additional hours to catch fish. Net value of fish caught under existing conditions is \$19,200 and with improvements is \$62,100. The net value of increased fish catch is \$43,000, as computed below:

With Improvement:	$(1,278 \times \$15) + (1,278)(\$48) \frac{1}{(70\%)}$	=	\$62,100
Without Improvement:	$(1,278 \times \$15)$	=	<u>19,200</u>
Net Value of Increased Fish Catch			\$42,900
	Rounded		\$43,000

$$\frac{1}{70} \$ (20.71 - 4.75) \text{ net value/hour} \times 3 \text{ hours} = \$48.$$

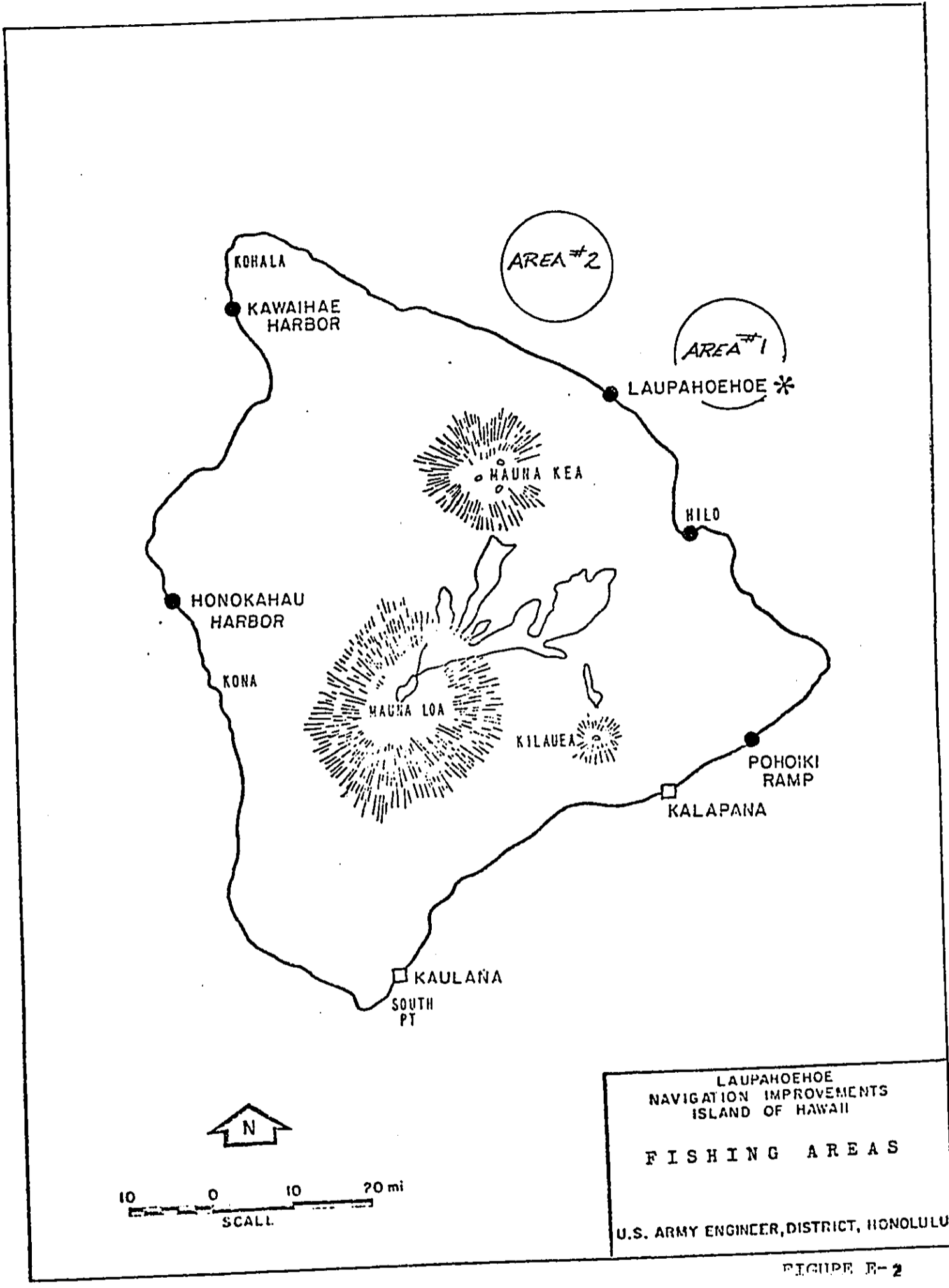


FIGURE R-2

f. The Hilo Rescue Squad Team and the Coast Guard respond to emergency help at sea along the Hamakua coast an average of 6 to 20 times each year. Both groups are stationed in Hilo. Both cover the entire eastern coastline of the island. During rescue operations they would prefer to drive the 1/2 hour route on road to Laupahoehoe then launch their boats instead of the 1-1/4 hour route by sea. The route by sea requires an extra 3/4 hour of travel time. All rescue boats are launched from Hilo today. As a result there are the additional costs and the possibility of losing lives. Only the additional cost can be quantified. The cost per hour per rescue team including labor and equipment is estimated at \$125. The additional fuel expense by sea one way is an estimated \$7 (or \$19 - \$12 = \$7) for a one-way trip. Saving in cost from having a ramp in Laupahoehoe is \$2,000. $[(2 \times \$125 \times 3/4) + (2 \times \$7)] [(6 + 20)/2] [70\%] = \$1,834$, or \$2,000 rounded to the nearest thousand.

g. Plans numbered 1 and 2 will provide protection 75 percent of the time and Plan 3 will provide protection 70 percent of the time. Computations for Plan 3 were described in detail. Using the same rationale as for Plan 3, the results of computations for Plans 1 and 2 are listed in the summary of benefit table below.

h. Summary of Benefits

<u>Type</u>	<u>Average Annual Benefits</u>		
	<u>Plan 1</u>	<u>Plan 2</u>	<u>Plan 3</u>
Damage Prevention	0	0	0
Increased Fish Catch			
Laupahoehoe Fishermen	\$195,000	\$195,000	\$182,000
Larger Boats	28,900	28,900	27,000
Hilo Fishermen Area 1	9,600	9,600	9,000
Hilo Fishermen Area 2	46,100	46,100	43,000
Emergency Action	<u>2,100</u>	<u>2,100</u>	<u>2,000</u>
Total Average Annual Benefits	\$281,700	\$281,700	\$263,000
(Rounded)	<u>\$282,000</u>	<u>\$282,000</u>	<u>\$263,000</u>

**NATURAL
RESOURCES**

Appendix F

APPENDIX F
NATURAL RESOURCES

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APPENDIX F
NATURAL RESOURCES

A. FISH AND WILDLIFE COORDINATION ACT OF 1958

In accordance with the Fish and Wildlife Coordination Act of 1958 (P.L. 85-624), the US Fish and Wildlife Service was officially consulted. The below figure indicates the Fish and Wildlife coordination input requirements at the various stages of the study:

<u>FISH & WILDLIFE INPUT</u>	<u>INIT. COORD.</u>	<u>NEG. AGRMT.</u>	<u>PAL</u>	<u>REVIEW PRELIMINARY REPORT</u>	<u>FINAL FWCA REPORT</u>	<u>REVIEW FINAL REPORT</u>
CORPS OF ENGINEERS & PLANNING SPECS PROCESS	RECON REPORT			DRAFT DPR & EIS	FINAL	PLANS DPR & EIS

FISH AND WILDLIFE COORDINATION ACT SEQUENCE

A Planning Aid Letter (PAL) report was provided to the Corps of Engineers on 17 September 1982. This planning aid letter described the fish and wildlife resources within the proposed project area. A Fish and Wildlife Coordination Act (FWCA) Report addressing effects of the selected plan on Fish and Wildlife Resources will be submitted within 45 days of receipt of the selected plan. The report will make recommendations regarding fish and wildlife conservation and development, mitigation and/or compensation for habitat and resource losses associated with our proposed plan. The Planning Aid Letter is included in Section C below.

B. SUMMARY OF REQUIREMENTS

<u>FWL Input</u>	<u>Time Table</u>
PAL	Completed September 1982
Review Draft Report and EIS	45 days after receipt of draft report
Final Fish and Wildlife Coordination Act Report	Completed January 1984



United States Department of the Interior

FISH AND WILDLIFE SERVICE

300 ALA MOANA BOULEVARD
P. O. BOX 50167
HONOLULU HAWAII 96354

IN REPLY REFER TO:

ES
Room 6307

SEP 14 1982

LTC Kenneth E. Sprague
U.S. Army Engineer District, Honolulu
Building 230
Fort Shafter, Hawaii 96858

RE: Laupahoehoe Point Navigation
Improvements, Island of Hawaii,
Hawaii

Dear Colonel Sprague:

This is the U.S. Fish and Wildlife Service's first Planning Aid Letter regarding the Honolulu District's planning studies for navigation improvements at Laupahoehoe Point, Hawaii. These comments are preliminary in nature and do not constitute the report of the Secretary of the Interior on the subject project within the meaning of Section 2(b) of the Fish and Wildlife Coordination Act. Additional Service comments and recommendations will be provided in future Planning Aid Letter(s) and/or in Coordination Act Reports.

This letter has been prepared by John Ford using available literature, results of joint-agency field reconnaissance surveys conducted by John Ford and William Lennan, and engineering information provided by your Environmental Resources Section staff. This information consists of the Corps' Reconnaissance Report, dated January 29, 1982, maps and conceptual drawings of the proposed alternative improvements.

Description of the Planning Area

The planning area is located on Laupahoehoe peninsula which is situated on the windward, Hamakua coastline of the Island of Hawaii (Figure 1). It is approximately 25 miles north-northwest of Hilo, the county seat. The peninsula lies at the mouth of Laupahoehoe Gulch, below precipitous seacliffs. It was formed by a late lava flow that descended into this valley (Reference 3). Laupahoehoe Stream discharges into the sea on the northern edge of the peninsula, and Kilau Stream drops into the sea over a pali approximately .25 mile southeast of the peninsula.

The planning area is currently devoted to public park use and is used primarily for daytime picnicking, neighborhood gatherings and shorefishing. Its scenic beauty and historic importance also make it an important destination for tourists. The remains of a small, boat launching ramp constructed by the County of Hawaii in 1970 are situated on the southern lip of the peninsula. Because of significant wave surge problems at this site and normally rough seas, the ramp was not extensively utilized before its eventual breakup (Reference 5). Today, the ramp and the small promontory south of the ramp serve as popular recreational areas. There are several private homes situated at the base of the cliff, above the park.



F-2

Save Energy and You Serve America!

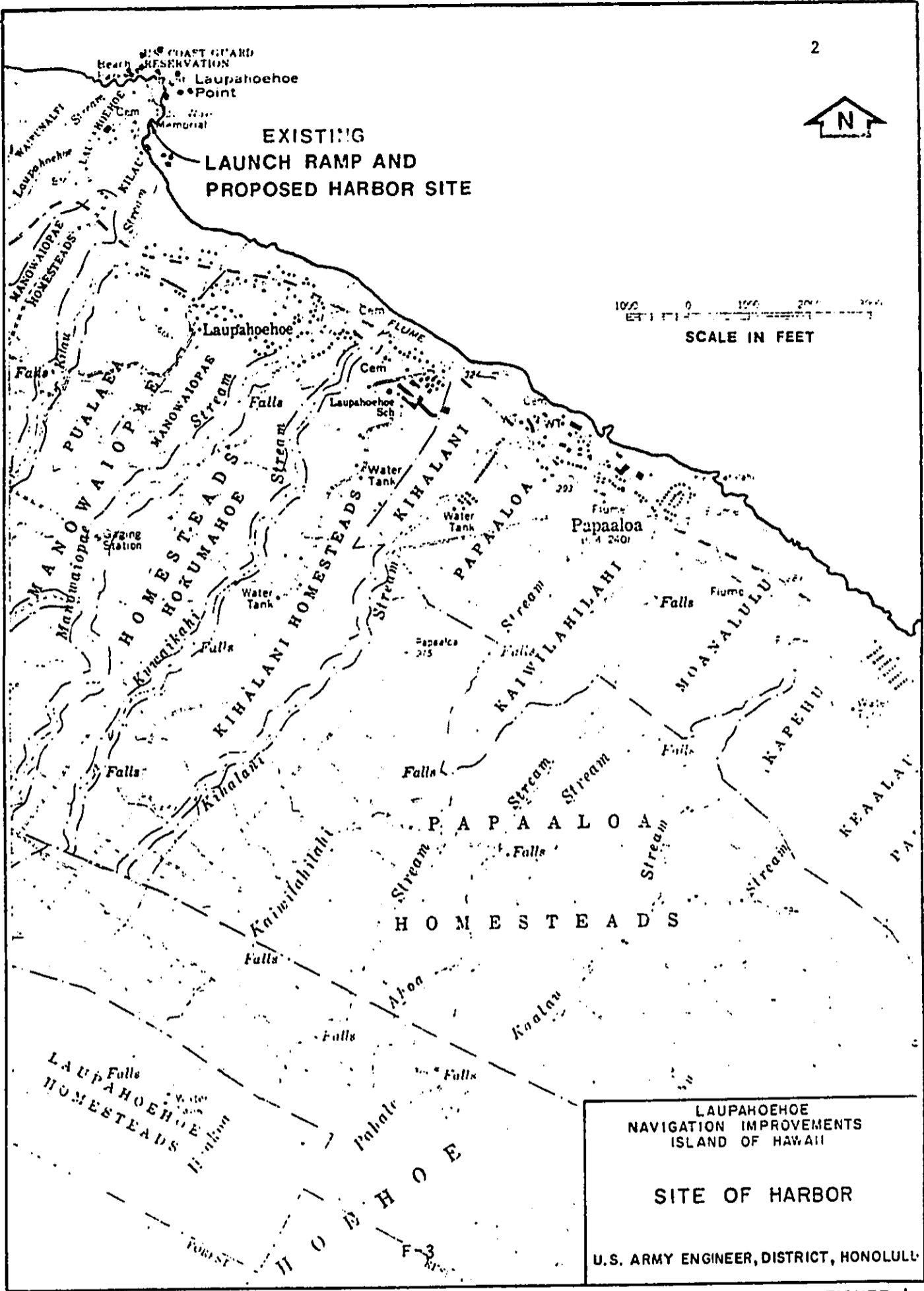


FIGURE 1

Terrestrial flora at the site is characteristic of well manicured coastal parklands and consists principally of ironwood (Casuarina equisetifolia), naupaka (Scaevola taccada), beach morning glory (Ipomoea pes-caprae), coconut palm (Cocos nucifera), common strand plants and lawn grasses.

Coastal currents along the Hamakua coast are believed to have a northwesterly set (Reference 4). Extensive water quality studies were conducted along the Hamakua coast adjacent to the Honokaa, Olokele and Pioneer sugar mills in 1970 by the Environmental Protection Agency (Reference 1). Data generated for this study reflect water quality conditions prior to the cessation of bagasse (cane trash) discharge into the sea, and are not directly applicable to Laupahoehoe. A brief study performed in 1974 (Reference 6) reported salinity, temperature, total nitrogen and phosphorus, and turbidity from nearshore waters at the tip of the peninsula. These data were within acceptable limits of State water quality standards.

Water clarity during our June 1982 underwater survey was excellent, with an estimated horizontal visibility of some 70 feet. Unusually calm seas prevailed during this period (Figure 2). High seas and prolonged heavy rains created poor water quality conditions at the time of our August 1982 field reconnaissance. Apparent color of the waters at the proposed project site was chocolate brown due to sediment-laden stream runoff.

Waters at the site of the proposed navigation improvements at Laupahoehoe harbor a surprising abundance of invertebrate and fishery resources (Figures 3-5). Reference 1 compares benthic habitat diversity and fishery resources at several locations along the Hamakua coastline in 1970, and illustrates the impacts of sediment-laden, washwater effluent from cane processing plants upon these marine resources. The only other available list of marine resources at Laupahoehoe appears in Reference 6. A list of the species recognized during our June 1982 reconnaissance appears in Table 1. It is believed that the diversity and abundance of reef corals and associated fauna is greater within the project area than on the northern side of the peninsula (Reference 6).

Endangered green sea turtles (Chelonia mydas) and hawksbill turtles (Eretmochlys imbricata) have been observed on the reefs along the Hamakua coast (including the project area). The endangered humpback whale (Megaptera novaeangliae) pass offshore during the period October-March.

Commercial fishery catch statistics developed by the State Division of Aquatic Resources, Department of Land and Natural Resources, are being collated and will be forwarded to the Corps as soon as practicable. These records will show annual catch by species from 1977 to 1981 for both nearshore and offshore commercial fishing within the Laupahoehoe area.

Discussion of Potential Environmental Consequences

The preliminary plan of improvement as stated in the Corps' Reconnaissance Report indicates that an entrance channel 80 feet wide and 9 feet deep by 100 feet and 7.5 feet deep. A 240-foot long breakwater would be constructed

Figure 2. View of the nearshore area at Laupahoehoe where proposed stub breakwater will be located. Photograph was taken from the parking area above the existing boat ramp.



Figure 3. This photo illustrates the diversity of reef corals which exist in shallow water at Laupahoehoe within the area designated for navigation improvements.

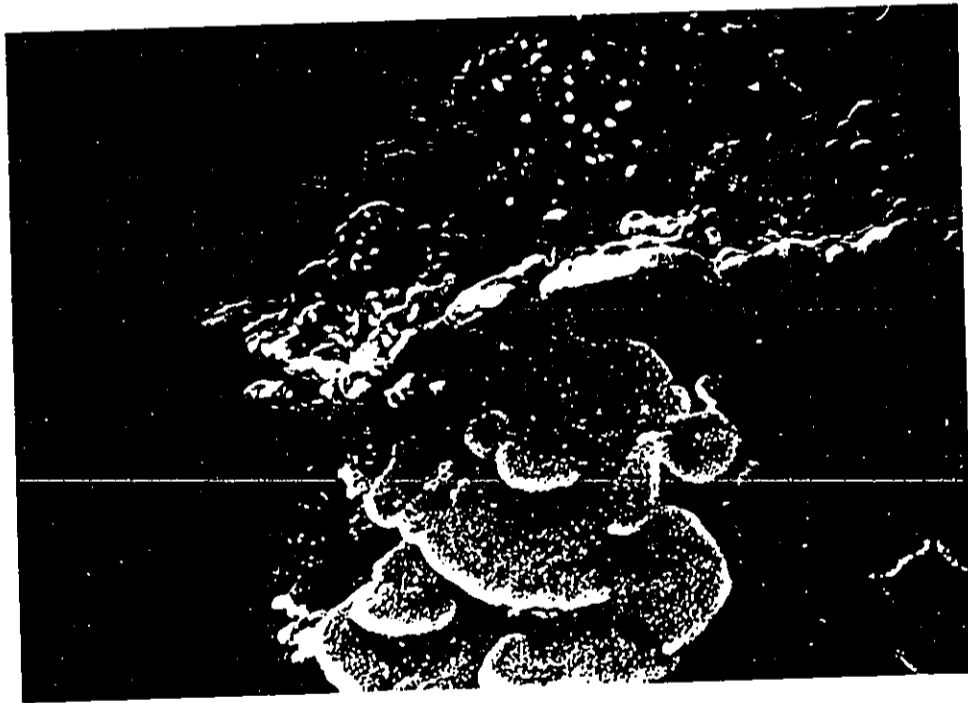


Figure 4. Massive stands of reef corals, such as this Porites sp., are found throughout the proposed project area at depths of 15-25 feet.

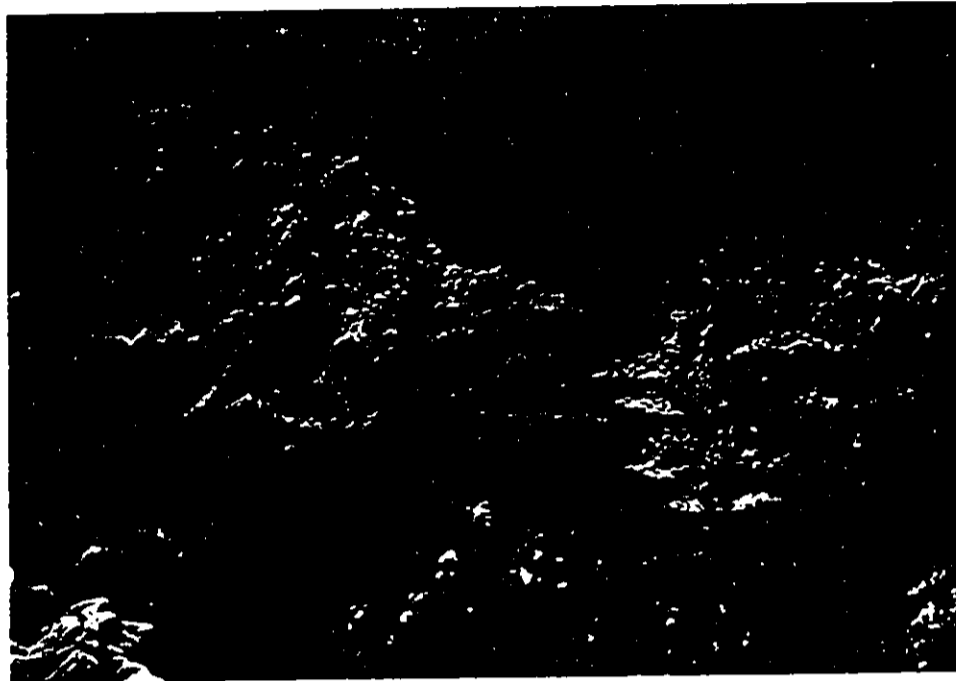
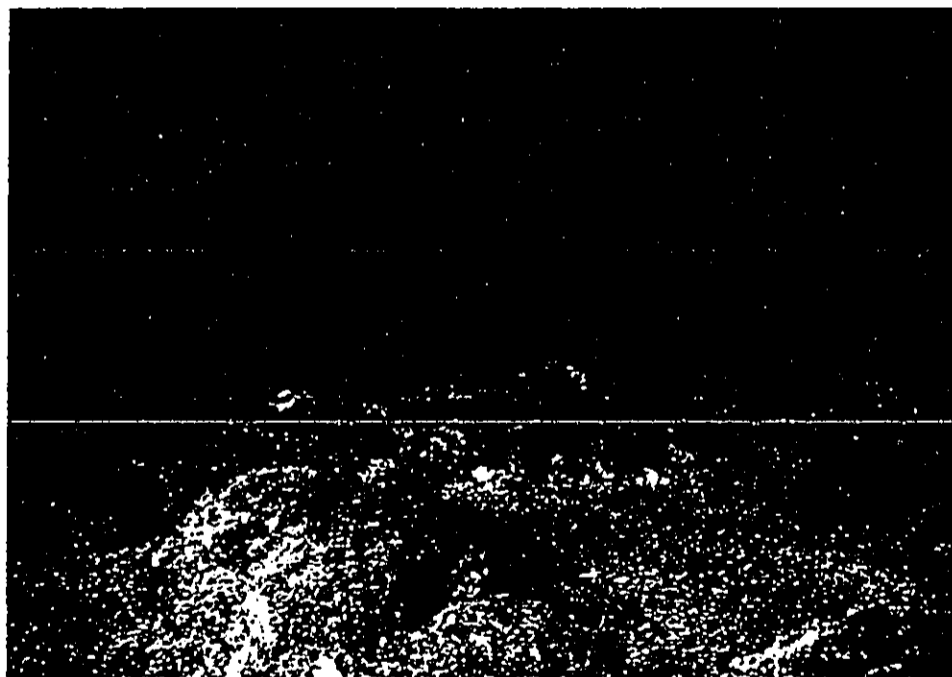


Figure 5. At a depth of approximately 30 feet, the bottom consists of dead coral boulders, rocks and coarse sand.



(unintelligible)

Table 1. Common marine resources observed during a field reconnaissance dive at Laupahoehoe Point, June 1982 (excludes infauna). U.S. Fish and Wildlife Service, Honolulu, Hawaii.

MARINE PLANTS

Porolithon gardineri
P. onkodes
Ulva fasciata
Boodleia composita
Dictyota acutiloba
Ralfsia pangoensis
Galaxura rugosa
Asparagopsis taxiformis

MARINE SPONGES

CORALS AND COELENTERATES

Porites compressa
P. lobata
P. spp.
Pocillopora damicornis
P. meandrina
Montipora verrilli
Palythoa tuberculosa

HOLOTHURIANS

Actinopyga mauritiana
Holothuria atra
H. sp.
Tripneustes gratilla
Echinometra mathei
Diadema paucispinum
Eucidaris metularia
Heterocentrotus mammilatus
Colobocentrotus sp.
Ophiocoma spp.

MOLLUSKS

Cellana exarata

CRUSTACEANS

ANNELIDS

Table 1. (Continued)

FISHES

Fistulacia petimba
Adloryx diadema
Apogon spp.
Paracirrhites arcatus
P. forsteri
Cirrhitops fasciatus
Lutjanus kasmira
Monotaxis grandoculis
Kyphosus bigibbus
Parupeneus bifasciatus
P. porphyreus
Chaetodon auriga
C. fremblii
C. lunula
C. miliaris
C. multicoloratus
C. ornatissimus
C. quadrimaculatus
C. unimaculatus
Forcipiger longirostris
Abudefduf abdominalis
Plectroglyphidodon imparipennis
Stegastes fasciolatus
Labroides phthirophagus
Pseudocheilinus octotaenia
Cephalophalis argus
Bodianus bilunulatus
Coris ballieui
C. flavovittata
C. gaimard
Thalassoma duperrey
T. fuscum
Stethojulis balteata
Scarus perspiculatus
Zanclus canescens
Acanthurus dussumieri
A. leucopareus
A. mata
A. nigrofuscus
A. triostegus
Zebrasoma veliferum
Naso unicornis
N. literatus
Cirripectes vanderbilii
Plagiotremus ewaensis
Sufflamen bursa

Table 1. (Continued)

Ostracion meleagris
Canthigaster amboinensis
C. epilampra
C. jactator
Pranesus insularum
Scomberoides santi-petri

to protect the ramp's turning basin from ocean waves. A 200-foot long, wave absorber would be constructed along the face of the cliffs at the shoreward side of the basin.

Construction related impacts are expected to be short-term in duration and will result primarily from (1) fill associated with breakwater and wave absorber construction, (2) blasting and dredging of the turning basin, and (3) excavation of land for the shoreside facilities. Since the existing bottom contours (estimated while scuba diving in the area) within the proposed turning basin are in excess of 9 feet, little dredging is anticipated in this area.

The most significant irreversible losses associated with the proposed project will be the destruction of diverse reef corals and associated infauna within an area of about 18,900 square feet, under the proposed breakwater. The outermost portion of the breakwater is expected to lie over an area of coarse sand. Approximately 3,120 square feet of rocky habitat within the intertidal zone will be destroyed by project features. Dredging within the turning basin will destroy reef corals and benthic invertebrates within a 27,000-square foot area. The total loss of marine benthic habitat is expected to encompass roughly 49,020 square feet (1.1 acres).

The completed breakwater and wave absorber will provide approximately 3,360 square feet of intertidal habitat which will be suitable for colonization by algae and sessile invertebrates. The interstices within the armor stone and dolos will serve as shelter for several species of reef fishes, and may enhance recreational fishing opportunities at the site.

Roughly 7,200 square feet of terrestrial habitat will be removed to accommodate the turning basin and boat ramp. This area includes a small, shaded knoll overlooking the existing launching ramp which is a very popular location for picknickers and sunbathers.

Water clarity will be degraded during construction. Blasting and dredging will suspend fine sediments in the water column which may stress adjacent areas if sediments are not confined to the construction site. There are little or no reducing, organic sediments at the site; therefore, significant degradation of dissolved oxygen concentrations, nutrient levels and pH is not anticipated. Because the surrounding shoreline areas consist of solid lava, no adverse effects due to changing patterns or erosion or accretion are expected.

Construction may interfere with recreational activities at the site and may temporarily reduce shore fishing success. Noise created by blasting and dredging and the associated fish kills will attract predatory fishes into the vicinity of the project.

The Corps has estimated that the proposed improvements can result in some 572 additional, commercial fishing trips per year at Laupahoehoe. Net benefits from increased fish catch attributable to these improvements has been estimated at \$90,000. Along with the associated benefits afforded by a safe launching and retrieval facility, the proposed harbor will result in overall enhancement of sport and commercial fisheries in East Hawaii.

Recommendation

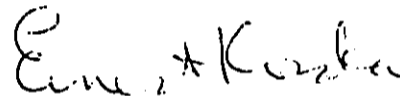
The Service recommends that the Corps consider adopting the following measures to lessen project-related effects upon the rich marine resources within the project area. Final design features and plans for protection of fish and wildlife resources must be developed in consultation with the Service and through the Hawaii Division of Aquatic and Wildlife Resources in accordance with the Fish and Wildlife Coordination Act.

Silt retention screens should be utilized where practical to limit the dispersal of suspended sediments during blasting, dredging and filling activities. The use of explosives should be minimized, and limited where necessary, to quantities sufficient only to facilitate dredging.

If possible, minor changes in orientation of the boat ramp and turning basin should be made to preserve the small, wooded knoll adjacent to the existing boat ramp. Consideration should be given to realignment of the breakwater so that a minimum amount of reef coral communities will be covered.

Care should be exercised during construction to prevent runoff of petroleum products into the water. Dredged material should be maintained behind berms to prevent silt-laden runoff from reentering the water. No stockpiling of dredged material in the water should be permitted.

Sincerely yours,



Ernest Kosaka
Project Leader
Office of Environmental Services

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2. Hoffman, R. G. and H. Yamauchi 1972. Recreational fishing: its impact on State and Local Economies. University of Hawaii, College of Tropical Agriculture Dept. Paper No. 3.
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COORDINATION ACT REPORT
LAUPAHOEHOE NAVIGATION IMPROVEMENTS
ISLAND OF HAWAII, HAWAII

UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
HONOLULU FIELD OFFICE

JANUARY 1984

Prepared for the Honolulu District,
U.S. Army Corps of Engineers, Honolulu, Hawaii

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PREFACE

This report has been prepared by John Ford and Yvonne Ching using available literature, results of joint-agency field reconnaissance surveys and current engineering information. Field surveys were conducted by John Ford (FWS) and William Lennan (of your staff) in July 1982 and August 1982. Engineering information, which was provided by your Environmental Resources Section Staff, includes the Corps' draft detailed and reconnaissance reports (References 12 and 13), maps and conceptual drawings of the proposed improvements.

DESCRIPTION OF THE PLANNING AREA

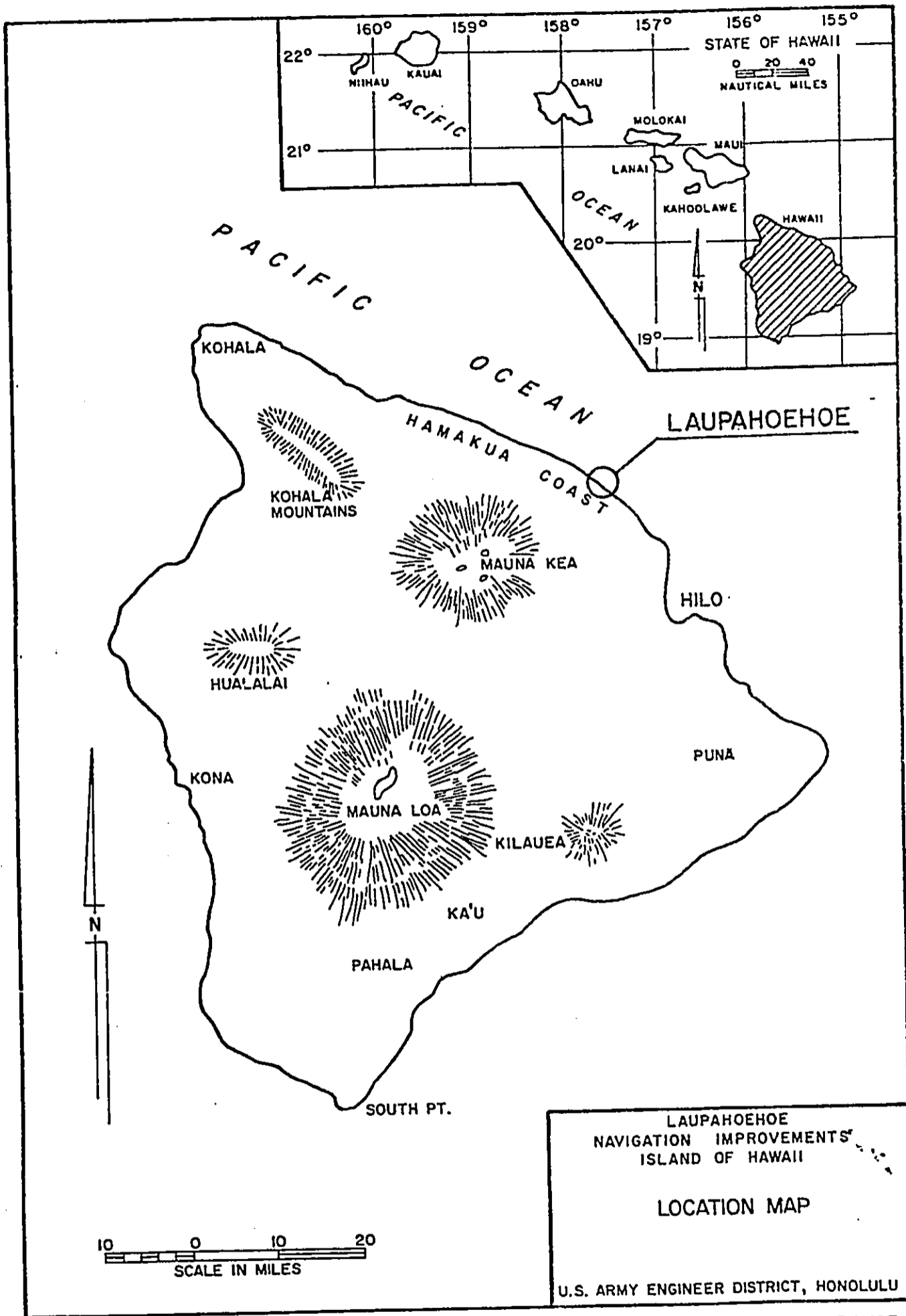
The planning area is located on Laupahoehoe peninsula which is situated on the windward, Hamakua coastline of the Island of Hawaii, approximately 25 miles north-northwest of Hilo (Figures 1 and 1a). The peninsula, which lies below precipitous seacliffs at the mouth of Laupahoehoe Gulch, was formed by a late lava flow that descended into this valley (Reference 5). Laupahoehoe Stream flows out into the sea on the northern edge of the peninsula, and Kilau Stream drops over a pali into the sea approximately .25 mile southeast of the peninsula.

The planning area is currently devoted to public park use and is used primarily for daytime picnicking, neighborhood gatherings and shorefishing. Its scenic beauty and historic importance also make it an important destination for tourists. In 1970, the County of Hawaii constructed a small, boat launching ramp on the southern tip of the peninsula. Because of significant wave surge problems at this site and normally rough seas, the ramp was not extensively utilized before its eventual deterioration (Reference 8). Today, the ramp and the small promontory south of the ramp serve as popular recreational areas. There are several private homes situated at the base of the cliff, above the park.

PROJECT DESCRIPTION

Navigational improvements proposed for Laupahoehoe consist of a breakwater, entrance channel, turning basin and wave absorber. A new boat ramp is to be constructed by the County of Hawaii at a later date. The three proposed alternatives differ in breakwater length and position of the boat ramp (Reference 12).

Alternative 1 - This alternative consists of a 285-foot breakwater to protect a boat ramp, along with a wave absorber, turning basin and entrance channel (Fig. 2). The breakwater would be constructed of basalt rock, capped with 1-3 ton armor stones, 6.5 and 30 ton dolos and concrete ribs. The breakwater would be approximately 125 feet wide at the base and would have a crest elevation of 15 feet above mean lower low water (MLLW). The entrance channel would be 90 feet wide, with a depth of 9 feet below MLLW, and the turning basin would be 100 feet square, dredged to 7.5 feet below MLLW. The wave absorber would be constructed of 2-3 ton stones, and would be approximately 60 feet long and 25 feet wide.



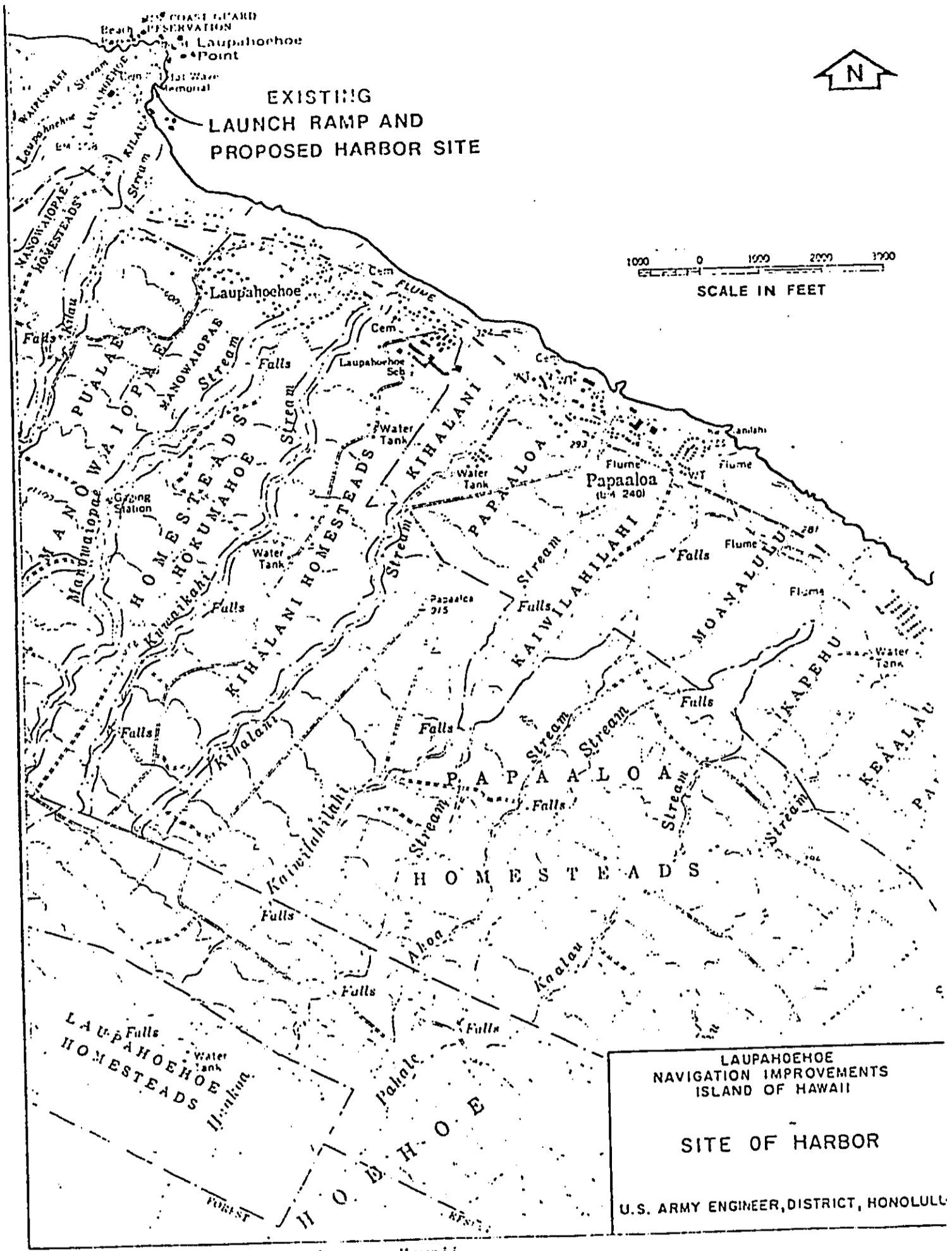


Figure 13. Harbor Area, Island of Hawaii. F-17

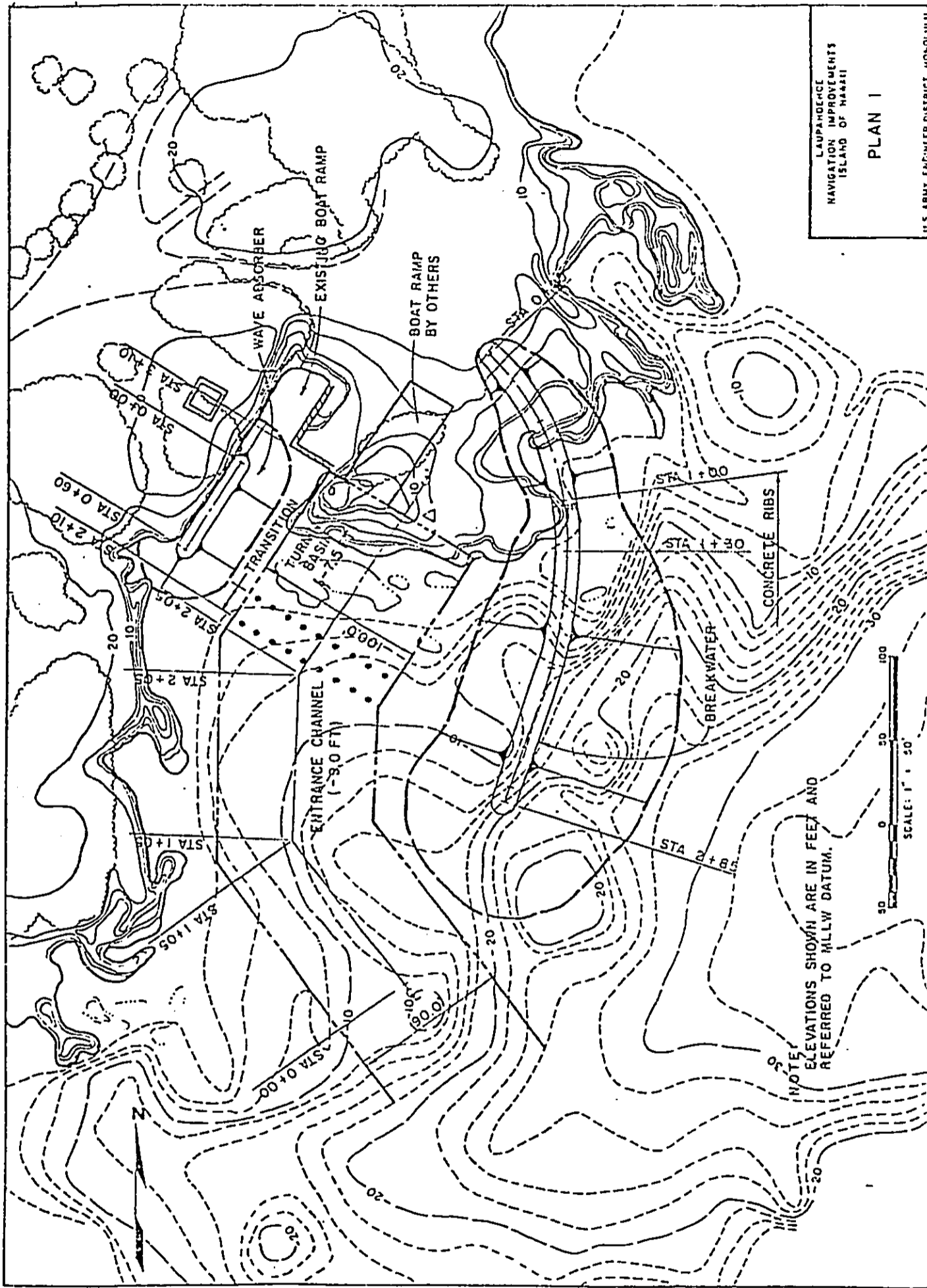


Figure 2. Alternative 1 design layout.

Alternative 2 - This is similar to Alternative 1; however, the location of the boat ramp would be different (Fig. 3). The breakwater would be approximately 255 feet long, 130 feet wide and would have a crest elevation of 15 feet. The entrance channel would be 90 feet wide for part of its length and 100 feet wide for the rest, with a depth of 9 feet below MLLW. The turning basin would be 100 feet wide, varying in length from 100 to 170 feet, with a depth of 7.5 feet. The wave absorber would be 60 feet long and 60 feet wide. Materials for the breakwater and wave absorber would be the same as for Alternative 1.

Alternative 3 (Selected Plan, NED Plan) - This alternative is similar to Alternatives 1 & 2 (Fig. 4). The breakwater would be 200 feet long, 125 feet wide, with a crest elevation of 15 feet. The entrance would be 90 feet wide and 9 feet deep, with the turning basin 100 feet wide, varying in length from 100 to 140 feet, and 7.5 feet deep.

Rock and concrete material will be obtained from either a Hilo commercial quarry or the stockpile at Honokohau Harbor. Armor stone sizes of 5 to 10 tons will be required. Material excavated onsite will be used as causeway fill and chinking material. Dredged material will be disposed of at an approved site located nearby (approximately 5 miles) from the project.

TERRESTRIAL AND AQUATIC RESOURCES WITHOUT THE PROJECT

Terrestrial flora at the site is characteristic of well manicured coastal parklands and consists principally of ironwood (Casuarina equisetifolia), naupaka (Scaevola taccada), beach morning glory (Ipomoea pes-caprae), coconut palm (Cocos nucifera), common strand plants and lawn grasses. Rock outcrops are sparsely vegetated.

Small wave-washed basins along the shoreline form intertidal habitat for typical alga, crustacean, mollusk and juvenile fish populations. Coastal currents along the Hamakua coast are believed to have a northwesterly set (Reference 7). Extensive water quality studies were conducted along the Hamakua coast adjacent to the Honokaa, Olokele and Pioneer sugar mills in 1970 by the Environmental Protection Agency (Reference 2). Data acquired for this study reflect water quality conditions prior to the cessation of bagasse (cane trash) discharge into the sea, and are not directly applicable to Laupahoehoe. A brief study performed in 1974 (Reference 10) reported salinity, temperature, total nitrogen and phosphorus, and turbidity from nearshore waters at the tip of the peninsula. These data were within acceptable limits of State water quality standards.

Water clarity during our June 1982 underwater survey was excellent, with an estimated horizontal visibility of some 70 feet. Unusually calm seas prevailed during this period (Figures 5-7). High seas and prolonged heavy rains created poor water quality conditions at the time of our August 1982 field reconnaissance. Apparent color of the waters at the proposed project site was chocolate brown due to sediment-laden stream runoff. Aquatic species recognized during our June 1982 reconnaissance are listed in Appendix 1 (also see Figures 6, 7 and 8). Waters at the site of the proposed navigation improvements at Laupahoehoe harbor held a surprising abundance of invertebrate

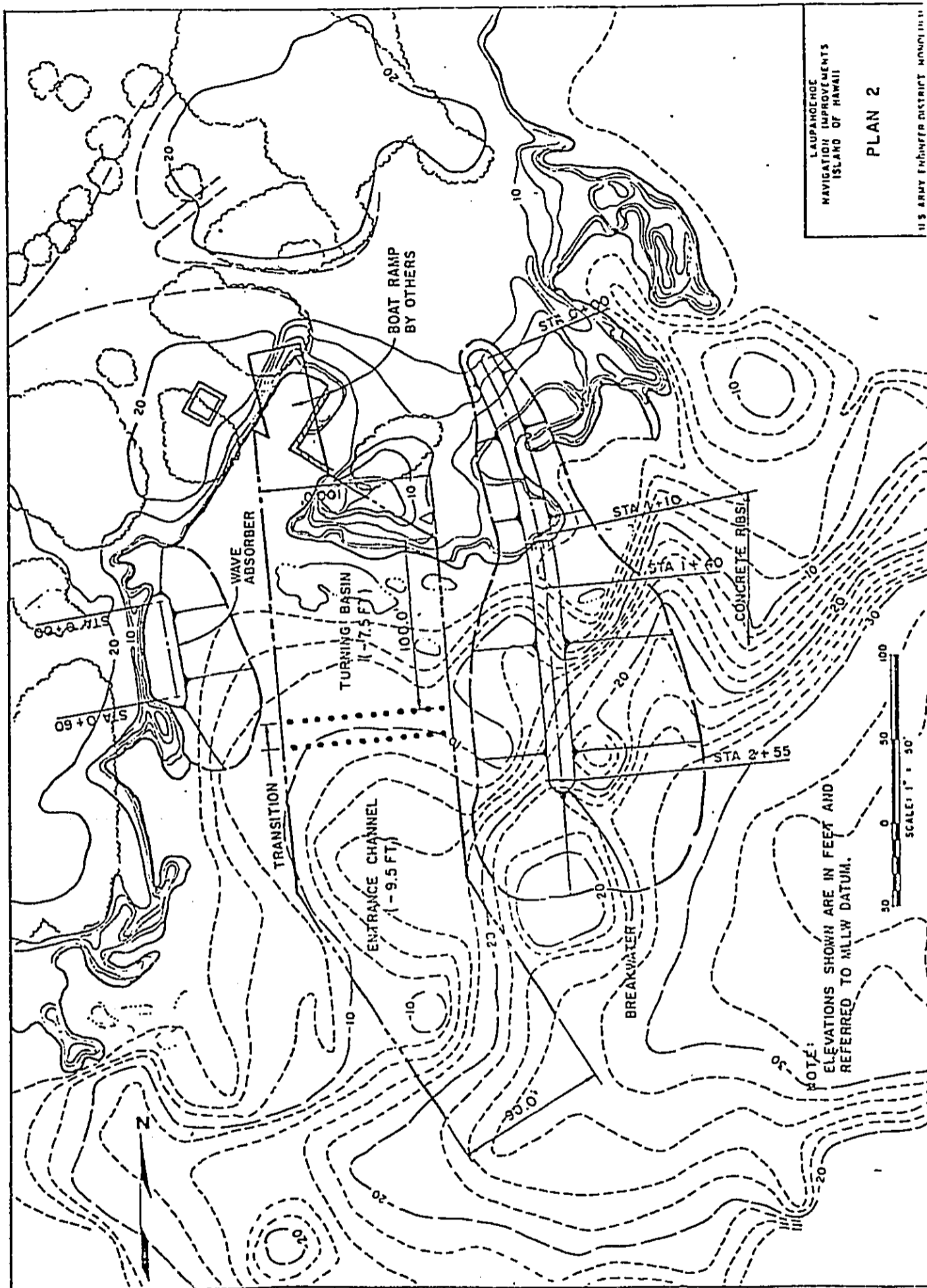


Figure 3. Alternative 2 design layout.

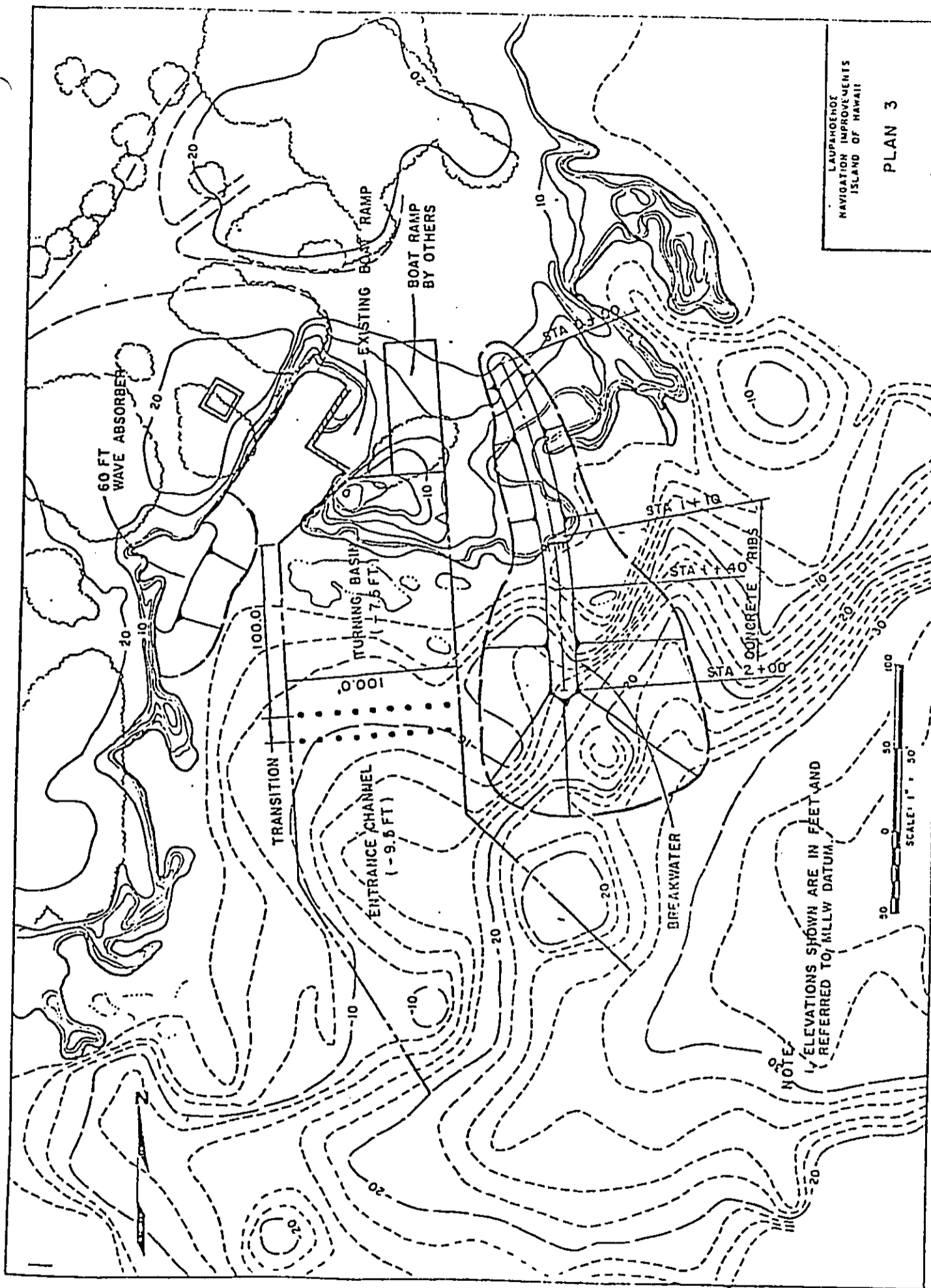


Figure 4. Alternative 3 design layout.

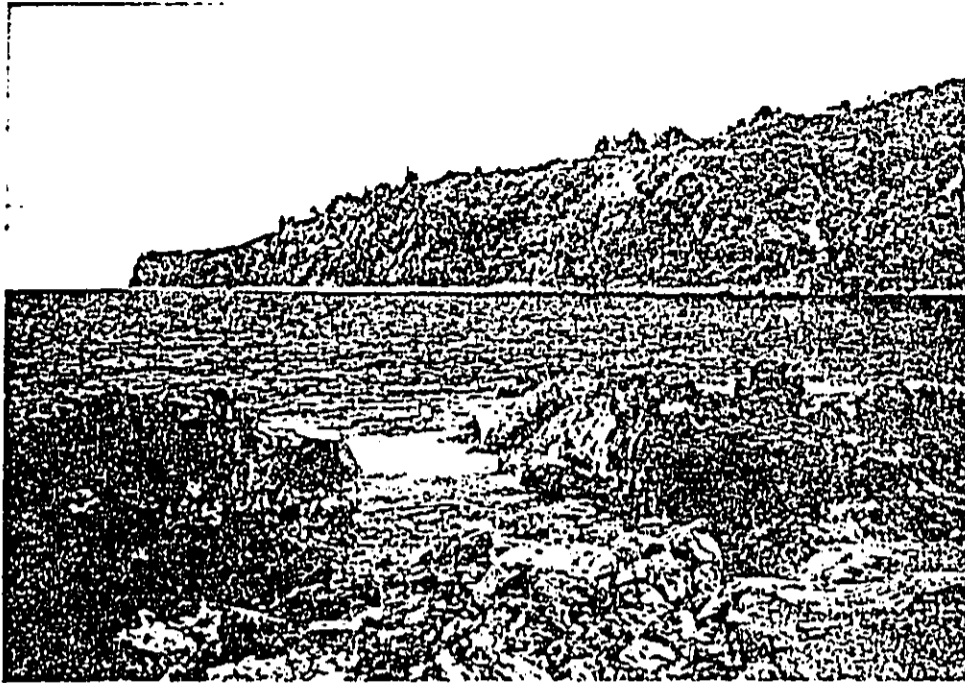


Figure 5. View of the nearshore area at Laupahoehoe where the proposed breakwater will be located. Photograph was taken from the parking area above the existing boat ramp.

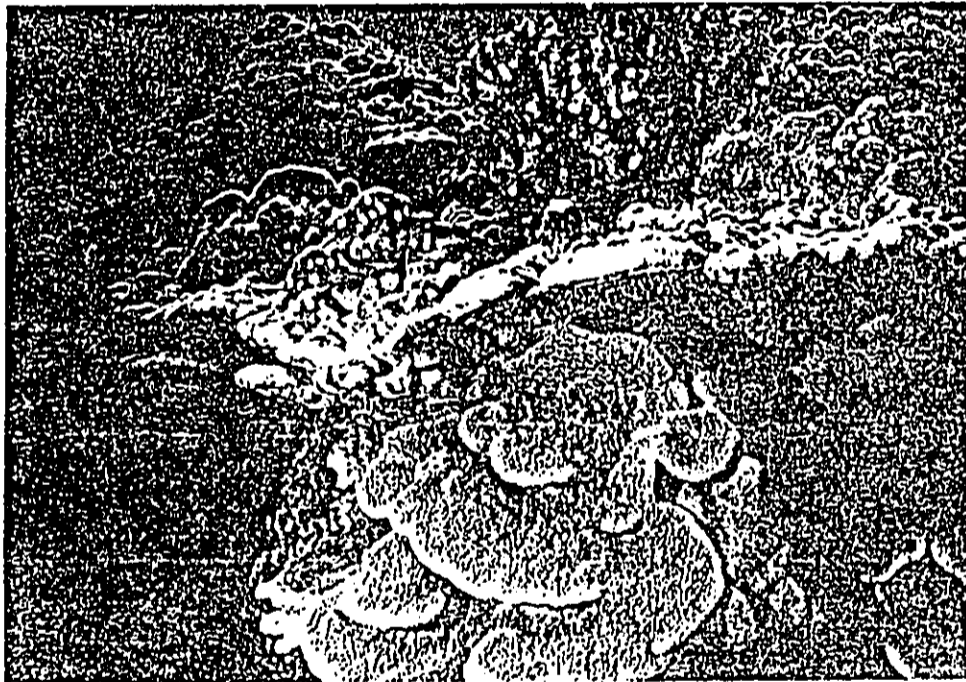


Figure 6. A diversity of reef corals exists at Laupahoehoe within the shallow water area designated for navigation improvements.

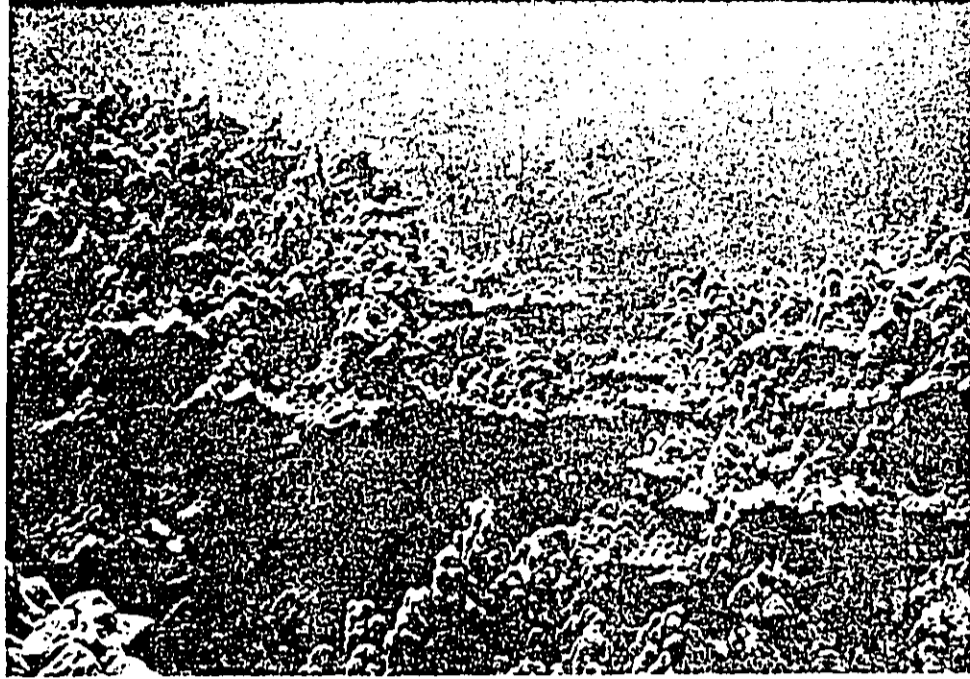


Figure 7. Massive stands of reef corals, such as this Porites sp., are found throughout the project area at depths of 15-25 feet.

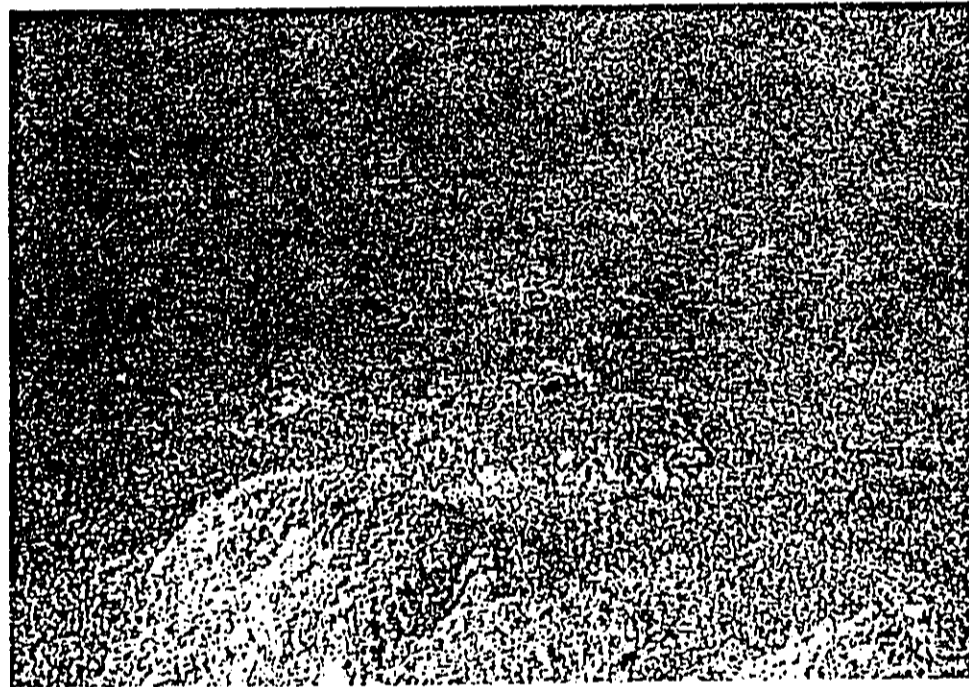


Figure 8. At a depth of approximately 30 feet, the bottom consists of dead coral boulders, rocks, cobbles and coarse sand.

and fishery resources. None of the fishes or invertebrates observed here are limited to the study area, or represent National Species of Significant Emphasis.

Reference 2 compared benthic habitat diversity and fishery resources at several locations along the Hamakua coastline in 1970, and illustrated the impacts of sediment-laden, washwater effluent from cane processing plants upon these marine resources. The only other available list of marine resources at Laupahoehoe appears in Reference 10. It is believed that the diversity and abundance of reef corals and associated fauna are greater within the project area than on the northern side of the peninsula (Reference 10).

The Threatened Green Sea Turtle (Chelonia mydas) and Endangered Hawksbill Turtle (Eretmochlys imbricata) have been observed on the reefs along the Hamakua coast (including the project area). No nesting habitat is known to exist within the Laupahoehoe area. Endangered Humpback whales (Megaptera novaeangliae) pass offshore between November and May.

Commercial fishery catch statistics developed by the State Division of Aquatic Resources, Department of Land and Natural Resources (Reference 9), were collated for the years 1972-1981 (Appendix 2). Records indicated that Menpachi (Myripristis murdjan and M. amaenus), Ono (Acanthocybium solandri) Kumu (Parupeneus porphyreus) and Opihi (Cellana exarata) were important for commercial fisheries in the nearshore area at Laupahoehoe. Ahi (Thunnus albacares, T. obesus, T. alalunga), Aku (Katsuwonus pelamis), Mahimahi (Coryphaena hippurus), Ono, Opakapaka (Pristipomoides filamentosis), Striped Marlin (Tetrapterus audax), and Kuahonu (Portunus sanguinolentus) represented important offshore resources.

TERRESTRIAL AND AQUATIC RESOURCES WITH THE PROJECT

Construction related impacts will result primarily from (1) fill associated with breakwater and wave absorber construction, (2) blasting and dredging of the turning basin, and (3) excavation of land for the shoreside facilities.

The most significant irreversible losses associated with the proposed project will be the destruction of reef corals and benthic fauna during construction of the proposed breakwater and turning basin. The fill and armor stone will cover benthic organisms. The Alternative 3 breakwater is shorter than that of Alternatives 1 & 2 and would result in less destruction of shallow water corals and benthic organisms. The total loss of marine benthic habitat is expected to encompass roughly 1.1 acres with Alternative 1, .80 acres with Alternative 2, and .56 acres with Alternative 3. Alternative 3 (the Selected Plan) would require the least amount of dredging and the least area for breakwater construction. The outermost end of the breakwater is expected to lie over an area of coarse sand. However, COE geotechnical investigations found that the bottom in the proposed project area was free of sediments due to strong wave action. It is likely that basalt gravel, cobbles and coarse sand will periodically accumulate in the area. The breakwater will replace the natural basalt habitat within the intertidal zone. The new breakwater will provide suitable habitat for colonization of coralline algae,

filamentous algae and benthic invertebrates. Some fishes will utilize interstices for shelter.

In addition, approximately .24 acre (Alternative 1), .16 acre (Alternative 2), and .23 acre (Alternative 3) of terrestrial habitat would be removed to accommodate the turning basin and boat ramp. This area includes a small, shaded knoll overlooking the existing launching ramp which is a very popular location for picknickers and sunbathers.

Water clarity will be temporarily degraded during construction. Blasting, dredging and land excavation will suspend fine sediments in the water column which may stress adjacent areas if sediments are not confined to the construction site. Suspended sediment effects would be most significant on juvenile stages and benthic organisms (Reference 6). Significant degradation of dissolved oxygen concentrations, nutrient levels and pH is not anticipated due to the low organic content of basaltic material to be excavated. Plan 2 would require the least land excavation. Because the surrounding shoreline areas consist of solid lava, no adverse effects due to changing current patterns, erosion or accretion are expected.

Construction may interfere with recreational activities at the site and may temporarily reduce shore fishing success. Dislodged organisms and noise created by blasting and dredging will attract predatory fishes into the vicinity of the project.

The completed breakwater and wave absorber will provide approximately .29 acre (Alternative 1), .23 acre (Alternative 2) and .13 acre (Alternative 3) of intertidal habitat which will be suitable for colonization by algae and sessile invertebrates. Communities which may develop would be those characteristic of adjacent intertidal and subtidal rocky shoreline. The interstices within the armor stone and dolos will serve as shelter for several species of reef fishes, and may enhance recreational fishing opportunities at the site. Reduced wave action behind the breakwater may allow some accretion of coarse basalt and marine materials. Reduced surge may facilitate coral recolonization in dredged areas.

The Corps has estimated that the proposed improvements will provide reduction of damages to fishing boats, increase in net value of fish catch, and enhanced safety. Approximately 274 days per year for safe launching and recovery (a 375% increase over present conditions) and an additional 728 fishing trips are anticipated with the improvements. Increased fish catch attributable to these improvements would result in an overall enhancement of commercial and recreational fisheries in East Hawaii. The net benefit from increased fish catch is estimated to be \$158,000. Along with the associated benefits afforded by a safe launching and retrieval facility, the proposed harbor will assist rescue operations by the County Fire Department.

RECOMMENDATION

Impacts of the three alternatives for Laupahoehoe navigational improvements would not significantly differ. Alternative 3 would allow more shallow water

habitat to be left intact while Alternative 2 would allow shoreline and land to be conserved. The Service does not object to any of the alternatives, and we concur with the selection of Alternative 3.

The habitat and marine reef-dwelling organisms to be affected by the project are well represented throughout Hawaiian coastal waters. None of the organisms inhabiting the affected reef are known to be endemic to the Laupahoehoe area.

The Service recommends that the Corps adopt the following measures to lessen project-related effects upon the marine resources within the project area:

1. The National Marine Fisheries Service be consulted if blasting may be used during construction and their recommendations concerning the timing and size of blasts must be adhered to.
2. Silt retention screens should be utilized where practical to limit the dispersal of suspended sediments during blasting, dredging and filling activities.
3. Visual surveys should be conducted immediately prior to blasting to insure that no endangered or threatened species and marine mammals are within the area which might be affected by the blasts.
4. Care should be exercised during construction to prevent runoff of petroleum products into the water.
5. Dredged material should be maintained behind berms to prevent silt-laden runoff from reentering the water. No stockpiling of dredged material in the water should be permitted.

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12. U.S. Army Corps of Engineers, Honolulu District. 1983. Laupahoehoe Point draft detailed project report and environmental impact statement.
13. U.S. Army Corps of Engineers, Honolulu District. 1982. Laupahoehoe Point Reconnaissance Report.

Appendix 1. Common marine resources observed during a field reconnaissance dive at Laupahoehoe Point, June 1982 (excludes infauna). U.S. Fish and Wildlife Service, Honolulu, Hawaii. Taxonomy for fishes and invertebrates based on References 4 and 11.

MARINE PLANTS

Asparagopsis taxiformis

Boodlea composita

Dictyota acutiloba

Galaxura rugosa

Porolithon gardineri

Porolithon onkodes

Ralfsia pangoensis

Ulva fasciata

CORALS AND COELENTERATES

Montipora verrilli

Palythoa tuberculosa

Pocillopora damicornis

Pocillopora meandrina

Porites compressa

Porites lobata

Porites spp.

Acanthurus triostegus

Naso unicornis

Naso lituratus

Zebrasoma veliferum

Apogonidae

Apogon spp.

Blenniidae

Canthigaster amboinensis

Canthigaster epilampra

Canthigaster jactator

Cirripectes vanderbilti

Ostracion meleagris

Plagiotremus ewaensis

Pranesus insularum

Scomberoides santi-petri

Sufflamen bursa

Chaetodontidae

Chaetodon auriga

Chaetodon fremblii

Chaetodon lunula

Chaetodon miliaris

Chaetodon multicinctus

Chaetodon ornatissimus

Chaetodon quadrimaculatus

HOLOTHURIANS

Actinopyga mauritiana

Colobocentrotus sp.

Diadema paucispinum

Echinometra mathei

Eucidaris metularia

Heterocentrotus mammilatus

Holothuria atra

Holothuria sp.

Ophiocoma spp.

Tripneustes gratilla

MOLLUSKS

Cellana exarata

FISHES

FAMILY NAME

SCIENTIFIC NAME

Acanthuridae

Acanthurus dussumieri

Acanthurus leucoparrieus

Acanthurus mata

Acanthurus nigrofuscus

	<u>Chaetodon unimaculatus</u>
	<u>Forcipiger flavissimus</u>
Cirrhitidae	
	<u>Para cirrhites arcatus</u>
	<u>Para cirrhites forsteri</u>
	<u>Cirrhitops fasciatus</u>
Exocoetidae	
	<u>Fistularia petimba</u>
Holocentridae	
	<u>Adioryx diadema</u>
Kyphosidae	
	<u>Kyphosus bigibbus</u>
Labridae	
	<u>Bodianus bilunulatus</u>
	<u>Cephalopholis argus</u>
	<u>Coris ballieui</u>
	<u>Coris flavovittata</u>
	<u>Coris gaimard</u>
	<u>Labroides phthirophagus</u>
	<u>Pseudocheilinus octotaenia</u>
	<u>Stethojulis balteata</u>
	<u>Thalassoma duperrey</u>
	<u>Thalassoma fuscum</u>
Lutjanidae	
	<u>Lutjanus kasmira</u>

Mullidae

Parupeneus bifasciatus

Parupeneus porphyreus

Pomacentridae

Abudefduf abdominalis

Plectroglyphidodon imparipenis

Stegastes fasciolatus

Scaridae

Scarus perspicillatus

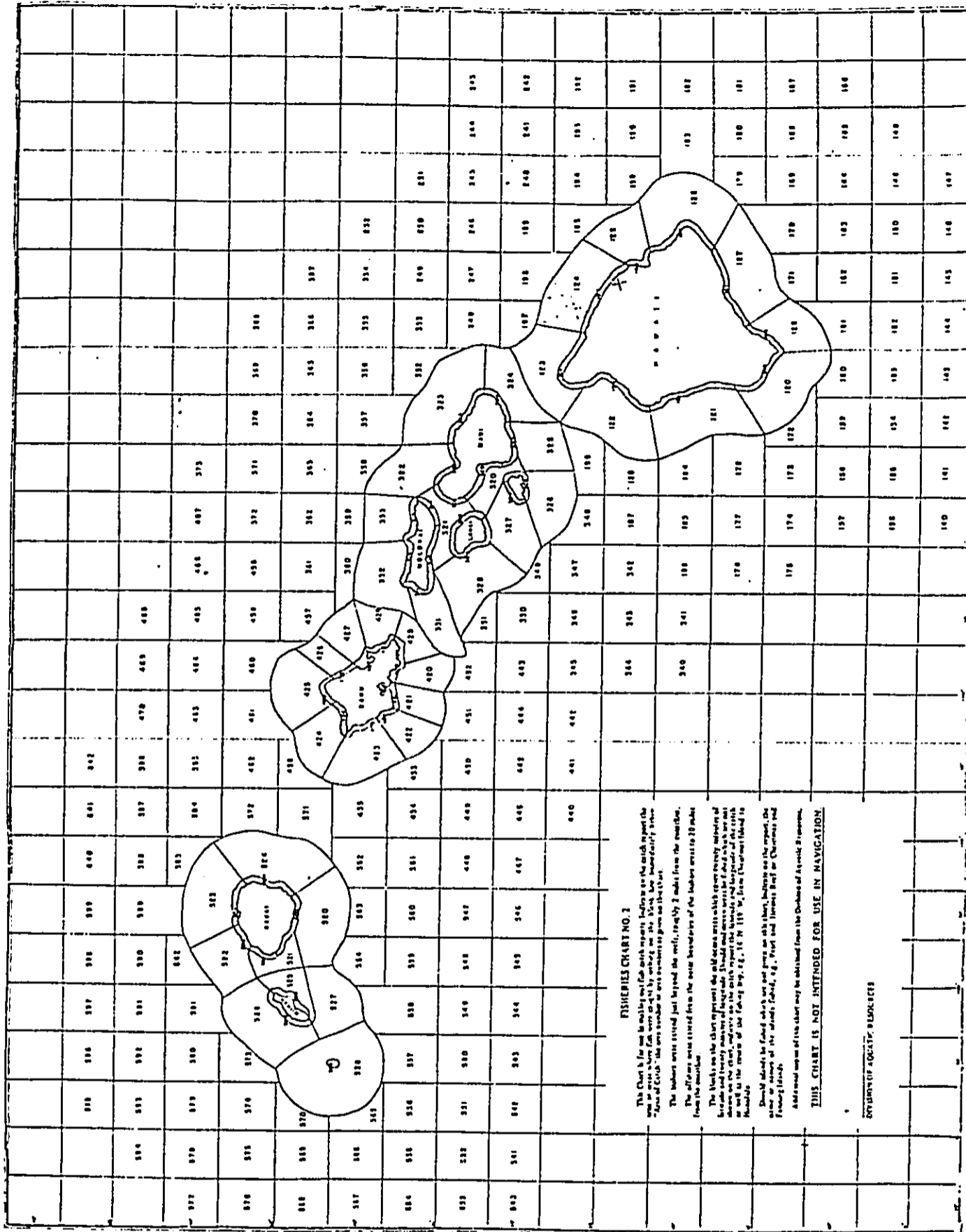
Sparidae

Monotaxis grandoculis

Zanclidae

Zanclus canescens

Appendix 2. Department of Land and Natural Resources, Division of Aquatic Resources Commercial Fishery Catch Statistics of the Laupahoehoe inshore (area # 104) and offshore (area # 124) sectors for the years 1972 to 1981.





United States Department of the Interior

FISH AND WILDLIFE SERVICE

300 ALA MOANA BOULEVARD
P. O. BOX 50167
HONOLULU, HAWAII 96850

MAY 13 1982

IN REPLY REFER TO:
ES
Room 6307
1-2-82-SP-206

7/19
PV
PJ
WR

MAY 17 1982

Mr. Kisuk Cheung
Chief, Engineering Division
U.S. Army Engineer District, Honolulu
Ft. Shafter, Hawaii 96858

Dear Mr. Cheung:

This replies to your request of April 29, 1982 for information on endangered or threatened species, listed or proposed, which may be present at the site of the proposed Laupahoehoe Navigation Improvement Study.

To the best of our knowledge, there are no endangered or threatened species, listed, proposed, or candidate for listing present in the proposed project area.

Thank you for sharing our concern for conserving listed species.

Sincerely yours,

Pacific Islands Administrator



Save Energy and You Serve America!

F-34

PCDEB-PV

14 December 1982

Mr. Gerald V. Howard
Regional Director, SW Region
National Marine Fisheries Service, NOAA
300 South Ferry Street
Terminal Island, CA 96731

Dear Mr. Howard:

This letter forwards the US Army Corps of Engineers biological assessment on the effects of the proposed Launahoehoe Navigation Improvements project on the endangered Humpback Whale and the threatened Green Sea Turtle. The assessment fulfills the requirements of Section 7 of the Endangered Species Act of 1973, as amended. Based on our biological assessment (Incl 1) we believe that the proposed navigation improvement project at Launahoehoe, Hawaii will not effect the two species, nor result in the destruction or adverse modification of their respective habitats. We request that your office provide us a response to the biological assessment by 15 January 1983 so that we may meet our schedule for completion of the study.

If you have any questions, please contact Mr. William Lennan, Environmental Resources Section at (808) 432-2264.

Sincerely,

1 Incl
As stated

HISUK CHEUNG
Chief, Engineering Division

FOUOED-PV

14 December 1982

Mr. Gerald V. Howard
Regional Director, SM Region
National Marine Fisheries Service, NOAA
300 South Ferry Street
Terminal Island, CA 95731

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Sincerely,

1 Incl
As stated

KISUK CHEUNG
Chief, Engineering Division

ENDANGERED SPECIES BIOLOGICAL ASSESSMENT
FOR LAUPAHOEHOE NAVIGATION IMPROVEMENTS

1. Background Information

a. Project Description: The recommended navigation improvement plan at Laupahoehoe, Hawaii, consists of dredging an approximately 150-foot-long, 80-foot-wide and 9-foot-deep entrance Channel; a 100-foot X 100-foot turning basin, 7.5 feet deep; and a 300-foot-long breakwater, with a crest elevation of 11.5 feet. Much of the breakwater will be on lava rock which is in the "splash zone", above high tide. When completed, the navigation improvement will encompass a total area of 1 acre.

b. National Marine Fisheries Service informed the Corps that the federally listed endangered Humpback whale and the threatened Green Sea Turtle are found on the Hamakua Coast. Although the Green Sea Turtle is commonly observed feeding along the Hamakua Coast, that area has not been identified as an important feeding foraging area in Synopsis of Biological Data on the Green Turtle in the Hawaiian Islands, George H. Balazs, Hawaii Institute of Marine Biology, September, 1979, nor were turtles observed during site surveys in June and August, 1982. The Humpback Whale is sometimes sighted along the Hamakua Coast. They were seen on 2 of 15 dates documented in The 1976/77 Migration of Humpback Whales into Hawaiian Waters: Composite Description, Louis M. Herman et al., University of Hawaii, for the Marine Mammal Commission, April, 1980.

2. Impact Assessment

Dredging the entrance channel and turning basin will remove very little turtle foraging area, since much of the area to be dredged is already at or below -9 feet MLLW, or is presently fast land. Additionally, no significant stands of algae preferred by the Green Turtle were observed during the site surveys. Because of the large amount of human activity associated with the project area at the present time it is doubtful if turtles would utilize the very small amount of Ulva fasciata observed near the present boat ramp. The noise associated with dredging the turning basin and entrance channel, especially if explosives were used, could disturb Humpback whales if there were any in the vicinity. Studies of Humpbacks indicated very few whales are seen in the area of the project (Figure 1). To insure the whales will not be disturbed during their calving/breeding season, the dredging contract will specify no blasting from 1 November thru 31 May. After completion of the project there may be an increase in the number of fishing trips by local hunters, however, because of the small number of whales utilizing this area, no increase in whale/boat contact is expected.

3. Conclusion

Due to the nature and location of the project, and the sparse populations of whales and turtles (and turtle food) in the immediate project area, coupled with the limitation on blasting during the whale season, it is our conclusion that the Navigation Improvements project at Laupahoehoe will not have an effect on either the endangered Humpback Whale or the threatened Green Sea Turtle.

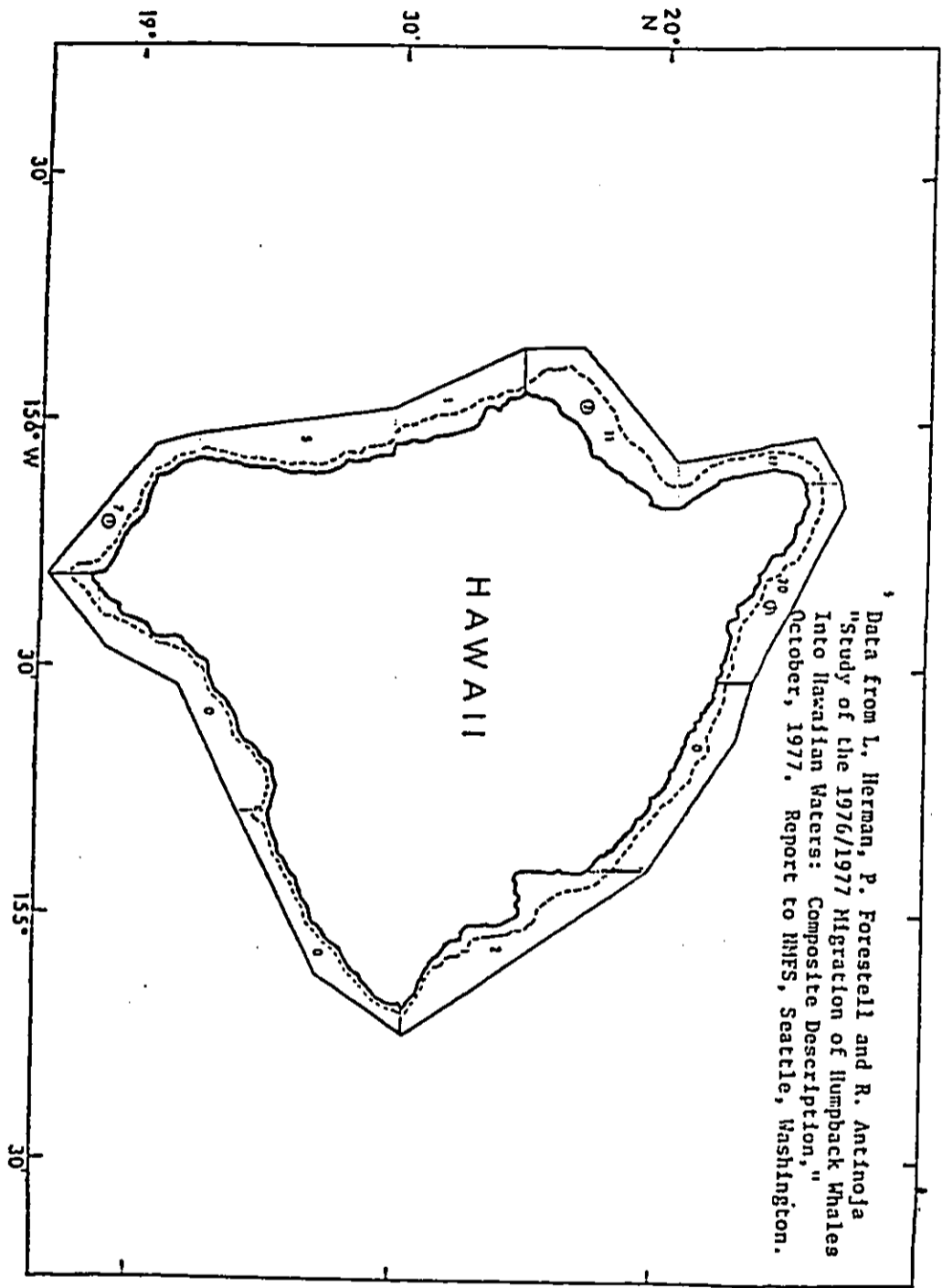


Fig. 1. The total number of whales and calves seen in each indicated subregion of Hawaii over all chartered aircraft surveys. The total of whales and calves is shown by the uncircled numbers. The subtotal of calves is shown by the circled numbers.

ENDANGERED SPECIES BIOLOGICAL ASSESSMENT
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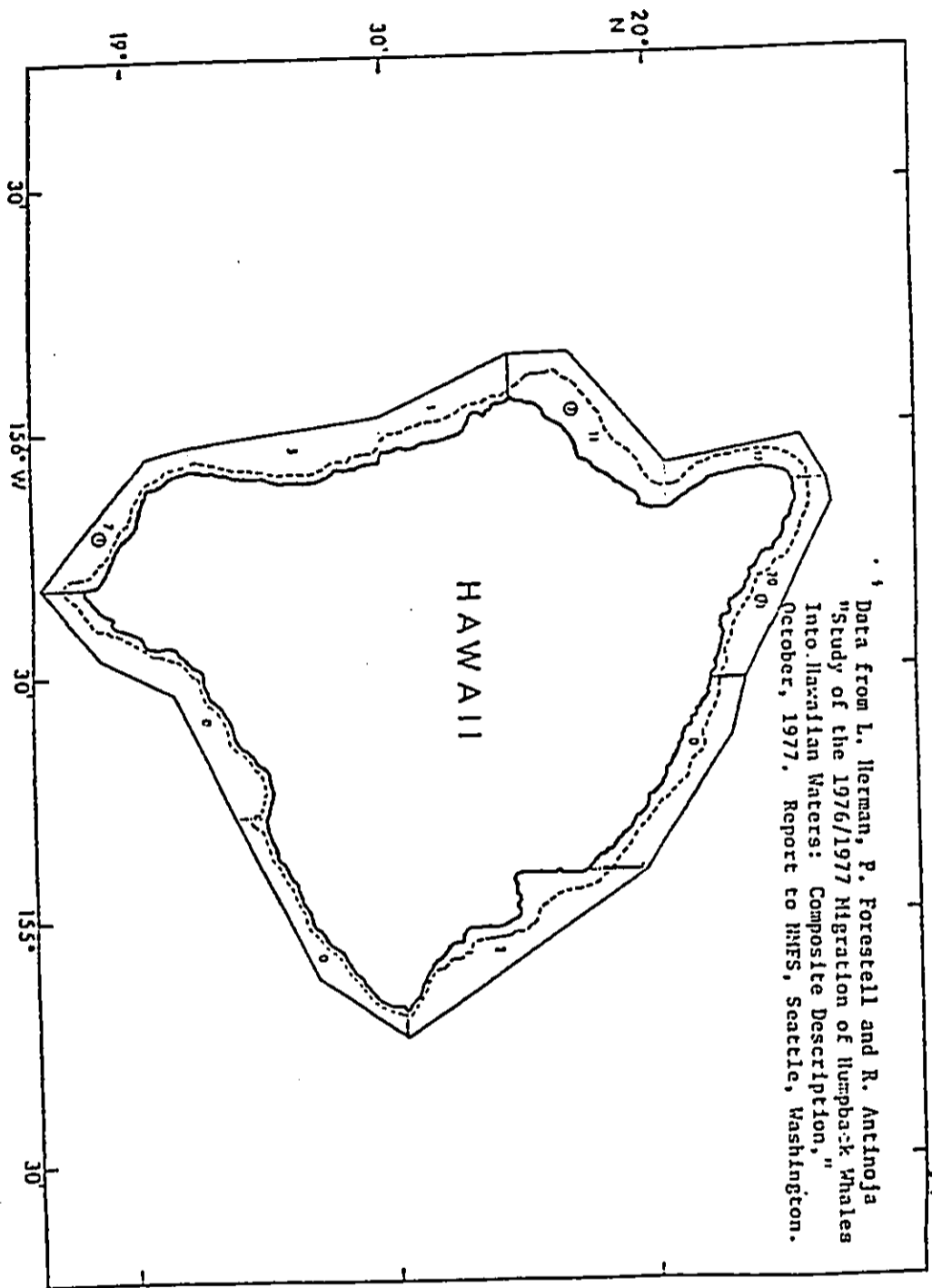


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**CULTURAL
RESOURCES**

Appendix G

APPENDIX G
CULTURAL RESOURCES

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I	HISTORIC SITE SURVEY	G-3



DEPARTMENT OF THE ARMY
PACIFIC OCEAN DIVISION, CORPS OF ENGINEERS
FT. SHAFTER, HAWAII 96858

REPLY TO
ATTENTION OF

December 8, 1983

Mr. Susumo Ono
Hawaii State Preservation Officer
Department of Land and Natural Resources
Post Office Box 621
Honolulu, Hawaii 96809

Dear Mr. Ono:

The Corps of Engineers is in the final stages of the Laupahoehoe Navigation Improvements Study to determine the feasibility of providing light-draft navigational improvements at Laupahoehoe, Hawaii.

We are enclosing the Draft Detailed Project Report and Environmental Impact Statement for this study for your comment and review.

In compliance with the National Historic Preservation Act of 1966, as amended, and the Reservoir Salvage Act of 1960, as amended, we undertook a Historic Resources Site Survey of the project area. We enclose a copy of that reconnaissance report for your information.

We would appreciate receiving your comments on the draft report by January 26, 1984 so that we can fully address your concerns in the Final Report and Environmental Impact Statement.

Sincerely,

Kisuk Cheung
Chief, Engineering Division

Enclosures

Copy Furnished:

Pacific Area Director
US Department of the Interior
National Park Service
Box 50165
Honolulu, Hawaii 96850

G-1



DEPARTMENT OF THE ARMY
PACIFIC OCEAN DIVISION, CORPS OF ENGINEERS
FT. SHAFTER, HAWAII 96858

December 8, 1983

REPLY TO
ATTENTION OF

Mr. Garland Gordon
The Inter Agency Archaeological Services
National Park Service
450 Golden Gate Avenue
Box 36063
San Francisco, California 94102

Dear Mr. Gordon:

The Corps of Engineers is in the final stages of the Laupahoehoe Navigation Improvements Study to determine the feasibility of providing light-draft navigational improvements at Laupahoehoe, Hawaii.

We are enclosing the Draft Detailed Project Report and Environmental Impact Statement for this study for your comment and review.

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Sincerely,

Kiuk Cheung
Chief, Engineering Division

Enclosures

Copy Furnished:

Pacific Area Director
US Department of the Interior
National Park Service
Box 50165
Honolulu, Hawaii 96850

PODED-PV

SUBJECT: Reconnaissance of Historic Resources for the Laupahoehoe Navigation Improvements Project, Laupahoehoe Point, Hawaii

1. INTRODUCTION

The purpose of this literature survey and field investigation was to identify the presence or absence of any cultural resources in the area that is being considered for the proposed replacement of the damaged Laupahoehoe Boat Ramp at Laupahoehoe Point, Island of Hawaii. The field investigation for this study was undertaken on 29 September 1982 by David W. Cox, Archaeological Technician for the Corps of Engineers, Honolulu District,.

2. METHODS

a. A literature search was undertaken at the University of Hawaii Hilo College Library's Special Collection Section, the Hilo Public Library, and the Lyman House Museum Library, all in Hilo, on the 28th of September, 1982. Research was also done at the Hawaii State Archives in Honolulu. The first two Hilo libraries have indexes of their periodical and newspaper article holdings. These are still limited or incomplete but are presently being expanded. A total of 21 listings were found in those indexes for Laupahoehoe--Point, Beach or Park. The majority of these listings, however, involve the more recent memorial commemorations of the 1946 Tsunami Disaster there.

b. The field reconnaissance was conducted by one person (Cox) on foot, through the shorefront areas of the County Park property. The first of two sweeps was along the high waterline of the low, bluff-like front of the park area. This survey of the backshore started at park's south boundary line, went past the present ramp and around the point to some 100 meters to the north of the mouth of Laupahoehoe Stream (see Map 1, Inclosure 1 - Parcels 24, 26 and 38). The return sweep covered the grassy, upper-nearshore edges of the park itself, from approximately 150

SUBJECT: Reconnaissance of Historic Resources for the Laupahoehoe
Navigation Improvements Project, Laupahoehoe Point, Hawaii

meters up the stream and back around the point to the south boundary wall. This return route provided a minimum 20m wide sweep corridor. Only one clearly cultural feature was located. It was recorded with notes, sketches of profile and plan, and photos being taken. Copies of field notes, maps and photos are on hand at the Corps' Planning Branch, Honolulu.

3. BACKGROUND

In the prehistoric and historic period, this point of flat land was the site of an extensive village. The village owed its existence to the combination of being the only relatively well-protected oceanfront landing site along the otherwise steep-faced cliffs of the Hamakua coastline and the proximity of the extensive and well-watered, fertile uplands. The latter provided support for a sizable population. By the turn of this century, Laupahoehoe had become a major shipping point for the sugar industry. The only other landing place along the whole northeast or windward side of the Big Island is the Port of Hilo, some 25 miles to the southeast. This advantage disappeared when the Hawaii Consolidated Railway reached Laupahoehoe, connecting the whole coast with the protected harbor at Hilo. By 1908, most of the population and all of the businesses had moved up the hill nearer the railroad (after M. Hughes, 1980).

4. RESULTS OF LITERATURE SEARCH

a. Historic descriptions and early photographs, some taken as early as the 1870s and 1880s, indicate that the location of the present boat ramp was the site of the main landing facility for handling the lighter cargo and passengers to and from steamers anchored offshore. Photos indicate the complex consisted of a main building served by a lightrail connection to a large sugar warehouse some distance inshore and to the south along the cliff base (see Photo A, Inclosure 2). The sugar mill landing was further south beyond this warehouse. The main building was approximately in the location of the 1946 Tsunami Memorial Monument. An inclined gantry spanned the small inlet from the main building to a smaller structure at the location of the present ramp. This system provided direct overhead

SUBJECT: Reconnaissance of Historic Resources for the Laupahoehoe
Navigation Improvements Project, Laupahoehoe Point, Hawaii

access for loading and unloading the "whale boat-" type, rowed lighters in this frequently rough water landing. In addition, a number of small storage and boat sheds were located in the general area of the present ramp parking area. No remains of any of these structures are evident today.

b. Early writers such as Ellis, Hudson, and Kinney (see Refs. §8), discuss in general terms the existence of a number of heiau in the Laupahoehoe Point area. Moiapuhi Heiau was located on the "beach," to the south of the point. This would put it in the vicinity of the 1880s sugar warehouse perhaps. Another named Papaulekii was the site later picked for the Monarchy's Court House. The early lighthouse at the tip of the point (in the present park) was built near yet another, dedicated to the god Lono, and called Lonopuha. The Hakalau Heiau was described as "...near the coconut grove at the south side of the settlement," by H. Kinney (1913:13). Study of the earlier photos of the area indicate only two coconut groves, one near the boat/lighter landing and the other at the base of the bluff to the north side of the settlement (see Photo B, Inclosure 3). The grove near the boat landing site was the vantage point for an earlier view shown in Photo C (Inclosure 4). This large, glass-plate negative was taken from atop a raised pavement that is most probably the main platform of a heiau. This is the location mentioned above from Kinney for Hakalau Heiau. The concentration of religious structures in this relatively small, but strategic, valley mouth is indicative of both the area's importance and its sizable pre-contact period population.

5. RESULTS OF FIELD INVESTIGATION

a. One archaeological feature of possible significance was identified during the field reconnaissance. This sizable, rock-walled feature is located along the north bank of the Laupahoehoe Stream in an area beyond the present park, but at one time was considered as a possible alternative site for the new ramp. For a variety of reasons, this alternative site was dismissed as impractical early in the planning process.

SUBJECT: Reconnaissance of Historic Resources for the Laupahoehoe
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b. The feature presently consists of a double-walled, stepped terrace, with the walls facing the top of and parallel to the streambed. The wall starts about 50m upstream of the shoreline and extends approximately 13m along the bank. The walls are constructed of worn, mixed-size boulders stacked in mixed single- and double-course fashion to a height of a meter or less each. The upper wall is stepped back an average of a meter from the lower, and appears to rest on a soil base. The lower wall is set on the exposed soil of the bank side and is two meters above the dry stream bottom (see plan and profile sketches, copies from field notebook, p. 30, Inclosure 5). At its end the alignment along the top turns perpendicular to the stream and extends back from the stream at least two meters, thus enclosing a rough, rectangular, leveled-soil platform area about 10m in length by an undetermined width. Testing, including excavations, would be required to identify the areal extent, specific function, and use of this sizable structure. There are a number of possibilities that could be considered: a very large residence or residence compound, a stream diversion structure and/or agricultural feature, a canoe storage enclosure area or structure, or even a shrine or heiau perhaps.

6. DISCUSSION

a. In spite of a rather thorough search along the entire oceanfront and portions of the flat areas of the park near the shore, no other evidence of any prehistoric features or structures remain in the study area, other than that as mentioned above. For instance, the general area where the photos indicate the "south grove of coconuts" and, therefore, the former location of the Hakalau Heiau is presently completely flat and in open lawn. This area is now used for picnicking, camping and ball games. In addition, no known or previously-identified historic period structures or even indications of those known from the photos could be located in the area of the proposed project.

SUBJECT: Reconnaissance of Historic Resources for the Laupahoehoe
Navigation Improvements Project, Laupahoehoe Point, Hawaii

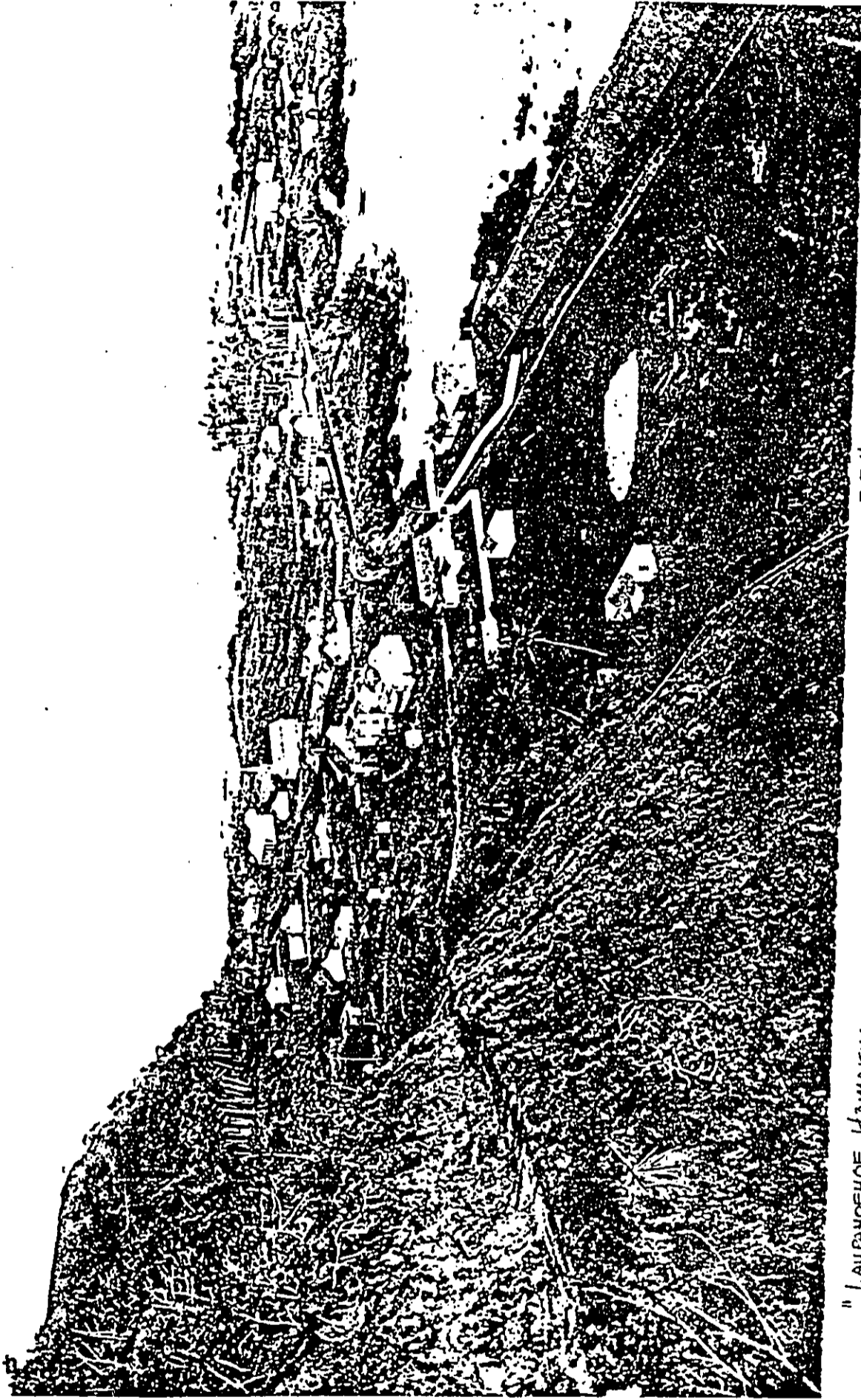
b. The irregular ridges or tongue-like outcrops of lava along the shore in the project area are well washed by storm waves. Only one small patch of soil is high enough to support vegetation in the planned construction area. This approximately 5 x 10m area is the location of the lower end of the early incline gantry. No evidence of any cultural material, or even foundations of this or other structures, were found here, however.

7. RECOMMENDATIONS

Previous changes in land use, additions, and improvements to the County and State's property, and natural events have combined to effectively remove all surface indications of any earlier prehistoric features or historic period structures within the immediate area of the proposed project. The planned construction of the breakwater and the excavation and dredging of the protected turning basin will occur almost entirely in the backshore areas near the present ramp, and offshore. This is the area of the lava ridges with tumbled boulder "beaches" between. Therefore, it is highly unlikely that the construction of the breakwater and other improvements at this location will uncover any subsurface cultural resources, or have any impact on historic or prehistoric features or properties.

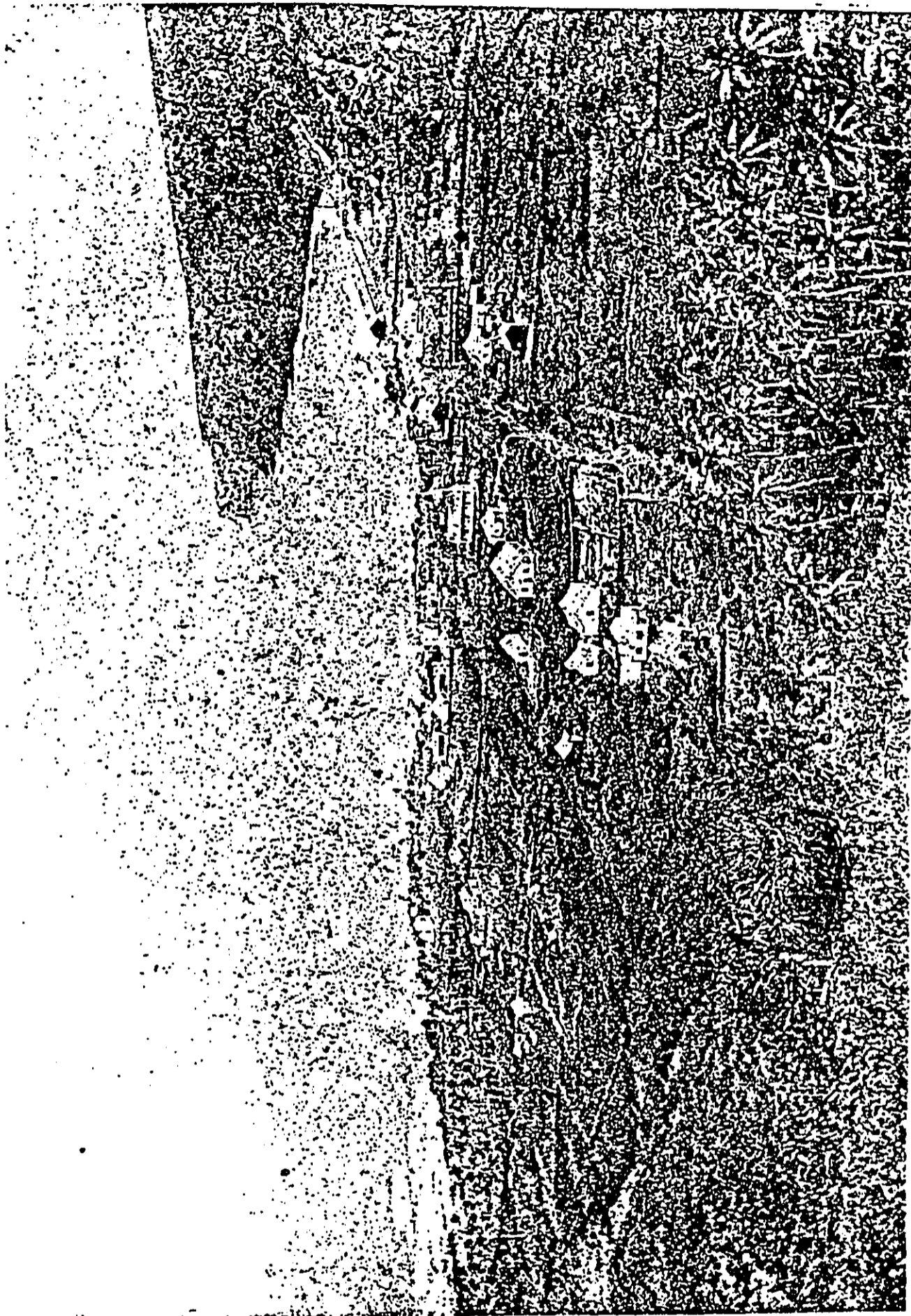
8. REFERENCES

- ELLIS, William, 1963. Narrative of a Tour of Hawaii, or Owyhee, Honolulu Advertiser Pub. Co., Honolulu
- HUDSON, Alfred E., 1932 ms. "Archaeology of East Hawaii", The B.P. Bishop Museum, Honolulu
- HUGHES, Maxine, 1980. Article "Historical Aspect of Old Laupahoehoe Mission", Hawaii Tribune Herald, p. 21, 17 June 1980, Hilo.
- KINNEY, Henry W., 1913. The Island of Hawaii. Hilo
- NEWMAN, T. Stell, et al, 1970. Bibliography of Hawaiiana. State of Hawaii, Dept. of Land and Natural Resources, Honolulu



"LAUPANOEHOE, HAMAKUA . SHOWING THE VILLAGE IN THE EARLY 1800'S"
(FROM THE MONSIEUR COLLECTION)

THE HAWAII STATE ARCHIVES COLLECTION
NEG. NO. 16733

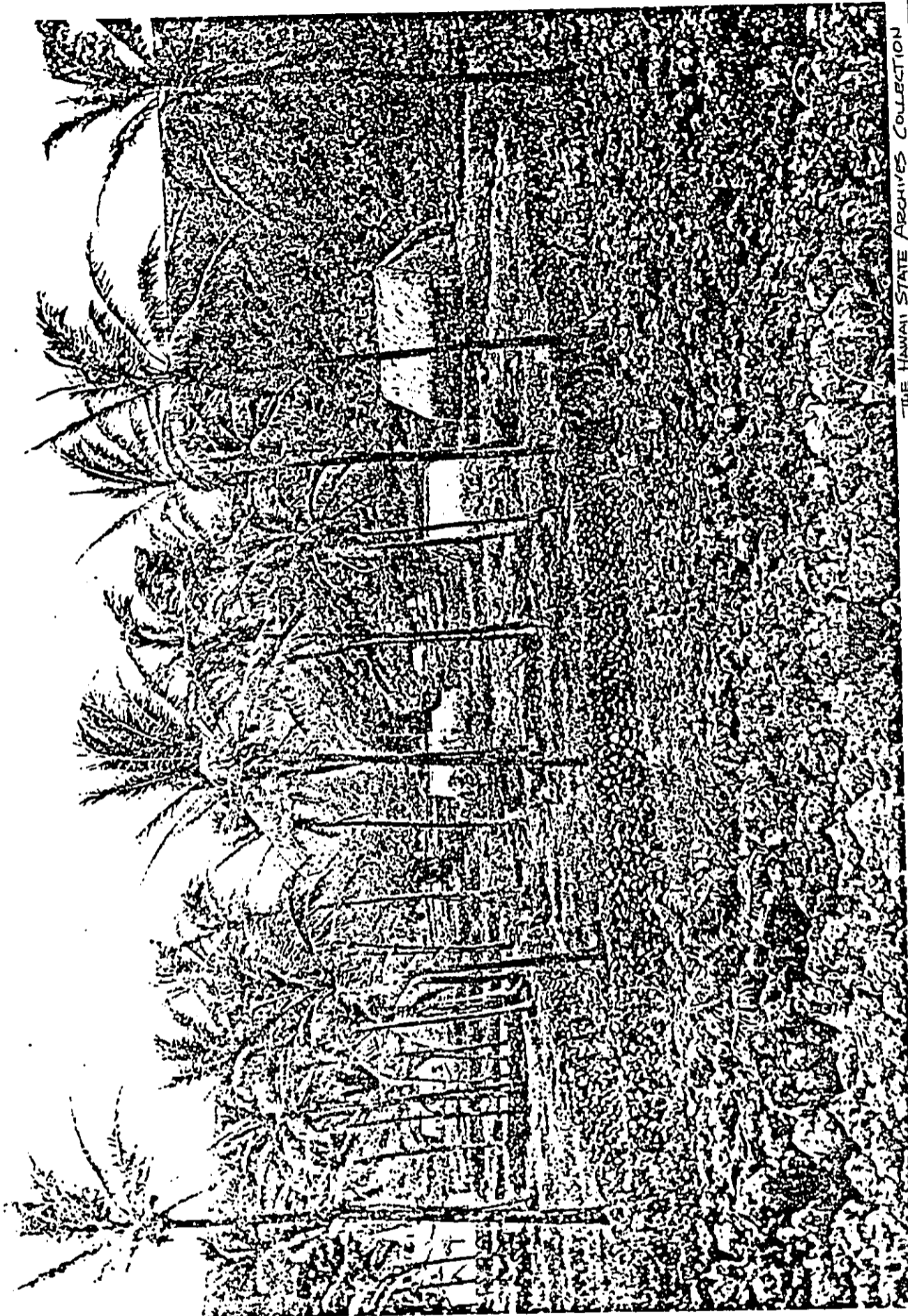


THE HAWAII STATE ARCHIVES COLLECTION

"LAIPANDEHOE"
(FROM THE MONSARRAT COLLECTION)

6-10

ENCL 3 PHOTO B



THE HAWAII STATE ARCHIVES COLLECTION

"LAIPAHOE GULCH, HAWAII: SHOWING COCONUT TREES AND GRASS HOUSES" (ca 1870s)

29

23 SEPT / PM CONT.

WAIKATO SIDE

- NICE STEPPED WALL, TERRACE FACING STREAM
BEDS JUST WHERE DEEP LAST IRONWOODS -

- STREAM DRY - UP ABOUT 50-60 M FROM
SHORE

- SINGLE WALL, SLIGHTLY HIGHER BANK, HILLS.

WIDE AND RAFTERS TUMBLED DOWN ALONG

WAIKATO END, STILL IN GOOD SHAPE AT

WAIKATO END - 20M LONG

2 SMALL SILLED CONCRETE FOUNDATIONS

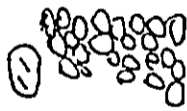
BEHIND WALL



- BACK TOWARD RAMP PARKING

- SMALL POSSIBLE FURNACE 2 M X 3 M

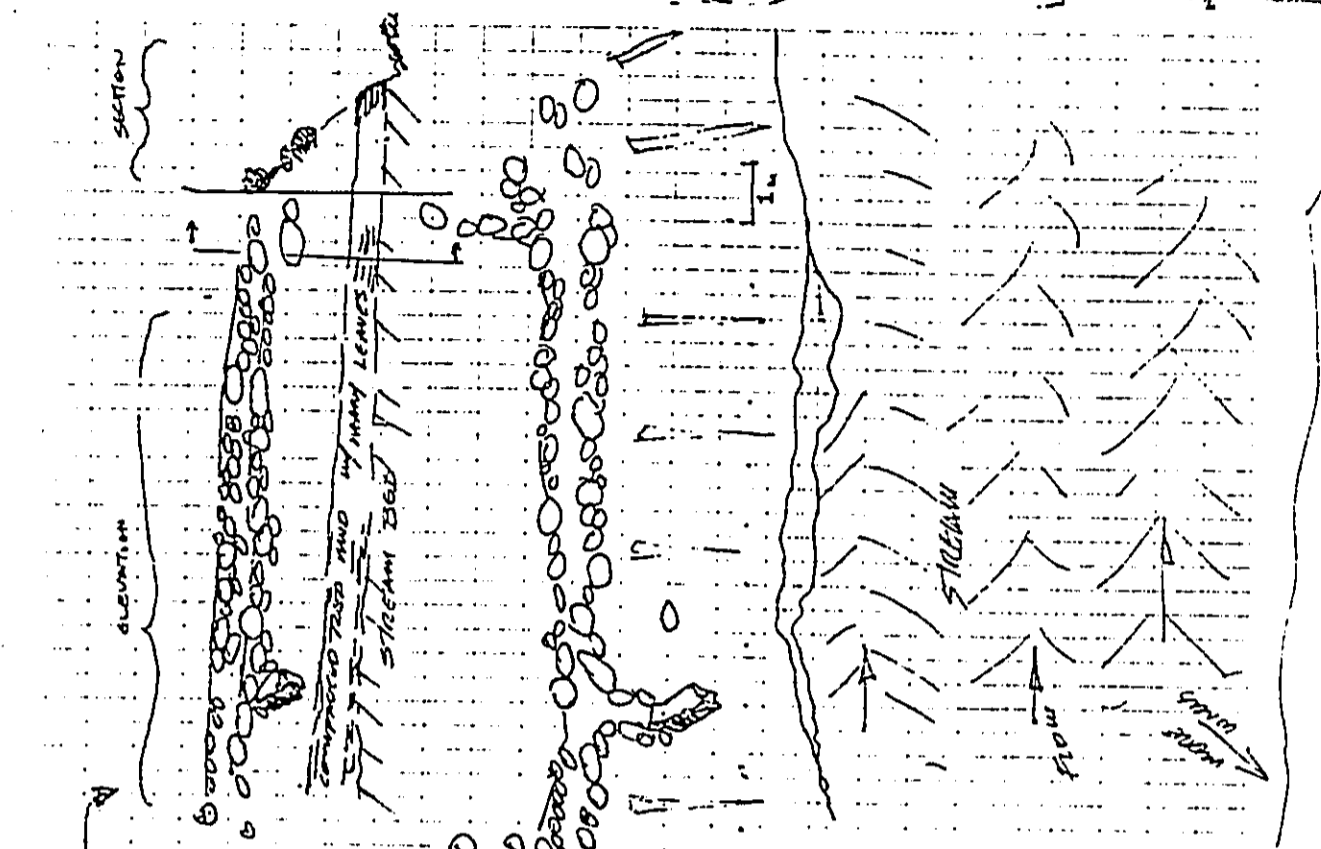
- NOW IN ERODING SOIL, MAY CHANGE AT
SEA-LEVEL EDGE OF LEVEE AREA



14

G-12

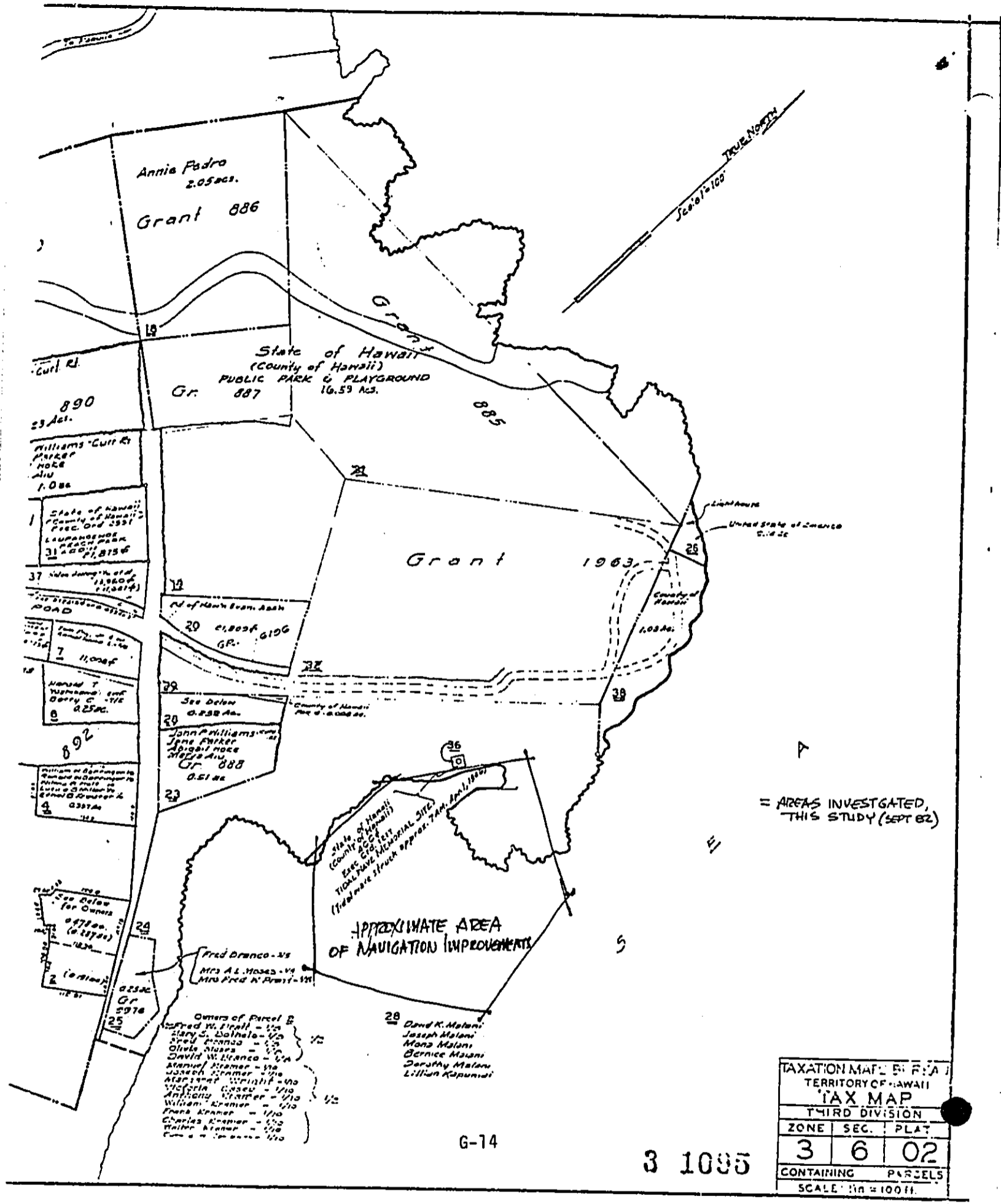
410 THE WALL AT PT -



ENCL 5 FIELD NOTEBOOK

28 Sept. 72

- PM TO LAUPA/DECK POINT & BOAT RAMP
- WHATS LEFT OF PRESENT LANDING TIER IS 3/4 UNDER WATER ON SURGE WASH - NOA CREW
 - THREE VANS OF EQUIPMENT AT POINT - BOAT OFF SHORE
 - SHOTS OF EX BOAT RAMP AND PIER, AWASH -
 - MORTARISE LIVING UNDER CONCRETE -
 - IN ROUTE OF LARGE IRONWOOD, NEAR RAMP
 - SOIL FACE N. 1m - MIXED SOIL & CORALS/PEBBLES/SEA
 - SAND NATURAL BY SHOT PLACES:
 - AT VARIOUS FROM DARK BLUE BLACK TO GREY TO RED
 - SOME WATER WORN PEBBLES IN UPPER 2/3, MOSTLY
 - COARSE TO RED BROWN, ASH BELOW
 - NO EVIDENCE OF MIDDEN OR OTHER NON-VOLCANIC MATERIALS
 - SMALL SEA CAVE / LIMITED SHOUTER / ROOF PLANKED OVER
 - 30m INSIDE OF RAMP AREA
 - PROBABLY FULLY AWASH IN STORM WAVE
 - DRIFT WOOD AT TIEBACK, SAND TO THE PEBBLE FLOOR - 1cm DIRT AT BACK - VERTICALLY
 - JUST UNDER CLOSED OFF ROOF HOLES
 - NEAR NATURAL BATH TUB FOUL; W/ HIGH LANK DIKE SEAWARD WALL AT MAUKA BOUNDARY - MID SIDE OF FT. 3m X 8m TO 1m DEEP, BOTTOM PROBABLY LEVEL COVERED W/ MORTARISE, PEBBLES TO CORALS
 - CHECKED ALL EJECTION FACES FROM RAMP AREA TO FLT
 - NO EVIDENCE OF MIDDEN OR ANY OTHER SURFACE CULTURAL MATERIAL
 - IRON WOODS
 - YOUNG COLONIES
 - NEW PINE
 - WANDERING JEW
 - CALIF GRASS - B. MUTTON
 - SAINT ANASTINE GRASS IN PARK AREA
 - CLOVER
 - HMA NEAR RAMP PARKING
 - TRUE KAMON w/ LOTS OF ISLES, NEAR MEMORIAL
 - NOA SKORG PARTY - JUST STARTED TODAY
 - BE IN LAUPA TILL DEC -
 - BEACH CLOSING W/ RIO SIDE OF THE LIGHT - 1.5m AT LOW



= AREAS INVESTIGATED, THIS STUDY (SEPT 82)

TAXATION MAP OF THE TERRITORY OF HAWAII		
THIRD DIVISION		
ZONE	SEC.	PLAT
3	6	02
CONTAINING		PARCELS
SCALE: 1" = 100'		

G-14

3 1095

ENCL 1 TAX MAP FOR LAUPAHOEHOE PT.

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. BOX 621
HONOLULU, HAWAII 96809

SUSUMU ONO, CHAIRMAN
BOARD OF LAND & NATURAL RESOURCES
EDGAR A. HAMASU
DEPUTY TO THE CHAIRMAN

DIVISIONS:
AQUACULTURE DEVELOPMENT
PROGRAM
AQUATIC RESOURCES
CONSERVATION AND
RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

11/1/84

A handwritten mark, possibly a signature or initials, enclosed in a circle.

Mr. Kisuk Cheung, Chief
Engineering Division
Pacific Ocean Division
Corps of Engineers
Ft. Shafter, Hawaii 96858

Dear Mr. Cheung:

Subject: Review of Archaeological Reconnaissance
Laupahoehoe Navigation Improvements Study
TMK: 3-6-02:24, Laupahoehoe Park
Laupahoehoe, North Hilo, Hawaii

Thank you for your letter of December 8, 1983, which enclosed a copy of the "Reconnaissance of Historic Resources for the Laupahoehoe Navigation Improvements Project, Laupahoehoe Point, Hawaii" (Corps of Engineers, 1983) for our review and comment.

Our review of the subject reconnaissance has resulted in our concurrence with the recommendations of the report which state:

Previous changes in land use, additions, and improvements to the County and State's property, and natural events have combined to effectively remove all surface indications of any earlier prehistoric features or historic period structures within the immediate area of the proposed project. The planned construction of the breakwater and the excavation and dredging of the protected turning basin will occur almost entirely in the backshore areas near the present ramp, and offshore. This is the area of the lava ridges with tumbled boulder 'beaches' between. Therefore, it is highly unlikely that the construction of the breakwater and other improvements at this location will uncover any subsurface cultural resources, or have any impact on historic or prehistoric features or properties." (Subject Reconnaissance, 1983)

Mr. Kisuk Cheung

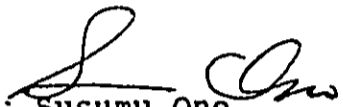
Page 2

June 11, 1994

This reconnaissance report is in compliance to Section 106 of the National Historic Preservation Act of 1966, as amended, and the Reservoir Salvage Act of 1960, as amended.

We further recommend that in the event that any previously unidentified sites or remains such as artifacts, shell, bone, or charcoal deposits, human burials, rock or coral alignments, pavings, or walls are encountered, please stop work and contact our office at 548-7460 immediately.

Sincerely yours,



Susumu Ono
Chairperson and
State Historic Preservation
Officer

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
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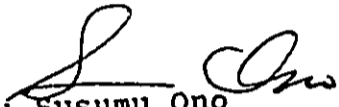
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