EXECUTIVE CHAMBERS

HONOLULU

GEORGE R. ARIYOSHI
GOVERNOR

September 30, 1985

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

Dear Ms. Uyehara:

Based on the recommendation of your office, I am pleased to accept the final environmental impact statement for the development of Kawaihae Boat Harbor, Kawaihae, Hawaii, as a satisfactory fulfillment of the requirements of Chapter 343, Hawaii Revised Statutes. This environmental impact statement will be a useful tool in the process of deciding whether the action described therein should be allowed to proceed. My acceptance of the statement is an affirmation of the adequacy of that statement under applicable laws, and does not constitute an endorsement of the proposed action.

When the decision is made regarding the proposed action itself, I expect the proposing agency to weigh carefully whether the societal benefits justify the environmental impact which will likely occur. These impacts are adequately described in the statement and, together with the comments made by reviewers, provide a useful analysis of the proposed action.

With warm personal regards, I remain,

Yours very truly,

George R. Ariyoshi

George R. Ariyoshi

cc: Honorable Wayne J. Yamasaki

Harbors Division
Department of Transportation
State of Hawaii

FINAL ENVIRONMENTAL IMPACT STATEMENT FOR DEVELOPMENT OF KAWAIHAE BOAT HARBOR KAWAIHAE, HAWAII

July 1985

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HARBORS DIVISION
DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

FINAL ENVIRONMENTAL IMPACT STATEMENT FOR DEVELOPMENT OF KAWAIHAE BOAT HARBOR KAWAIHAE, HAWAII

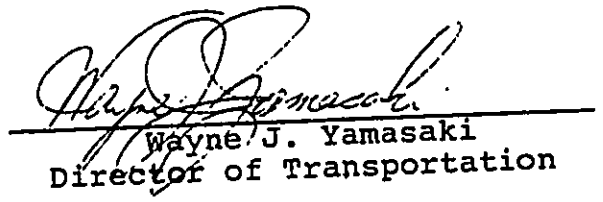
This statement was developed in accordance with the Environmental Impact Statement Regulations, State of Hawaii, and is submitted pursuant to Chapter 343, Hawaii Revised Statutes

PROPOSING AGENCY:

Department of Transportation
State of Hawaii

ACCEPTING AUTHORITY:

Governor, State of Hawaii



Wayne J. Yamasaki
Director of Transportation

8/6/85
Date

David K. Higa
Chief, Harbors Division

8/6/85
Date

PREPARED BY:

WOOLSEY, MIYABARA & ASSOCIATES, INC.
71 North King Street
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JULY 1985

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1. SUMMARY

1.1. DESCRIPTION OF ACTION

Construction of a small boat harbor consisting of a detached breakwater, revetted moles, interior mole, wave absorber, navigational channels, attendant onshore facilities including parking areas, administrative building, commercial areas, launching ramps, and berthing slips.

1.2. PROPOSED PROJECT - ENVIRONMENTAL IMPACT

The proposed harbor would further alter the existing condition of the 33-acre project site from a shallow sedimented, recently altered reef and dredged basin area to a permanent light-draft vessel harbor complex consisting of revetted land areas, channels, turning basin, and berthing sanctuaries.

The oceanographic regime of the new harbor may substantially differ from the existing conditions. The natural bathymetry of the project area will be permanently altered by filling and dredging operations. Also, the completed harbor structures are intended to slow and deflect existing sluggish wind-generated currents, and provide shelter to small boats from the wave and surge regimes of the area. Turbid water will continue to be trapped on the south side of the partially completed breakwater of the proposed harbor, and an increase in turbidity may occur on the south side of the completed small boat harbor. This turbidity can be greatly reduced by controlling wind-borne sedimentation and constructing sediment traps for major drainage ways. The harbor will be designed so that there will be no significant restriction of the already poor water circulation in the basin.

Noise and hydrocarbon emissions generated by construction equipment will be temporary, and impacts will be minor since the area is sparsely populated. Noise and hydrocarbon emissions will be generated by boats and vehicles utilizing the completed harbor.

Increased sedimentation on the harbor floor because of reduced wave action and project dredging and filling operations may result in the replacement of the already depauperate marine fauna by other organisms more tolerant of a sediment bottom. Complete harbor structures such as moles, breakwaters, etc., should serve as favorable habitats to many fish species, some corals, algae, and other invertebrates.

The onshore environment is presently sparsely vegetated with coconuts and beach naupaka. Much of the area is bare coral fill material.

Previous studies have not identified any known threatened or endangered species nor critical habitats within the project.

Recreational and commercial opportunities will be greatly enhanced by the project, including boating and related offshore fishing activities, shoreside fishing and passive recreation.

The project will provide temporary construction jobs and permanent operations and maintenance jobs at the completed harbor area. Also, the harbor's commercial activities will create permanent job opporunities. These jobs will enhance the short-term and long-term economic climate of the Kawaihae area and the island of Hawaii. The harbor will also attract additional users to the area, although the nature of the surrounding land developments is not likely to be significantly changed or accelerated because of the harbor.

1.3. ADVERSE IMPACTS OF THE PROJECT THAT CANNOT BE AVOIDED

The project will permanently alter a 33-acre area from a shallow sedimented reef and dredged basin area to a small boat harbor. Some marine habitats for individuals of a few species will be altered. Some minor degradation of water quality may occur. Noise, dust, and hydrocarbon emissions will be generated during construction and use of the harbor.

The onshore area, consisting essentially of dredged coral fill material, will be permanently altered with the implementation of development plan. Most of the area will be graded and paved or built upon with various facilities and structures. The remaining areas will be landscaped.

1.4. ALTERNATIVES

Alternatives to the proposed project would be to forego any further improvements and continue to use existing, inadequate and unsafe facilities; to site the harbor in other locations; or to alter the design configuration of the proposed facilities and features.

2. PROJECT DESCRIPTION

2.1. PROJECT GOALS AND OBJECTIVES

- Meet the existing and projected needs of local boaters in the region to the year 2030, consistent with social, environmental, economic and physical planning for the area.

- Provide safe, convenient and pleasant harbor facilities. Specifically, the facility's water areas should be navigable under moderate to heavy sea conditions, should provide a relatively quiet berthing area, and should be accessible to general small boat traffic.

- Broaden the recreational potential for the area. Facilities should provide berthing, shoreside and support facilities which enhance recreational boating and commercial fishing as well as passive recreation on site and should relate favorably to the adjacent proposed historic site.

- Enhance the visual and environmental quality of the site. The project should be responsive to terrestrial and marine environmental concerns. In addition, facilities and landscaping should be compatible with the surrounding site.

- Reduce conflicting traffic within existing Kawaihae harbor.

- Provide economic and social opportunities for local residents.

2.2. PROJECT LOCATION

A small boat harbor is proposed for construction at Kawaihae on the northwest coast of the County of Hawaii, State of Hawaii. The proposed site is adjacent to the existing deep-draft harbor in Kawaihae Bay (Figure 1).

This location is convenient to the majority of anticipated users and is accessible to existing highways and other infrastructure including power and domestic water. The landward area is currently owned by the State of Hawaii and is under the jurisdiction of the Hawaii State Department of Transportation, Harbors Division. The seaward portion, including the protective structures and entrance and access channels, will be maintained by the Corps of Engineers

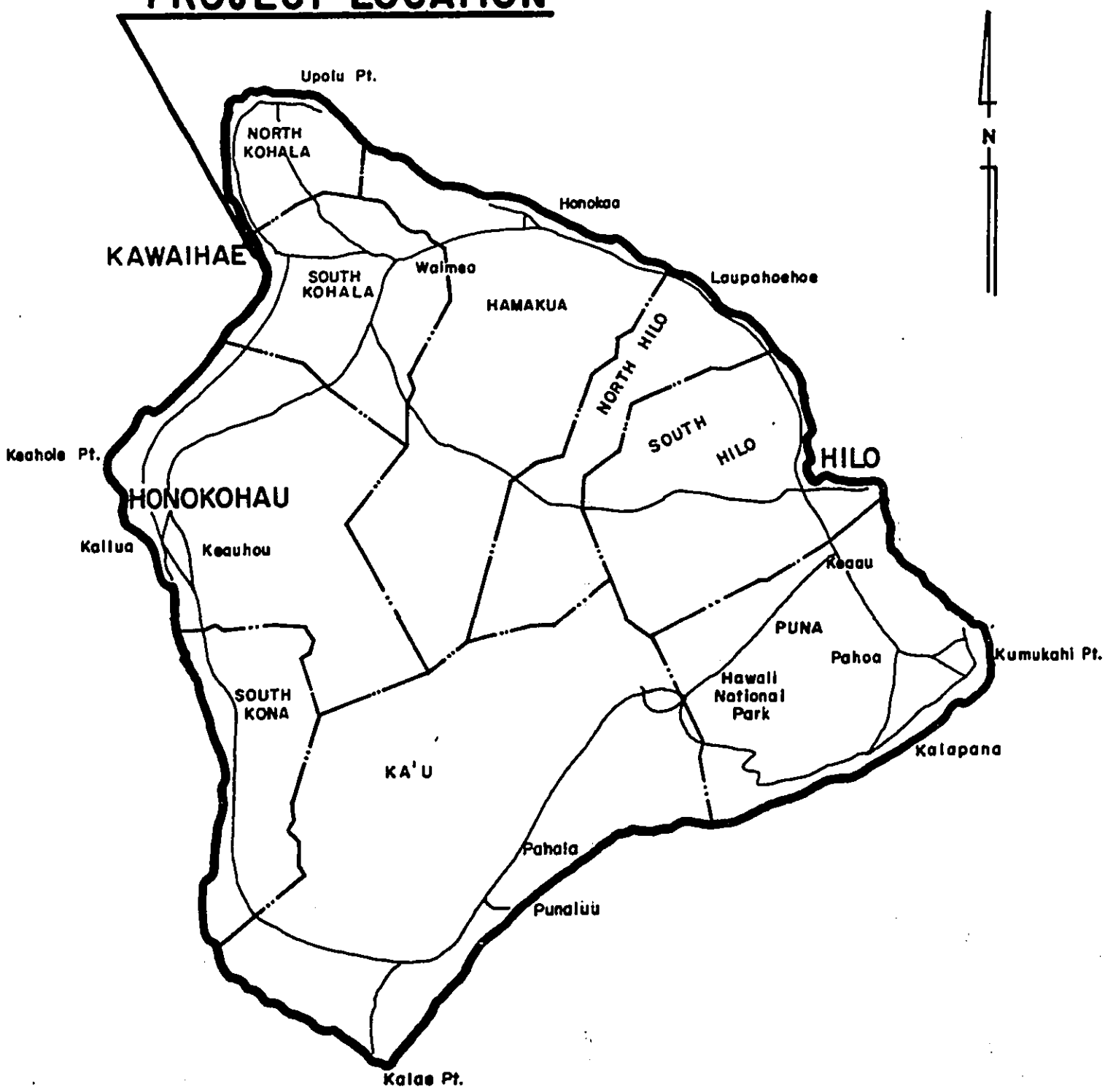


FIGURE 1

REGIONAL MAP

after they have been developed jointly by the Corps and the State. The entire project area lies within the Shoreline Management Area of the County of Hawaii and is subject to County, State and Federal regulations.

2.3. PROJECT HISTORY

2.3.1. Previous Statements and Studies

Construction of a harbor for light-draft vessels at Kawaihae, Hawaii, was authorized by Section 301 of the River and Harbor Act of 18 October 1965, in accordance with recommendations of the Chief of Engineers contained in House Document No. 75, 89th Congress, 1st Session. This document also provided for modifications to the existing Kawaihae Deep-Draft Harbor. A General Design Memorandum was submitted in March 1968 for engineering and design for both the modification to the deep-draft harbor and construction of the authorized light-draft harbor within the deep-draft harbor basin. After approval of the document by the Chief of Engineers in June 1968, the State of Hawaii requested that the light-draft harbor be relocated from the authorized site within the deep-draft harbor to a site immediately south of the existing revetted fill area for the deep-draft harbor.

Subsequently, the relocated site was selected for a high-explosive row charge cratering research and development project. The results of this research, called Project Tugboat, were incorporated into the Kawaihae light-draft vessel project (Ref. 2).

As a result of the site relocation and the newly adopted National Environmental Policy Act of 1970, a draft Environmental Statement was prepared in December 1970, and a General Design Memorandum (Ref. 4) and Final Environmental Statement were prepared in August 1971 (Ref. 5). After the coordination and review phase, additional current and oceanographic studies were conducted in the area. An Environmental Assessment (EA) was prepared in October 1975 (Ref. 1) which evaluated the results of such studies as well as other comprehensive environmental, archaeological and hydrological studies conducted in the region after completion of the 1971 Final Environmental Statement. A Draft Information Supplement to the Final Environmental Statement was prepared in June 1978 which integrated all previous data and additional data from studies subsequent to the EA (Ref. 6). This document utilizes relevant data from these previous studies, comments to the draft information supplement of 1978, and data from studies currently in progress.

2.3.2. Site Relocation

Based on extensive coordination between the Corps of Engineers and the State of Hawaii, the State requested that the authorized site for the light-draft harbor be moved outside the limits of the existing deep-draft harbor. This was recommended to allow for future expansion of shoreside facilities and permit the development of any proposed inter-island ferry terminal and movement of the existing barge terminal inside the deep-draft harbor where serious surge effects are absent. The relocated site provides considerable natural protection from waves due to the existing coral reef (Ref. 6).

2.3.3. Project Tugboat

Subsequent to the harbor site relocation, the U.S. Army Nuclear Cratering Group conducted test excavations using high-explosive row charge cratering techniques under Project Tugboat (Ref. 2). The experiments included extensive investigations of wave refraction, hydrography, geology, safety, and environmental impact on marine life. The project resulted in near completion of all Federal excavation requirements of the light-draft harbor. The detonations using conventional ammonium nitrate explosives were completed in May 1970 and resulted in the creation of an 850-foot-long, 120-foot-wide, 12-foot-deep entrance channel, and a 1.2 acre turning basin. An 850-foot-long breakwater was also constructed during Project Tugboat, and the feature will be included as part of the completed harbor facilities.

Under Project Tugboat, experimental excavations removed approximately 33 acres of reef formations in the creation of the entrance channel and turning basin. An 850-foot-long breakwater was also constructed during Project Tugboat, a feature which would be incorporated into the proposed development plan (Ref. 2). The landward portion of the proposed project site is located entirely upon coral fill created during the initial deep-draft harbor construction in 1958-1960 with a minimal area containing topsoil, vegetation or other natural resources. The coral fill site was generated during the construction of the deep-draft harbor, and was in excess of area needed for operations relating to commercial and industrial harbor activities.

2.4. PROJECT DESCRIPTION

The proposed action is based on the Corps of Engineers Plan B (Figure 12) as outlined in the General Design Memorandum of 1971 (Ref. 4).

The proposed harbor will accommodate approximately 300 small crafts within a 33-acre berthing basin adjacent to

20 acres of onshore facilities and harbor structures (see Figure 2). Harbor features include an existing main access channel and turning basin which will be protected by a proposed extension of the existing northern breakwater. A revetted mole on the southern end of the harbor and an offshore breakwater will protect a secondary access channel. Projecting into the interior of the harbor will be a wave absorber at the end of a proposed interior access mole. Onshore facilities will include access road, parking, dry storage areas, launching ramp, administration building, fueling dock, boat repair area, landscaping, and irrigation (Ref. 43).

2.4.1. Berthing and Mooring

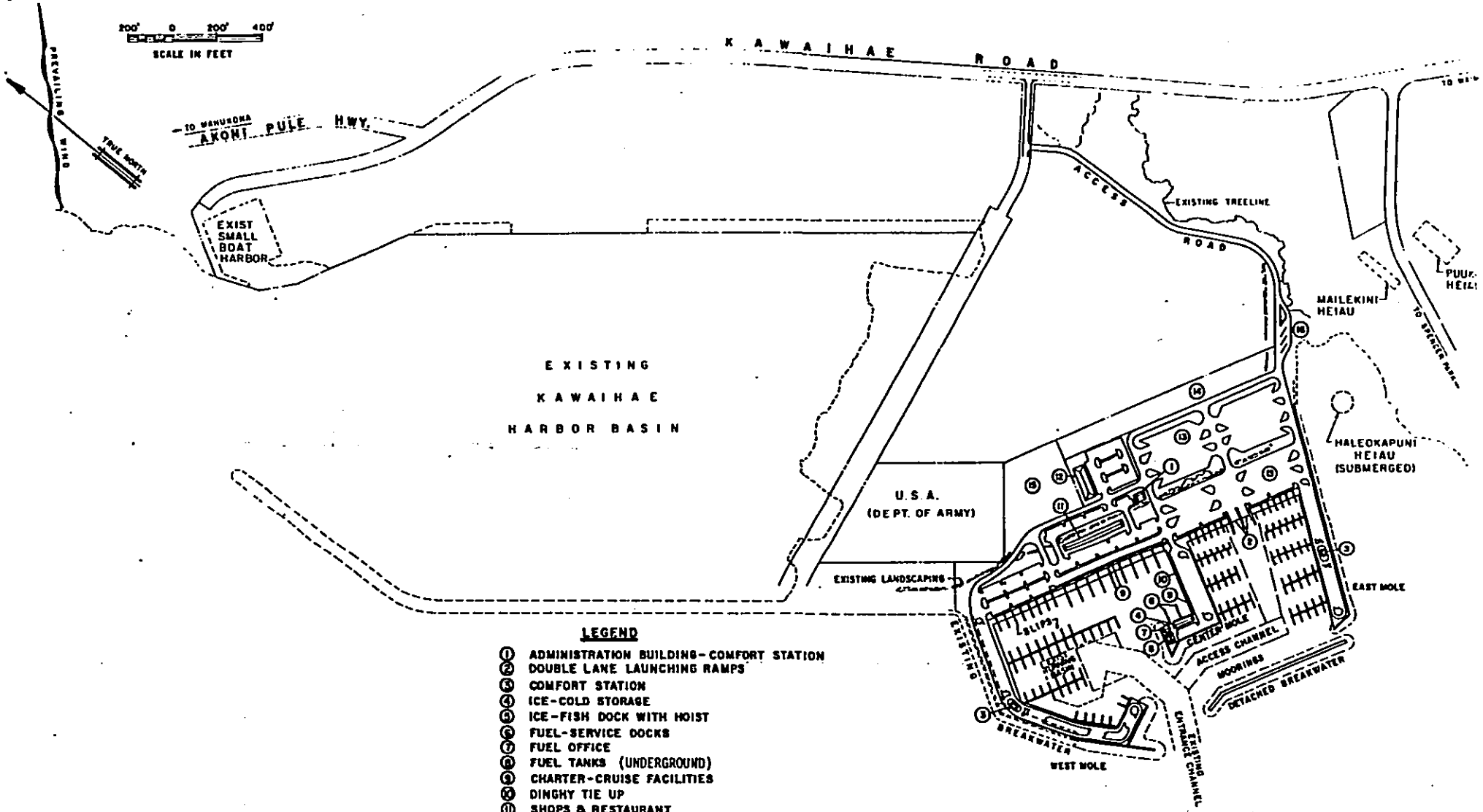
The Total Development Plan (Figure 2) illustrates the proposed berthing and mooring layout. The recommended plan is based on providing the maximum safety, efficient use of water area, conformance to the physical configuration of the harbor as well as being in close proximity to vehicular parking stalls. The distribution of berths is as follows.

	Recommended Plan	
Boat Length	Number of Berths	% of Total
25	48	16
30	66	23
35	60	21
40	56	19
50	42	14
65	19	7
TOTAL	291	100%

Moorings for transient crafts is also provided and is located on the sheltered side of the detached breakwater.

Main catwalks are designed to have a minimum width of six feet. Hose bibbs will be provided at each slip.

KAWAIHAE BOAT HARBOR



LEGEND

1. ADMINISTRATION BUILDING - COMFORT STATION
2. DOUBLE LANE LAUNCHING RAMPS
3. COMFORT STATION
4. ICE - COLD STORAGE
5. ICE - FISH DOCK WITH HOIST
6. FUEL - SERVICE DOCKS
7. FUEL OFFICE
8. FUEL TANKS (UNDERGROUND)
9. CHARTER - CRUISE FACILITIES
10. DINGHY TIE UP
11. SHOPS & RESTAURANT
12. BOAT CLUB
13. CAR - TRAILER PARKING
14. DRY DOCK - REPAIR - DRY STORAGE
15. FUTURE EXPANSION AREA

FIGURE 2

TOTAL DEVELOPMENT PLAN

2.4.2. Access Road

The access road to the harbor from Kawaihae Road is located as shown on the development plan. The road is located as far as possible to the east toward the thickly wooded kiawe growth and at a safe distance from water's edge. Thus, vehicular traffic to the small boat harbor will not conflict with nor interrupt the activities at the maritime activities and industrial area.

During the initial stage of construction, the access road will be graded to the designed base course level and compacted. Ultimately, the road will be paved with two-inch asphaltic concrete having a width of 24 feet. The road shoulders are a minimum of six-foot width and stabilized with medium-curing liquid asphalt (Ref. 43).

2.4.3. Parking

Vehicular parking are as follows for each respective facility or activity.

Wet Stored Vessels

Three hundred seventy-one (371) auto parking stalls with dimensions of 9' x 20' for both 90° and 45° angles are provided for the 291 berths. This is a ratio of 1.27 stall per berth and meets the standard of providing a 1:1 ratio. Separate parking stalls are being provided for the other boat harbor activities.

Trailered Vessels

Two hundred (200) car/trailer parking stalls with dimensions of 10' x 40' at 45° angle are provided for the two double-lane launching ramps. Considering the minimum criteria of 40 stalls per launching ramp, 200 stalls are more than adequate.

Administration Building

Based on a floor area of 1,500 square feet per floor or a total floor area of 3,000 square feet for a two-story building, six parking stalls are required by the applicable County Ordinance. Seven parking stalls are shown provided.

Shops and Restaurant

For 18,000 square feet of shops and restaurant floor area, the Ordinance requires 90 parking stalls. A total of 119 stalls are provided.

Since, it is expected that, individuals and/or groups may operate their own or rental vehicles to visit the charter and cruise facilities nearby, parking stalls would be available for them at the shops and restaurant area.

Boat Club

Parking for the Boat Club will be provided by the lessee. There is room for approximately 92 stalls or 17 more than required by the County Ordinance.

Ice-Cold Storage

Fifteen parking stalls are provided for the ice-cold storage area.

2.4.4. Utilities

A. Domestic Water

Presently a six-inch domestic water main within Kawaihae Road serves the Kawaihae Village and the surrounding developed areas. Under the jurisdiction of the Hawaii County Department of Water Supply, the existing main and the existing source are inadequate to service all of the proposed water needs at the harbor. Until additional sources and larger transmission lines are funded and constructed, water usage at the harbor may be restricted by the currently allowed installation of a 5/8-inch meter, which would probably be adequate for washdown, comfort station and drip irrigation use demands.

In order to have adequate fire fighting capabilities, the existing six-inch main in Kawaihae Road will need to be increased in size.

B. Power, Telephone and Lighting

A 12-kV distribution line exists within Kawaihae Road. This line is more than adequate to handle the anticipated electrical demand by the facilities in the harbor. In addition to the 12-kV line, a 69-kV transmission line is installed on the existing pole. This latter line is not active and will be activated if necessary to operate very high-energy consuming equipment and motors.

The existing telephone service within Kawaihae Road is also adequate. Power and telephone service to the harbor is proposed as an underground system located within the access road shoulder. At the harbor, 55-watt, 29-foot-high low-pressure sodium luminaries are proposed to be mounted on poles located along the harbor shoreline and along the access road. A public phone and booth will be located close to the launching ramp (Ref. 43).

C. Sewerage

There are no public or private sewerage systems in the vicinity of the proposed harbor and there are no immediate plans to construct a public system. The coastal water at the harbor is currently Class A and as such, a system complete with treatment facilities will be provided.

One packaged wastewater treatment plant complete with aeration and setting compartments, chlorination chamber and a treated effluent cesspool will handle waste from the proposed onshore facilities. The plant is located on the west end of the harbor. In the distant future when a public wastewater treatment plant is built, the packaged wastewater treatment plant could be either converted to a sewage lift station or a packaged sewage lift station installed (Ref. 43).

D. Solid Waste Disposal

Collection of solid waste will be by trash cans or other suitable containers which could easily contain polyethylene plastic bags. Filled bags could be collected and disposed of at the public Puako Transfer Station, a collection area where a container trailer equipped with hydraulic compacter is stationed, and located approximately five miles from the harbor, or at the Waimea open dump, approximately nine miles from the site.

E. Drainage

The isohyetal map for the island of Hawaii shows that the mean annual rainfall at the harbor site is less than ten inches. As such, surface runoff during the early stages of development will be easily handled by the unpaved area.

When the area is paved, surface runoff will be directed to one or more drywells. The specific number of drywells will be determined during the design stage after the flow quantity is calculated.

2.4.5. Launching Ramp and Access for Launched Craft

The two double-lane launching ramps with loading docks are proposed within the east basin, which is more protected from direct wave action and is thus calmer.

2.4.6. Administration Building

Centrally located within the harbor complex, the administration building is seen as a two-story structure with offices on the top floor. From that vantage point, administrative staff and personnel would have maximum control of the various harbor operations. The ground floor would house meeting rooms and a public comfort station.

Extensive use of native pahoehoe and/or moss rock for veneers should be encouraged during the design stage of the building for corrosion protection as well as to blend with the general surrounding.

2.4.7. Fuel Service Docks and Fuel Tanks

The fuel service docks and fuel tanks are to be located at the terminus center mole adjacent to the ice-fish and ice-cold storage. This location provides (1) surge protection, (2) easy access to boaters, and (3) safety to moored vessels at slips in the event of accidental fuel spills. Four fuel service docks are to be provided - two for diesel and two for gasoline.

Fuel tanks will be installed underground as required by the Hawaii County fire code. The underground installation would allow for surface parking as well as lessening the visual impact of above ground fuel tanks.

2.4.8. Boat Harbor Activities

Charter and Cruise Facilities

The charter and cruise facilities area is shown where onshore and offshore needs and activities are located in close proximity to each other for efficiency. The plan allows for easy tour bus movements, ticket booths, easy and convenient access to and egress from charter and cruise vessels, restrooms, parking, restaurant and retail shops.

Shops and Restaurant

An approximate 18,000-square-foot area is set aside for retail shops and restaurant(s). Types of shops commonly found at Kailua-Kona, which cater to the harbor activity needs at Honokohau Harbor and Kailua Bay include:

Marine Supply and Service
Snorkel Shop
Dive Shop
Surf Shop
Fresh Fish Market
Aquarium
Curio Shop
Liquor Shop
Pantry

It is recommended that the shop and restaurant structure be a two-story building of 9,000 square feet per floor with the restaurant on the second floor, which would afford better views of surrounding areas and features.

Boat Club

An approximate total area of 1.4 acres is set aside for a boat club. Improvements could include a 40,000 square feet parking area, a 15,000 square feet clubhouse, a 7,000 square feet open area and a screen planting strip around the perimeter. A dry storage area for boat club members only is not included since the dry storage area for the harbor is located adjacent to the club. Thick screen planting is recommended within a strip around the perimeter of the area. This would accomplish three purposes: act as a windbreak for part of the harbor during the prevailing trades; provide greenery; and for aesthetic purposes.

The improvement discussed above should be made by the Lessee.

Ice-Fish Dock and Ice-Cold Storage

Located adjacent to the fuel facilities on the center mole, the activities here include a combination ice and fish dock and an ice plant. Its central location provides efficient service to boaters.

2.4.9. Dry Dock - Repairs - Dry Storage

Approximately 2.4 acres in area, this site is located to provide easy access to and from the launching ramps. Also, boats destined to the area trailered into the harbor from Kawaihae Road would cause little interference to the other harbor activities.

2.4.10. Future Expansion Area

An approximate 2.4-acre site is set aside for future expansion. Possible needs which would expand into this area could include additional auto parking, shops and a restaurant.

Other possibilities include boat sales and perhaps a second boat club.

2.4.11. Public Safety

Aside from police and fire protection, potential steps to avoid hazards to the public and the boaters include providing paved, adequate concrete curb barriers to restrain vehicles from inadvertently entering the water. During the initial stage when the back-up area is only graded, a temporary barrier will be provided. The barrier will be of wooden, metal or wire rope construction, or one- to two-ton boulders.

Fencing of the entire harbor shoreline may prevent the public from entering the harbor waters. Such preventive measure is considered costly and aesthetically unpleasant. Instead, adequate signs warning the public of the presence of sharks should be strategically placed near water's edge and a Haleokapuni (shark) Heiau sign placed to indicate the approximate location of the Heiau (see section 3.11, Historic/Archaeological Setting) (Ref. 43).

2.4.12 Recreation

In addition to boating, other passive recreational opportunities are provided with the construction of the harbor. The observation point for the adjacent historic/archaeological site and a connection to the historic site, is located on the south shore of the coral fill area. Pedestrian pathways connect other project features such as parking, administration building/restrooms, and other structures. Passive landscaped areas may be provided along pedestrian pathways for picnicking and relaxation.

Other passive recreation that may be provided as a result of the harbor construction includes shoreline fishing and netting from harbor structures (Ref. 43).

2.4.13. Landscaping and Irrigation

The landscape development concept for the small boat harbor site will involve the use of native and/or adapted species of trees, palms, shrubs, groundcovers and grasses to create two landscape development intensity zones--low and moderate development. The plant materials in each zone will be selected for general low maintenance characteristics as well as their tolerance to drought, wind and salt.

Zone One, low intensity development, includes treatment of the entry road and the west, center and east moles. This zone includes the perimeter areas of the project site and generally is more exposed to the somewhat harsh environmental conditions. Species in Zone One which will primarily serve to provide wind and visual buffering include:

Cocos nucifera	- Coconut
Casuarina equisetifolia	- Ironwood
Scaevola frutescens var. sericea	- Beach naupaka

Zone Two, moderate intensity development, treats the remaining areas generally within the parking areas and adjacent to buildings to provide shade and visual relief. Plantings include shade and wind buffer types, such as:

Thespesia populnea	- Milo
Messerschmidia argentea	- Beach heliotrope
Scaevola frutescens var. sericea	- Beach naupaka

The existing vegetative buffer of Beach naupaka and Coconut palms is planned to be left intact except for segments where vehicular accessways are needed.

Irrigation would be by the drip method, where exposed polyethylene tubing with emitters inserted would irrigate each plant. Within pavement areas, polyvinyl chloride pipe are recommended to be installed underground with sleeve for protection. This irrigation method is more economical than conventional systems and will aid in conserving water.

2.4.14. Source of Rock

Approximately 40,000 cubic yards of quarry rock are required for the construction of the Kawaihae Small Boat Harbor offshore protective structures. The maximum size of rock required is four tons.

Potential sources of rock for the construction of harbor structures were investigated by the

Corps of Engineers. One site considered is the Makeahau Quarry, owned by Queen's Hospital, which was opened for the construction of the large-draft harbor at Kawaihae from 1957 to 1959. Because of previous and potential negative impacts to the nearby John Young Homesite and the Haleokapuni Heiau downstream, the Corps of Engineers will investigate feasible alternate quarry sites. Should the Makeahau Quarry be the preferred site, approval and coordination must first be obtained from the State Historic Preservation Officer and the National Park Service (Ref. 43).

The proposed Corps historic site protection plan will initially be in the form of a determination of effect pursuant to 36 CFR Part 800.4(b) which will be submitted to the State Historic Preservation Officer and the National Park Service for their review and comment. All detailed blasting plans at the site will be coordinated with the SHPO and the NPS prior to the start of work. The Corps may be required to monitor the blasting operations at the quarry to insure that they will be within acceptable levels that will not cause direct damage to the historic sites.

2.4.15. Dredging and Deposition

The required dredging work would be limited to the 80-foot-wide, 640-foot-long, and eight-foot-deep main access channel since the entrance channel and turning basin were constructed under Project Tugboat. The dredging is expected to be accomplished using land-based equipment operating from a temporary causeway constructed of coral material from the existing coral fill area. Allowable overdepth would be limited to one foot to compensate for inaccuracies in dredging. Required dredging and allowable overdepth dredging volumes are estimated at 5,000 and 1,700 cubic yards, respectively (Ref. 4).

Stones and rock obtained from field borrow and/or commercial quarries along with coral rock and coral sediment obtained from the existing deep-draft harbor dredged material stockpile site (adjacent to the project site) will be deposited as fill material for the harbor construction. Approximately 40,000 cubic yards of stones and boulders and 40,000 cubic yards of coral rock and coral sediments will be discharged by shore-based crane or dump truck on the sea bottom to construct the protective structures.

A Section 404 Evaluation of the small boat harbor is currently being prepared by the Corps of Engineers which details the characteristics of the action and presents the

environmental impacts and proposed mitigation measures (Ref. 20).

2.4.16. Development Plan Phasing

Five phases of development are recommended. These phases were developed to provide an orderly sequence of construction of the harbor. It is recognized that the recommended phasing plans may be adjusted to accommodate future economic trends, population shifts and demands, and available public and private funds.

The work items of all phases are presented as follows. Work items marked with an asterisk (*) after the work description indicates federal-state funding.

Phase I Development

1. Construct detached breakwater;* east, west and center moles;* and harbor revetment.

2. Dredge new turning basin in west basin of harbor and dredge access channel and access for launched crafts in east basin of harbor.*

3. Use dredged materials to construct moles and supplement with existing stockpiled coral material.

Phase II Development

1. Construct one double-lane launching ramp and two service docks.

2. Construct administration building-comfort station.

3. Install sewage treatment plant, lift station and sewer and force main from administration building to treatment plant. Install sewer to fuel service docks.

4. Construct access road to subgrade level; and install water, power and telephone lines to service administration building, center mole and washdown facility.

5. Construct fuel service docks.

6. Install temporary moorings.

Phase III Development

1. Construct comfort stations on east and west moles.

2. Install water, sewer, power and telephone lines to service comfort stations on east and west moles.

3. Construct one double-lane launching ramp and one service dock.

4. Install area lights.

Phase IV Development

1. Install berthing facilities, and water and power lines.

Phase V Development

1. Install six inches concrete curb.

2. Pave access road and parking areas. Exclude Boat Club area.

3. Stripe parking stalls, road centerline and install signs.

4. Install area lights.

5. Install landscaping and irrigation system.

2.4.17. Development Plan Cost Estimate

Construction cost estimates for the five phases of development at Kawaihae Boat Harbor are based on prices as of December 1983.

Included in the totals of the phases are surveying and engineering costs, supervision and administrative costs and a contingency factor. The estimates are approximate since they are based on conceptual plans and not on detailed construction plans.

Since funding will be the governing factor on the description of work during the development phases, it is recommended that adjustments be made annually.

The following estimates are based on work, in place complete as described above:

Phase I Development	$ 7,993,000	(Federal 2,842,700) (State 5,150,300)
Phase II Development	2,048,800	
Phase III Development	2,683,200	
Phase IV Development	3,105,600	
Phase V Development	2,672,100	
TOTAL	$18,502,700	

2.4.18. Use of Public Lands and Funds

The entire project occupies land owned by the State Department of Transportation, Harbors Division. On the national level, the project represents an expenditure of Federal funds. Specifically, the Federal funds will be used in the construction of oceanside or outer structural revetments. This work is included in Phase I and constitutes $2,842,700 of that phase. The State of Hawaii will contribute part of the total money for the Federal portion of the project, plus 100 percent of the money for the non-Federal portion of the project, which constitutes the cost figures for the balance of Phase I and Phases II to V.

3. DESCRIPTION OF ENVIRONMENTAL SETTING

3.1. GENERAL

Kawaihae is located on the northwest coast of the Island and County of Hawaii (Figure 1). Kawaihae lies in the South Kohala District, approximately 71 miles west of Hilo. The tributary area for the project includes the North and South Kohala Districts as well as the Honokohau District.

The project is on Kawaihae Bay, a gently curving identation along the coastline which stretches about 6.5 miles between Kapuniau and Kaiopae Points and encompasses a water area of approximately 13 square miles.

The slopes of the Kohala mountains extend to the northeast about seven miles to an elevation of about 5,500 feet. Mt. Hualalai, an 8,000-foot peak, lies about 16 miles south of the bay, the black lava flows no longer being visible through the vegetated slopes.

The tributary area for the Kawaihae Boat Harbor includes the North and South Kohala Districts and the Hamakua and North Kona Districts. The Population count conducted during the 1980 U.S. Census shows that within the tributary area there are 3,249 persons in North Kohala and 4,607 persons in South Kohala. In addition to the above two districts, the Hamakua District, where the principal town of Honokaa is about 25 miles from the site (as compared to 45 miles from Hilo) and where the population count for the district is 5,128 persons, should also be included within the tributary area.

The Kawaihae deep-draft harbor is a commercial harbor immediately adjacent and to the north of the project area. This harbor has been excavated from shallow coral reef formations at the Northeast end of the bay and encompasses 35 acres of offshore waters and industrial onshore facilities.

The deep-draft harbor is owned and maintained by the State of Hawaii and is approximately 85 nautical miles from Hilo Harbor. The construction of the harbor was completed in 1959 with the dredging of an extensive coral reef formation which extended 4,000 feet offshore and more than a mile along the coast to the south of Kawaihae. Since 1959, additional dredging for expansion and storm repair work has been employed.

Onshore facilities include a 605 foot concrete deep-draft wharf; a 410-foot concrete barge landing; three general cargo sheds; a large bulk sugar storage shed with

conveyor and dockside loading facility; pipelines and tank storage for fuels, liquid fertilizer and molasses; a cattle-loading chute and corral; a 35-acre area for storage and handling of containers, general cargo and pumice; a dry fertilizer manufacturing plant; a wood chip processing facility; and Kawaihae military reservations. Two small boat harbor facilities exist within the harbor, a ten-foot-deep, 250-foot-square basin at the north end of the site adjacent to the barge wharf, and a ten-foot-deep, 250-foot-square basin with mooring facilities at the southeast end of the harbor adjacent to the overseas wharf. Both small boat harbors are adjacent to the sloping riprap shoreline (both cemented and uncemented) and each provide timber catwalks for mooring (Ref. 9).

The land area created by dredging and filling operations consists of approximately 46 acres of coral fill, most of which is in excess beyond that needed for land development related to the deep-draft harbor. It is upon this fill area that the onshore facilites and access are proposed for the small boat harbor.

In 1973 coral areas along the harbor side of the breakwater and landfill areas were dredged to provide additional usable harbor water area and this dredged material was used as fill at the southeastern end of the harbor to create additional landfill which resulted in two semi-enclosed water areas. This fill was created to be utilized for expansion of the commercial port.

The 77-acre Pu'ukohola Heiau National Historic Site and the adjacent Samuel Spencer County Park lie immediately south of the project area. Approximately 1.5 miles south of the site lies the Mauna Kea Beach Hotel, overlooking Kaunaoa Beach.

The shoreline of Kawaihae Bay is predominantly rocky with numerous low sea cliffs. Several small pocket beaches occur along the shoreline south of the existing harbor. One of these sand beaches fronts Samuel Spencer County Park, and the other beach fronts the Mauna Kea Beach Hotel.

3.2 TERRESTRIAL GEOLOGY AND SOILS

The island of Hawaii was formed by five volcanoes, three of which contributed surface lava flows to the Kawaihae region. To the north, the flows of Kohala Mountain, the oldest of the volcanoes, formed land features during the Hawi and Pololu volcanic series. During the Hamakua volcanic series (Pleistocene Age) volcanic flows from Mauna Kea created land forms within the immediate area of Kawaihae Bay. These deposits were

later covered with Pahala ash. Additional land features were created to the south by Mauna Loa, while Mt. Hualalai contributed to lava flows south of Kawaihae near Puako (Ref. 6).

Soils in the coastal plains region adjacent to the coral fill are in the Kawaihae association which is moderately deep and gently sloping to moderate steep. The soils are excessively drained and have a medium textured subsoil. The association is used for pasture, but the carrying capacity is low and the water supply is limited. The soils are also suitable for recreation areas, wildlife habitat, and homesites.

The other major soils associations within the South Kohala District include the Puu Pa-Pakini-Waiaha association, a shallow to deep, nearly level to steep and well to excessively drained medium textured subsoil found on uplands; and the Waimea-Kikoni-Naalehu association of very deep, nearly level to steep, and well drained medium to fine textured subsoil found on the uplands (Ref. 8).

Topographically, the coral filled land area at the harbor is generally irregular with a portion of the back-up area having three terraces.

3.3 GROUNDWATER HYDROLOGY, WATER QUALITY AND DRAINAGE

Due to the highly permeable substrate in the Kawaihae area and low rainfall (less than ten inches per year), there are no perennial streams. The greatest groundwater reservoir for the area, and the entire island, is near sea level where fresh water recharge from rainfall accumulates in widespread bodies floating on the slightly heavier sea water (Ref. 31). The interface of this dynamic Ghyben-Herzberg system is brackish water, resulting from the mixing of fresh and sea water (Ref. 32). The basal water is probably brackish to saline at the shore and for several thousand feet to several miles inland as in the Kona area (Ref. 26). In dry areas such as Kawaihae where fresh water exchange is small and tidal influences is felt, the effect of mixing may extend such that the entire lens is brackish for more than a mile inland (Ref. 31 and 25). Movement is continous within the water body as fresh water recharge percolates into the lens at the water table and moves laterally to the sea. The thickness of the brackish lens depends on the magnitude of mixing caused by the tides and the variation in recharge (Ref. 26). Mixing is greatest near the shore due to the proximity to tidal fluctuations (Ref. 25). Groundwater quality varies considerably from place to place, due to variations in the extent of fresh and marine water mixing.

Continuous fresh water addition via rainfall infiltration and movement down the slope toward the shore necessitates a means of outflow. Most of this groundwater escapes into the sea as diffused nonpoint flows along the shore, and at a few places it is concentrated in large springs (Ref. 27). Diffuse groundwater discharge along the shore is a characteristic hydrological feature and has been shown to occur around the entire island of Hawaii (Ref. 25, 27, 28, 29, 30). Experts feel that a substantial part of the island rainfall discharges perenially at the shore. This discharge appears to be most prevalent in embayments, but it is not known if this a true pattern or if it is only more easily detected in bays because of the reduced wave energy. The groundwater flux in the Kawaihae area is probably comparatively low because of the small recharge resulting from the generally low rainfall and high evapotranspiration. Groundwater was probably discharged along the shoreline prior to the construction of the commercial harbor. Excavation and landfill areas of the completed harbor have probably displaced the natural discharge points in the immediate area. There are no data indicating groundwater discharge areas in the present commercial harbor. Landfill may have been impervious enough to displace groundwater discharge to one or both ends of the harbor area, or landfill may have been impervious enough to displace the groundwater discharge point farther seaward within the harbor area. Despite the low percentage of groundwater recharge from local rainfall in the Kawaihae area, groundwater supplies will greatly exceed the demand for water resources for many years in the region, even beyond the year 2000 (Ref. 6).

Two gulches reach the coral fill area, the Makahuna Gulch from the northeast and the Makeahua Gulch from the east. Because of high percolation rates, surface runoff through the site is negligible although occasional heavy storms may produce runoff into marine waters.

3.4 TERRESTRIAL BIOLOGY

The Kawaihae region supports an arid, desert-like vegetation. The soil is the reddish-brown variety typical of Hawaii's desert regions and supports a small number of grasses, hardy shrubs such as the haole koa, ilima, and kolu; and the kiawe tree. Other trees including monkeypod, beach heliotrope, milo, kou, and coconut grow along the shore where groundwater is available (Ref. 3). A row of coconut trees is planted in a strip along the landfill margin at the project site, approximately 200 feet inland from the water's edge, parallel to the shoreline. Beach naupaka (Scaevola fraccada) has been planted as groundcover beneath the palm trees. A Bird and Mammal Survey of Army Lands in Hawaii (Ref. 22) identified the terrestrial

biota on and in the vicinity of the Kawaihae Military Reservation, which is located within the existing deep-draft harbor. Non-game birds recorded consisted of the Japanese White-eye and the House Sparrow. Bird species probably found occasionally in the open landfill and occasionally feeding along the shoreline are the Wandering Tattler, the Ruddy Turnstone, and the American Golden Plover. Additional bird species may include the Cardinal, House Finch, Warbling Silverbill, Spotted Dove, and Barred Dove. The Nene or Hawaiian Goose visited the area irregularly until removed and released elsewhere by government biologists. This location is far from the normal range of the Nene. A pair of Green Sea Turtles were observed off the breakwater during the bird survey (Ref. 22). The Hawaiian population of this species, is now listed by the Federal government as a "threatened" species, however, the prime breeding area for this species is in the northwest Hawaiian islands (Ref. 6).

No Federally- or State-listed threatened or endangered species utilize the project area as a critical habitat, nor is the project area located within or adjacent to any designated wildlife refuge, marine sanctuary, or natural area reserve. The green sea turtle, which was recently listed as a threatened species, occasionally visits the project site (Ref. 7).

A Fish and Wildlife Coordination 2(b) is currently scheduled for the project which will provide a qualitative terrestrial survey (including shorebirds) and update earlier evaluations by Ocean Research Consulting and Analysis, Inc. (Ref. 7) for terrestrial and marine fauna.

3.5 AIR QUALITY

There are no State of Hawaii air quality monitoring stations located near the site of the proposed project. The quality of the air in the Kawaihae area has generally been considered good. The Kona coast of the island of Hawaii is subject to temperature inversions during the early morning and early evening hours; however, the quantity of hydrocarbon emissions generated in the Kawaihae area is so small that there is no apparent reason for concern. The prevailing winds disperse and transport any hydrocarbon emissions out to the sea or over uninhabited land areas. Gusty winds have occasionally, over the last five years, generated fugitive dust from the landfill area of the commercial harbor. This dust has occasionally formed towering clouds that have blown up to a mile offshore. Although a coconut tree windbreak and a small amount of naupaka groundcover are present at the landfill site, they are insufficient to control or mitigate wind-induced erosion (Ref. 6).

3.6 NOISE CONDITION

Existing noise conditions at the proposed project site are a result of both natural and man-induced factors. Natural noises in the vicinity which tend to provide the predominant background sound include wind and surf. Noises generated by man's activities surrounding the site are occasionally superimposed and include commercial harbor activities, nearby highway traffic, and occasional overhead aircraft. Residences in the vicinity of the project site are few and scattered, and are at sufficient distances to remain relatively unaffected by these intermittent sounds. Specific noise level data have not been compiled for the study area (Ref. 6).

3.7 MARINE SETTING

3.7.1 General

Prior to the start of construction of the deep-draft harbor at Kawaihae in 1959, a pristine apron reef of approximately 434 acres existed offshore of Kawaihae. Construction of the deep-draft harbor resulted in the burial of approximately 103 acres of pristine reef by coral landfill, the burial of approximately two acres of pristine reef by breakwater rock, and the destruction of approximately 108 acres by dredging of the pristine reef. Impact to additional pristine reef has also been observed (Ref. 7).

The construction of the entrance channel for a new small boat harbor in 1971 (Project Tugboat, Ref. 2), resulted in the destruction by row charge excavation of approximately two acres of pristine reef at the outer end of the entrance channel (0.5 percent of the original pristine reef area). It is not known to what extent the breakwater constructed for the small boat harbor is acting as either a barrier to sediment transport or a protective structure for the remaining pristine reef outside of the commercial harbor from sedimentation occurring behind the proposed small boat harbor breakwater, but such relationships are highly likely.

There are no known marine biological surveys of the pristine reef off Kawaihae prior to the start of deep-draft harbor construction in 1959.

3.7.2 Bathymetry

The large coral reef offshore is the most predominant submarine geological feature near the project site. Analyses of maps indicate that only three small apron reefs exist off the island of Hawaii of which the Kawaihae

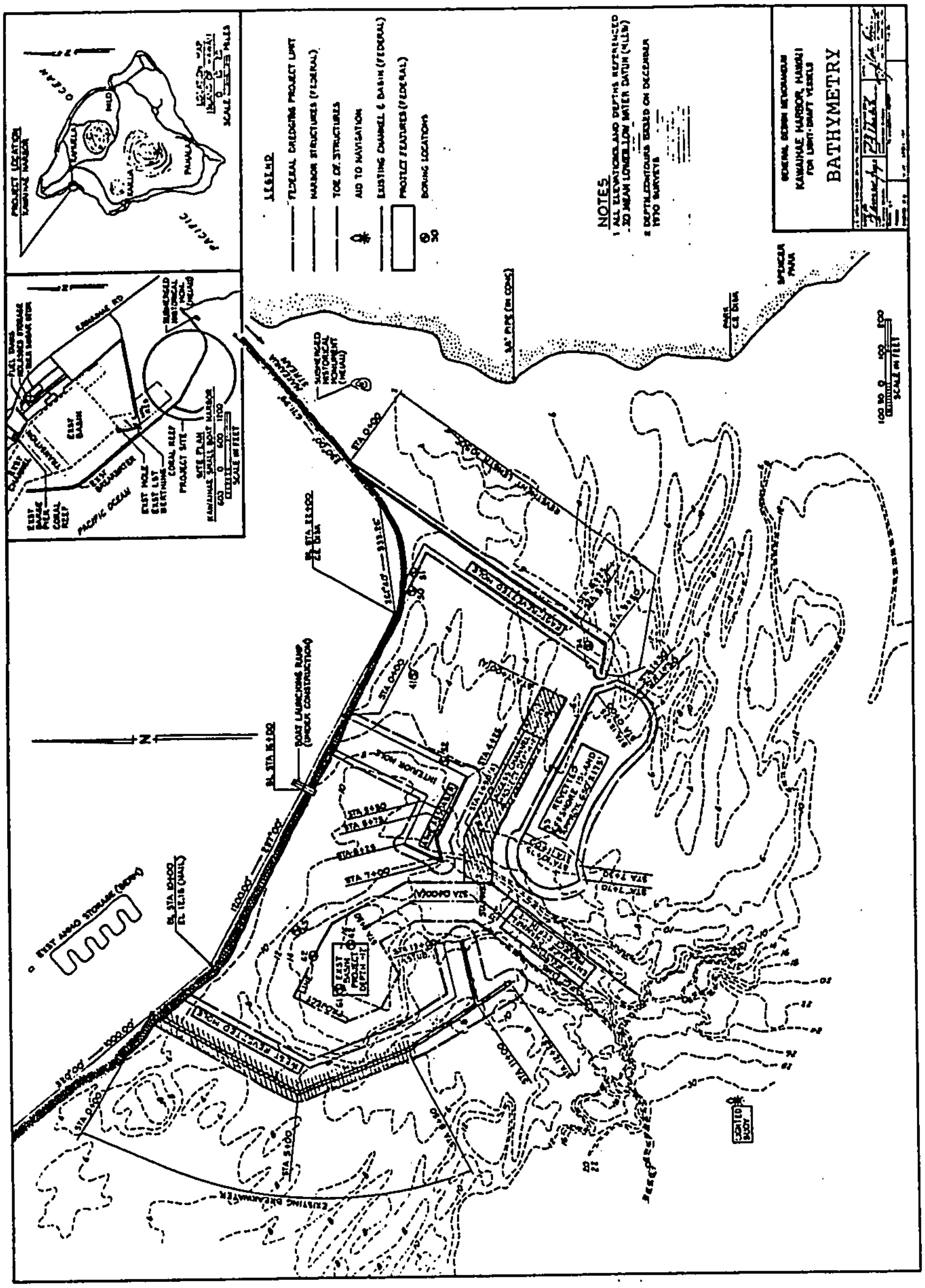
reef is the largest. Extensive sand deposits offshore from Kawaihae (Ref. 24) and sand from pocket beaches along the coast are derived from the erosion of coral reef. Extensive marine geological investigations were conducted during Project Tugboat (Ref 2) before and after the explosive excavations. Drillings to a depth of 76 feet below mean lower low water did not penetrate through the coral reef structure to the underlying basalt layer. Detailed depth soundings prior to Project Tugboat detonations revealed a complex and irregular reef bathymetry at the project site. In general, the submerged areas comprising the shallow southeastern basin of the proposed harbor have an average water depth of four feet while the deeper northwestern basin has an average of 12 feet. Figure 3 shows the bathymetry of the project area. The reef areas at the project site were classified by the Corps of Engineers into several categories prior to detonations:

A. Sediment Zone. The 150-foot- wide section adjacent to the existing coral fill area was covered by sediment deposits two to eight feet thick consisting of silt-sized blue-grey particles basaltic in origin.

B. Sporadic Coral Growth Zone. The zone between 300 to 600 feet off-shore from the existing fill area is relatively flat and covered with benthic algae (seaweeds). Scattered, large, and living coral heads rise to near sea level in the zone.

C. Active Coral Zone. Between 600 to 1,000 feet from the existing fill area is found a variety of species and forms of living coral, including dome-shaped colonies (probably Porites lobata) and branching finger-like forms (Porites compressa). The corals create a rough and irregular surface.

D. Sand Channels. Between 800 to 1,500 feet from the existing fill area are found sand channels which cut into the reef rock. The sand channels are seaward dipping grooves formed by a combination of wave action and scour. The location and thickness of the large sand channel off Spencer Beach Park has been studied by Marine Options Program students at the University of Hawaii, Hilo (Ref. 23). The report indicated that a branch of the sand channel diverges north toward the site of the proposed harbor. The thickness and width of the sand deposit increases offshore toward deeper water. The deposit was mapped south of the breakwater from the shoreline at the beach park to a depth of 100 feet offshore.



(REF. 4)

FIGURE 3

All of the reef flat in the proposed small boat harbor area has been covered by additional materials during and since the construction of the commercial harbor and the small boat harbor breakwater. The sources of these sediments are the landfill area of the commercial harbor and silts washed into the nearshore area from Makeahua Gulch. These sediments are deposited in the deeper water behind the existing breakwater of the proposed small boat harbor as currents are sluggish in this area. The Makeahua quarry, utilized during the construction of the commercial harbor, is situated in Makeahua Gulch approximately 0.5 mile from the proposed project site and probably contributes sediments to the mouth of Makeahua Gulch during storm runoff.

Project Tugboat detonations resulted in the scattering of ejecta material over a large area and the accumulation of silt in the basin and entrance channel created by the detonations. Submarine observations indicate that the inshore silt deposits near the existing fill and breakwater have increased since predetonation conditions (Ref. 5).

It may later be necessary for the State of Hawaii to further alter the bathymetry of the small boat harbor area by additional dredging to provide adequate depth clearance for boats moored in the eastern basin, which now has an average depth of only four feet.

3.7.3 Oceanography

Detailed observations on the oceanography of Kawaihae Bay were conducted for the Corps of Engineers between June 1973 and June 1974 (Ref. 13). These studies, conducted monthly, included measurements of currents, turbidity, winds, and waves. Within the proposed small boat harbor area, the currents are wind-induced and are typically of very low velocity (0.02 to 0.1 knot) which is usually characterized as "deadwater" or "stillwater." The exchange rate between the project waters and the open ocean is very slow. However, waters off Spencer Beach Park move rapidly with the wind. The layer of water affected by the wind is believed to extend to the full depth over most of the Bay when wind velocities exceed 12 to 15 knots. Beach debris from Spencer Beach was commonly observed in offshore waters but was never reported entering the area of the proposed small boat harbor behind the breakwater. The effect of ocean swell on currents within the basin was observed to be minor. Currents were slightly swifter during ocean swell conditions in the area of the proposed harbor basin. Waves most responsible for affecting the Kawaihae area are the Kona storm waves which are most likely to occur in winter and early spring, and waves of the southern swell occurring most frequently in

the summer months. Kona storm waves commonly have heights of ten to 15 feet and eight- to ten-second periods while the typical southern swell produces one- to four-foot waves with periods of 14 to 22 seconds (Ref. 33). Only one damaging storm has affected the Kawaihae Deep-Draft Harbor since its completion in 1959. This storm occurred on 18 January 1963 and caused damages to the barge landing and the existing small boat harbor.

Wave refraction studies were conducted for deep water waves approaching the project site from S67.5 W, due west and N67.5 W, utilizing the offshore island, Alternate #3, design Alternate A. These directions were governed by analyzing storm exposure conditions. Based on the refraction studies, a 25-foot, 16-second wave from N67.5 W is the critical deepwater storm wave affecting the project site (see Ref. 4).

3.7.4 Tsunamis

Since 1819, the Hawaiian Islands have experienced six major tsunamis comparable in magnitude to the one which struck Hilo in 1946 (Ref. 34). Analysis of data indicates that damaging tsunami phenomena may be anticipated once every 25 to 30 years in Hawaii (Ref. 35). Only tsunamis approaching from the west will strike the Kawaihae coast directly and produce considerable runup. However, written records have indicated that no tsunamis have approached Hawaii from the west (Ref. 34) and that their probable occurrence is assumed to be very rare. Tsunamis can approach the Kawaihae Coast from other directions only by refraction or diffraction. Two of the historical tsunamis can be attributed to disturbances in the Kamchatka-Aleutian region, north and northwest of Hawaii. Tsunami runup date have been collected since 1946 and during this period of record the highest inundation recorded along the west coast of the island of Hawaii was +13 feet MLLW. The maximum water level observed during the 1960 tsunami was nine feet above MLLW, while observed water levels at the time of the 1946 and 1957 tsunamis were five and 12 feet above MLLW, respectively (Ref. 6).

3.7.5 Marine Water Quality

The offshore waters of the Kawaihae area are currently classified "A" by the State of Hawaii. These waters are to be protected for recreation (including fishing, swimming, boating, and water-contact sports), aesthetic enjoyment, and the support and propagation of aquatic life. The offshore Kawaihae area is designated as an Effluent Limitation II Segment (EL II). These are water areas where water quality is meeting or will be higher than the applicable water quality standards (Ref. 36).

The waters within the commercial deep-draft harbor are classified "B" to be protected for small boat harbors, commercial and industrial shipping, bait fishing, compatible recreation, and the support and propagation of aquatic life, and aesthetic enjoyment. Freshwater springs line the shoreline along the Pu'ukohola National Historic Site. The intrusion of this fresh and brackish water along the coastline contributes to depressed surface salinities in the nearshore area (Ref. 37) and these waters may not meet their classification requirements for water quality.

Some water quality measurements on turbidity at the small boat harbor project site were described in 1974 (Ref. 11). Water turpidity is high at times within the proposed harbor basin area and along the walls of the landfill area, with water visibility generally less than one meter. Both act as silt traps, and the fine sediment particles may be placed in suspension during windy periods. There is ample evidence of silt being blown from the existing landfill area of the commercial harbor into the waters of the proposed small boat harbor and of landfill erosion along the revetment of the landfill area (Ref. 7). Additional fresh groundwater outflow contributes to the turbidity. Recent aerial photographs show additional evidence that sediment transported from Makeahua Quarry is directed into the cul-de-sac water area formed by the landfill site (Table 1).

Table 1. Water Quality Data. Salinity, temperature, orthophosphate and combined nitrate/nitrite values for three Kawaihae harbor sites. Samples were obtained from 12-14 April, 1978 during the daily maximum high and minimum low tide at the surface collected nearshore (100m distant) and offshore (250m distant.)

Depth	Station	Tide Level	S°/oo	PO (ug-at/l)	NO /NO (ug-/at/l)	Temp °C
Outer Reef Deep-Draft Harbor						
Bottom	250m	High	33.90	0.58	0.77	24.6
Surface	250m	High	32.23	0.39	0.46	25.3
Bottom	100m	High	34.14	0.54	0.63	25.3
Surface	100m	High	33.86	0.28	0.76	25.3

Bottom	250m	Low	33.40	0.21	0.62	24.9
Surface	250m	Low	34.08	0.19	0.55	25.2
Bottom	100m	Low	32.25	0.18	0.95	25.6
Surface	100m	Low	34.23	0.23	0.67	25.8
Small boat Harbor Project Site, West Mole (Existing Project Tugboat Basin)						
Bottom	250m	High	33.20	0.77	0.54	24.5
Surface	250m	High	32.14	0.80	1.26	25.4
Bottom	100m	High	34.04	0.56	0.12	24.7
Surface	100m	High	33.42	0.69	1.57	25.3
Bottom	250m	Low	34.23	0.21	0.62	25.3
Surface	250m	Low	34.25	0.23	0.75	25.4
Bottom	100m	Low	33.20	0.29	0.05	24.6
Surface	100m	Low	34.19	0.24	0.06	25.1
Spencer Park						
Bottom	250m	High	34.04	0.77	0.93	25.0
Surface	250m	High	30.00	1.52	6.26	25.7
Bottom	100m	High	33.73	0.77	1.47	25.0
Surface	100m	High	30.98	1.33	7.37	25.5
Bottom	250m	Low	34.17	0.30	0.97	25.1
Surface	250m	Low	33.82	0.32	1.24	25.7
Bottom	100m	Low	34.14	0.30	1.09	25.4
Surface	100m	Low	32.05	0.68	3.29	26.6

(Ref. 7.)

The mouth of Makeahua Gulch also shows recent accumulations of terrigenous silt deposits and turbid waters. Haleokapuni Heiau is believed to have been buried in the silt in recent years (see Section 3.11). Elsewhere outside the harbor complex, water quality appears good and water clarity high. At times, waters off Spencer Beach Park are turbid, but flourishing coral communities exist and tolerate the conditions. A number of water quality parameters were monitored within the commercial harbor during field evaluations on the effect of dredging operations on water quality and marine life (Ref. 10).

Water quality within the Kawaihae Small Boat Harbor Project Site (existing harbor structures) is listed as meeting quality standards for Class A waters. Turbidity is high due to windborne dust from the landfill area and from sediments transported into the area from the quarry area. Low surface salinities and high nutrient values at a water quality study site off Spencer Park are probably the result of groundwater seepage into the nearshore marine environment. Similar groundwater contribution of nitrates has been demonstrated at Waialua Bay (Ref. 38), Barbers Point (Ref. 39), Honokahau Harbor (Ref. 40), and at Lahaina (Ref. 41). High nitrate values in the project area are probably related to fresh groundwater discharge in the area. Water circulation is poor due to low velocity wind-induced currents, and the prevailing wind directions create eddy patterns near and within the project site (Figure 3).

3.7.6. Marine Biology

One hundred eleven species of fish were reported by personnel of the State Fish and Game Division who conducted marine biological surveys before, during, and after Project Tugboat (1969-1970, Ref. 2). The majority of these species were observed in the reef areas not disturbed by the effects of commercial harbor construction. The project site was within the areas that were disturbed during the harbor construction.

However, in another study, the Ocean Research Consulting and Analysis, Ltd. report (1978, Ref. 7) states that within the proposed small boat harbor area, "The benthic environment is silt laden, coral cover is subnormal, and the fish life is virtually non-existent, and the area has shown very little recovery or growth since pertubation." Coral cover in the project site was relatively low (in 1978) with the bottom mainly dominated by silt and fine sand. In contrast, the reef within the breakwater of the deep-draft harbor demonstrated a marked recovery in coral growth since basin dredging and breakwater construction. This recovery is believed to be due to (1) availability of hard substrate, (2) ample water circulation, and (3) sufficient water clarity for growth. In rubble areas of the project site, coral recruitment has been restricted to small rubble fragments which ultimately limits the size of the colony. Some coral species are able to withstand heavy siltation (Yonge, 1935; Marshall and Orr, 1931); however, any sedimentation within the project area may cover rubble fragments making suitable substrate unavailable to settling larvae. These stresses may consist of (singly or in various combinations): (a) sedimentation that occurred only during construction of the deep-draft harbor; (b)con-

tinuing sedimentation that may be attributed to wind-induced erosion of, or leakage from the commercial harbor landfill and dredged coral stockpile; and (c) continuing sedimentation that may be attributed to transport of quarry tailings by flash flood waters coursing through Makeahua Quarry.

The degree of sedimentation within the project area that may be attributed to each of the above sedimentary processes is difficult to assess; however, elimination or mitigation of the above stress factors (either singly or in various combinations) may contribute to the improvement of the project's marine environment and possibly provide suitable conditions for the recruitment of biota from the non-affected areas surrounding the project site. Candidate recruitment species for the project site, if improved ecological conditions permit, would include those species observed and reported by the State Division of Fish and Game (1969-1970, Ref. 7); by Cheney et al. (1977, Ref. 37), and by Ocean Research Consulting and Analysis, Ltd. (1978, Ref. 7).

Many varieties of corals, including Porites and Pocillipora are common components of the remaining living reef communities outside of the project area. An uncommon Hawaiian coral, Porites (Synaraea) convexa, seems to achieve unusual abundance at Kawaihae offshore from Spencer Beach Park and off of the commercial harbor breakwater. The reef seaward and to both sides of the proposed small boat harbor is well-developed, pristine, wave-exposed, coral reef with abundant fish population and a typical dominance of the finger coral Porites compressa and the lobed coral Porites lobata.

In deeper waters off Kawaihae, black corals and abundant sand deposits are found which contain a variety of organisms including polychaete worms, sea slugs, benthic algae, and communities of the pen clam Pinna (Ref. 24). Thirteen species of macroscopic algae were found off the shore of the Pu'ukohola National Historic Site in 1977 (Ref. 42), of which only two were abundant, Biddulphia pulchella and Valonia aegagrophila. Two species which are sometimes indicative of polluted water, Ulva fasciata, and Enteromorpha sp. were present along the Kawaihae commercial harbor revetment. A more recent algal survey in 1978 (Ref. 7) within and in the vicinity of the proposed boat harbor observed and collected 15 species of macroscopic algae. In the northern third of the sea floor of the proposed project site, species of micromolluscs are present in dense populations indicating that sediments are oxidizing in nature. Mullet, akule, and a wide variety of reef fish and some green sea turtles (Chelonia mydas) have

been caught by gill net fishermen. The green sea turtle was recently listed as a threatened species. Nehu is also caught in the area with surround nets. The area immediately adjacent and to the south of the project are is a shark breeding and spawning ground. Grey reef sharks (Carcharhinus menisorrah) and white tip reef sharks (Tridenodon obsesus) frequent the shallow waters of Pu'ukohola Bay. During the calving season from November to March, Humpback whales (Megaptera novaeangliae) pass as close as 400 meters off the commercial harbor breakwater. The offshore waters of the Kona Coast are some of the richest fishing grounds in the main Hawaiian Islands (Ref. 6).

3.7.7. Climate and Meteorology

The general climate of Kawaihae is typical of the leeward sides. During most of the year, rainfall is sparse and winds are light and variable. The area is semi-desert: sunshine predominates, soil is thin, vegetation is scanty and composed of hardy, drought-resistant plants. Temperatures vary from warm during the night to hot during the day. The average annual high temperature for the Kawaihae area is 83.4 F, while the average annual low is 67.0 F (see Table 2). Rainfall for the area is an average 16.33 inches annually.

Table 2. Surface Temperature and Rainfall Summary for Kawaihae Area

Month	Average High Temperature (°F)	Average Low Temperature (°F)	Average Rainfall (in)
January	80.8	63.4	3.14
February	80.4	63.0	2.54
March	80.4	63.9	2.22
April	81.4	65.3	1.44
May	83.4	67.1	0.69
June	85.4	68.9	0.18
July	86.4	70.1	0.43
August	87.0	71.0	0.35
September	86.7	70.0	0.25
October	85.5	69.1	0.87
November	82.9	67.0	1.52
December	80.6	64.8	2.70
Annual	83.4	67.0	16.33

(Ref. 2.)

Because Kawaihae Bay lies nestled at the base of the coalescing slopes of the three mountains Kohala, Mauna Kea, and Hualalai, winds are very unpredictable. Additionally, temperature variations in the specific heats of water, air, and land affect the land and sea breeze setup, causing the wind patterns to change from morning to afternoon. General patterns are:

1. Normal tradewinds from the north-northeast dominate about 75% of the time at Kawaihae.

2. When tradewinds reach velocities in excess of 20 knots, the wind may approach Kawaihae from easterly headings.

3. Eddies probably characterize much of the wind pattern setup by topographic effects.

4. The harbor area is protected to a great extent against north-easterly storms by the Kohala Mountains and against southerly storms by the promontory to the south.

A typical day begins with westerly winds at five to eight miles per hour at 9:00 to 10:00 a.m. These winds blow continuously througout the day until 7:00 to 10:00 p.m., during which time the winds usually shift to easterly at seven to ten miles per hour and continue until three to four hours after sunrise. During wind shift times, the wind speed is rather light and the direction is quite variable. During the winter months, the steady pattern of the tradewinds occasionally breaks down for periods of several days. During these periods "Kona" (leeward) storms may occur, bringing fresh to strong southwesterly winds and heavy rains (Ref. 11).

3.8. INFRASTRUCTURE, UTILITIES AND SERVICE SYSTEMS

Telephone, power and water lines service the deep-draft harbor and the small number of residents in the Kawaihae area. Waste water in the area is handled only by local cesspools.

Presently, a six-inch domestic water main within Kawaihae Road serves the Kawaihae Village and surrounding developed areas. Presently, however, the line is inadequate to serve all of the harbor's various activities and provide adequate fire protection capacity. The County of Hawaii will allow a 5/8-inch meter to service the project.

A 12-KV distribution line exists within Kawaihae Road. In addition to the 12-KV line, a 69-KV transmission line is installed on the existing pole, but is not active.

A solid waste disposal site exists approximately five miles from the site at the public Puako Transfer Station, a collection area where a container trailer equipped with hydraulic compactor is stationed (Ref. 43). Also, the Waimea open dump is located nine miles away.

The nearest police stations are located in Kapaau and Waimea. The nearest 24-hour fire station is in Waimea, while there are 8-hour stations in Hawi and in Kawaihae.

Medical services are provided at Kohala Hospital in Kapaau, Honokaa Hospital in Honokaa, and Kona Hospital in Kealakekua.

Land transportation is served by major highway systems that link Kawaihae to Kamuela, Hawi, and Kailua. The Kaahumanu Highway 19 (or Queen's Highway) links Kailua to Kawaihae and Kawaihae to Waimea, while State Highway 27 links Kawaihae to Hawi. The Kawaihae bypass connects the Route 19/270 intersection northerly 2.8 miles to a new connection with existing route 270. Bus lines also service these routes. This relatively recent completion of Highway 19 between Kailua and Kawaihae and (Federal aid project No. S-0270 [4]) provides the potential for major economic, commercial, and residential expansion. Both the existing County road leading to Spencer Beach Park and State Highway 27 now transit the Pu'ukohola Heiau National Historic Site adjacent to the project site. The bypass road will supercede the existing Route 27. Both roads will ultimately be rerouted outside of the boundaries of the historic site, and the segments existing within the site demolished. Unimproved roads exist in the adjacent landfill area and traffic in the landfill area is minor. Paved roads serve the area within the commercial harbor.

The new Keahole Airport north of Kailua is now less than 25 miles from Kawaihae and serves the western side of the island.

Marine transportation is now served by the commercial deep-draft harbor at Kawaihae which is the newest and fastest growing harbor in the State. The port provides shipping facilities for the south and west coast of Hawaii, thus eliminating the costly overland transportation of goods and supplies from Hilo 76 miles distant. The Kawaihae commercial port is designed for the further expansion of activities and commerce anticipated for the Kona Coast.

Ammunition storage facilities on the project site are periodically used by the U.S. Army. Coordination with the U.S. Army Munitions Division will be carried out for any work affecting the ammunition storage facility.

3.9. SOCIO-ECONOMIC SETTING

3.9.1 Demographics

The resident population of Hawaii County (island of Hawaii) according to the U.S. Bureau of Census survey conducted in 1980 is 92,053, with the North and South Kohala Districts making up approximately 8.5 percent of this total, or 7,856. The districts cover a land area extending in a 35-mile radius from Kawaihae and their respective populations are: North Kohala, 3,249; South Kohala, 4,607; Hamakua 5,128; and North Kona 13,748 (see Table 3). Hilo is the only major urban concentration with a population of 35,269. Population projections for Hawaii County in 1985, 1990, 1995, and 2000 are, respectively, 95,200, 105,100, 115,000, and 123,300.

Residents of Japanese extraction make up the largest segment of the island's resident population at 30.4 percent. Hawaiians and part-Hawaiians make up the second largest group at 25.3 percent, followed by Caucasians at 22.1 percent. The average family size in the County is 3.38, with a median income of 11,337 (Ref. 19).

Table 3. Resident Population of Counties and Districts: 1970 to 1980

	1980 Census Data		1970 Census Data		#Change	%Change
SOUTH HILO DISTRICT		42,278		33,915	8,363	24.7
City of Hilo	35,269		26,353		8,916	33.8
Honomu	559		737		-178	-24.2
Papaikou	1,567		1,888		-321	-17.0
Paukaa	544		-		-	-
Wainaku	1,045		-		-	-
Remainder	3,294		4,937		-1,643	-33.3
NORTH HILO DISTRICT		1,679		1,881	-202	-10.7
Laupahoehoe	500		452		48	10.6
Ookala	401		486		-85	-17.5
Remainder	778		943		-165	-17.5
HAMAKUA DISTRICT		5,128		4,648	480	10.3
Honokaa	1,936		1,555		381	24.5
Kukuihaele	332		310		22	7.1
Paauilo	755		710		45	6.3
Remainder	2,105		2,073		32	1.5

		1980 Census Data		1970 Census Data	#Change	%Change
NORTH KOHALA DISTRICT		3,249		3,326	-77	-2.3
Hawi	795		797		-2	-0.2
Kapaau	612		237		375	158.2
Remainder	1,842		2,292		-450	-19.6
SOUTH KOHALA DISTRICT		4,607		2,310	2,297	99.4
Waimea	1,179		756		423	56.0
Remainder	3,428		1,554		1,874	120.6
NORTH KONA DISTRICT		13,748		4,832	8,916	184.5
Holualoa	1,243		-		-	-
Kainaliu	512		-		-	-
Kailua	4,751		365		4,386	1,201.6
Remainder	7,242		4,467		2,775	62.1
SOUTH KONA DISTRICT		5,914		4,004	1,910	47.7
Captain Cook	2,008		1,263		745	59.0
Kealakekua	1,003		740		263	35.5
Remainder	2,903		2,001		902	45.1
KAU DISTRICT		3,699		3,398	301	8.9
Naalehu	1,168		1,014		154	15.2
Pahala	1,619		1,507		112	7.4
Remainder	912		877		35	4.0
PUNA DISTRICT		11,751		5,154	6,597	128.0
Keaau	775		951		-176	-18.5
Mt View	540		419		121	28.9
Pahoa	923		924		-1	-0.1
Remainder	9,513		2,860		6,653	232.6
TOTAL	92,053		63,468		28,585	45.0

SOURCE: U.S. BUREAU OF THE CENSUS, 1980

3.9.2 Economy

Population changes between 1970 and 1980 reflect changing socio-economic conditions and activities. While the South Kohala District population has increased 99.4 percent due to tourist and second home land development and increased industrial activity at Kawaihae, North Kohala population has decreased 2.1 (Ref. 19) percent because of shifting employment opportunities particularly in agriculture; the termination of Kohala Sugar Company operations being the primary factor.

Until recently, the Kohala area has been agriculturally oriented, producing sugarcane, diversified truck crops, and cattle. However, the principal crop, sugarcane, was phased out of North Kohala in 1975. There are presently many attempts to diversify the agricultural and economic base of the area. The rich soils and greater rainfall of the North Kohala area suit agriculture well, but those of the more arid Kawaihae region do not. The major commerce of the region includes cattle ranching on the upper slopes, oil storage, tourism, marine transportation, residential land development, small businesses, and charter boat fishing. There are numerous plans for economic expansion at Kawaihae, particularly within the resort and visitor industry (Ref. 44, 45). Kawaihae has also been proposed as a site for an oil refinery, and Hawaiian Electric Company is investigating a site along northern Kawaihae Bay for a power generating station. The State of Hawaii's implementation of improved marine and land transportation facilities will undoubtedly contribute toward economic growth. The existing commercial harbor contributes both directly and indirectly to the economy of the local area as well as the State by providing governmental revenues, private enterprise profits, and jobs (Ref. 6).

There appears to be little doubt that the economic base of the Kohala area has been and will continue to shift toward a tourist recreation base. In February 1980, for example, there were 407 existing hotel units in the Kohala districts and 3,348 planned (either under construction or announced for future construction) (Ref. 19).

Existing and planned real estate development directed toward vacation, retirement, and second home markets will further accelerate the changing nature of the economic base and put increasing pressures on existing and available recreational and tourist-related facilities. Thus a favorable economic climate for new visitor-related commercial development including commercial sports fishing and other boating related recreational activities is created.

Retail commercial service centers for the Kohala districts are currently concentrated in Waimea and Hawi. Projected hotel development will also include related commercial activities but there will also be new demand for non-hotel retail outlets more convenient to the concentrations of new developments in South Kohala.

Along with hotel and commercial development an increased demand for labor will be created and concurrently a demand for convenient employee housing. Thus, it can be anticipated that a continued shift and growth of permanent resident population to South Kohala and the Kawaihae area will occur. Assuming that all of the planned hotel development is accomplished, and using an employment

multiplier (including secondary employment) of 1.5 jobs per hotel room (an approximate average of outer island ratios), employment within the Kohala districts can be expected to grow by 5,189 jobs within the foreseeable future, perhaps by the year 2000. This would result in approximately 2,500 to 3,000 new households, depending on the number of jobs per household and the number of current residents who will enter the new labor market.

3.10. RECREATIONAL SETTING

3.10.1. Boat Registration

According to the May, 1983 list of boats for the island of Hawaii, there are a total of 2,751 boats, varying in size from six feet to 50 feet, registered with the Harbors Division. By districts, the distribution is shown on Table 4.

Table 4. Boat Registration

District	No. of Boats
Hamakua, East Hawaii	111
North Hilo, East Hawaii	23
South Hilo, East Hawaii	751
Puna, East Hawaii	341
Kau, East Hawaii	64
North Kohala, West Hawaii	87
South Kohala, West Hawaii	194
North Kona, West Hawaii	1,108
South Kona, West Hawaii	72
TOTAL	2,751

Of the 2,751 boats, 1,461 boats (53%) are in West Hawaii where the population in 1980 is 27,518 persons or 30 percent of the island population. One thousand two hundred ninety (47 percent) are in East Hawaii where the 1980 population is 64,535 persons or 70 percent of the total population (Ref. 43).

3.10.2 Existing Boating Facilities

To satisfy the demands of the boating public, the State has provided, either in dredged harbors, or in complementary facilities at natural coastal bays and estuaries, five small boat harbors throughout the island. These are located at Hilo in East Hawaii and at Keauhou Bay, Kailua Bay, Honokohau and Kawaihae on West Hawaii.

In addition to the harbors, the State has provided for launching ramp facilities at the following locations (Ref. 43):

Keauhou Bay, North Kona, West Hawaii
Kailua-Kona Wharf, North Kona, West Hawaii
Kawaihae, South Kohala, West Hawaii
Puako, South Kohala, West Hawaii
Honokohau Boat Harbor, South Hilo, East Hawaii
Wailoa River, South Hilo, East Hawaii
Kaulana, Kau, East Hawaii
Pohoiki, Puna, East Hawaii

3.10.3 Boating Analysis

On a boat-ownership-per-population basis, the ratio is 30.5 boats per 1,000 persons for the Island. By district, the ratios are shown on Table 5 (Ref. 43).

Table 5. Boat Ownership Ratios

District	No. of Boats	Population	Boats per 1,000 Persons
Hamakua	111	5,128	21.6
North Hilo	23	1,679	13.7
South Hilo	751	42,278	17.8
Puna	341	11,751	29.0
Kau	64	3,699	17.3
North Kohala	87	3,249	26.8
South Kohala	194	4,607	42.1
North Kona	1,108	13,748	80.6
South Kona	72	5,914	12.2

(Ref. 43.)

Within the tributary area of North and South Kohala, Hamakua, and North Kona, the boat ownership and boat size breakdown is as shown on Table 6. Statistics for North Kona are shown for comparison purposes and also since North Kona is a neighboring district (Ref. 43).

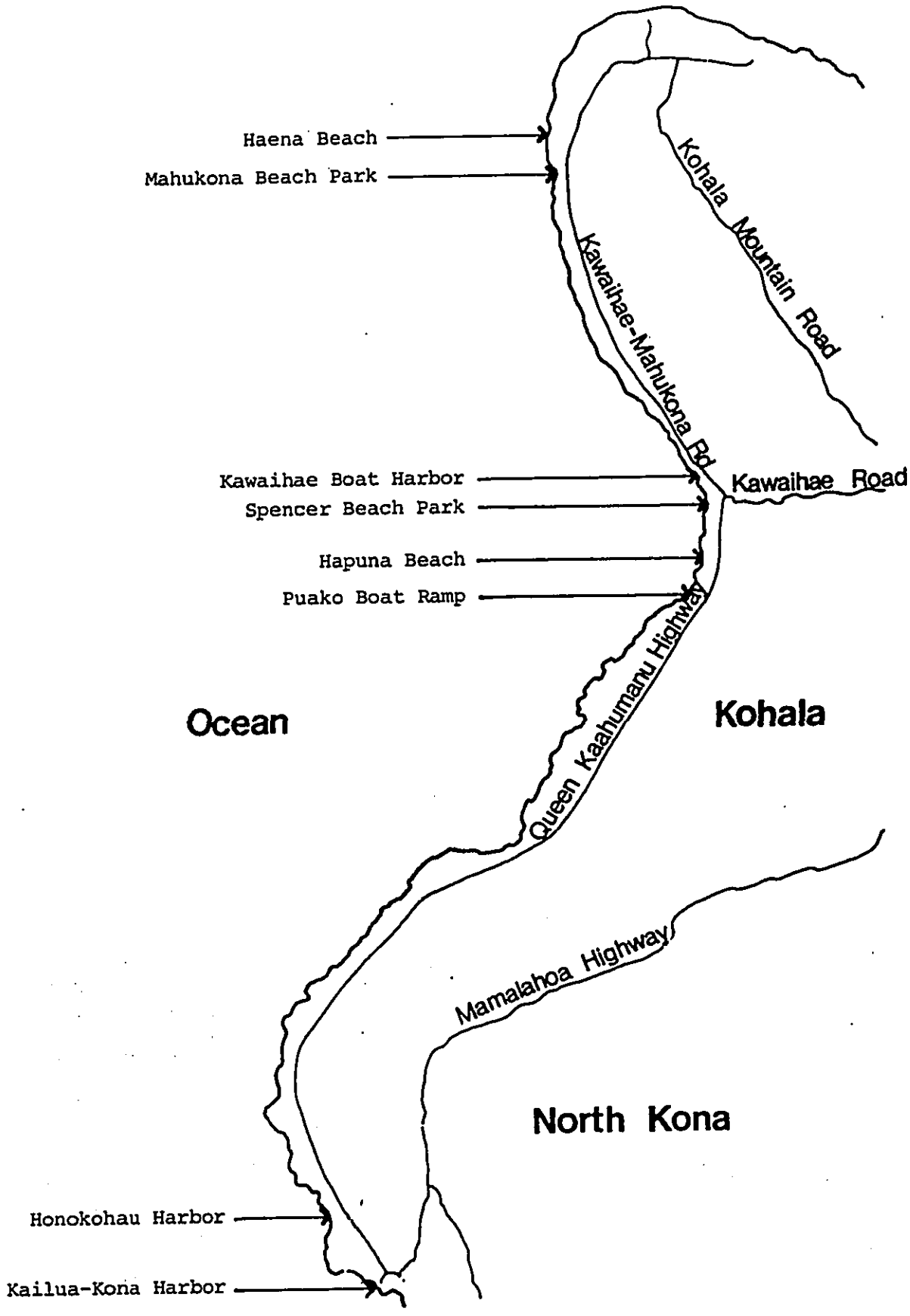
Table 6. Boat Size Breakdown

Boat Size	Tributary Area: North Kohala	South Kohala	Hamakua	Total	North Kona
18' and below	64	127	68	259	474
19' - 25'	23	52	37	112	525
26' - 30'	-	9	3	12	67
31' - 35	-	4	2	6	22
36' - 40'	-	2	1	3	11
41' & over	-	-	-	-	9
TOTAL	87	194	111	392	1,108

(Ref. 43.)

3.10.4. Other Recreation

Public recreation facilities in the tributary area (Figure 4) include Hapuna Beach State Park, three miles south, Kauna'oa Beach, two miles south, Lapakahi Historic Site and State Park, 15 miles to the north, Mahukona Beach Park, 17 miles to the north, and Kapaa Beach Park, 19 miles to the north. Also in the tributary area in the Niulii area is the Keokea Beach Park and Pololu Valley lookout. The Mauna Kea State Park is approximately 60 miles by road to the east of the project site. There are plans to ultimately develop much of the area between Puako and Kawaihae into recreational areas according to the Division of State Parks, Outdoor Recreation, and Historic Sites, Department of Land and Natural Resources. Lapakahi historical site (and the Mahukona boat launching ramp) is 15 miles to the north. Although three surfing sites were identified in the vicinity of the proposed project area by the Hawaii Surfing Survey conducted in 1968, these sites were classified as ancient Hawaiian surfing sites and are not extensively surfed now. The surfing information sheet also stated that the sites offer good or average surfing conditions only 30 percent of the year. A major recreational problem identified by the Hawaii Resources Regional Study was the lack of adequate public access to



LOCATION OF RECREATIONAL FACILITIES
KAILUA TO MAHUKONA

(REF. 6)

FIGURE 4

nearshore areas in the Kawaihae region. Spencer Beach Park, 1,300 feet to the south is heavily used as a camping, swimming, diving, and picnicking beach. Spencer Park is heavily used during peak weekend and seasonal periods. Fishermen have been observed utilizing the commercial harbor for recreational fishing. Water contact sports are probably minimal in the proposed harbor area and adjacent areas due to the presence of several shark species that inhabit these areas (Ref. 6).

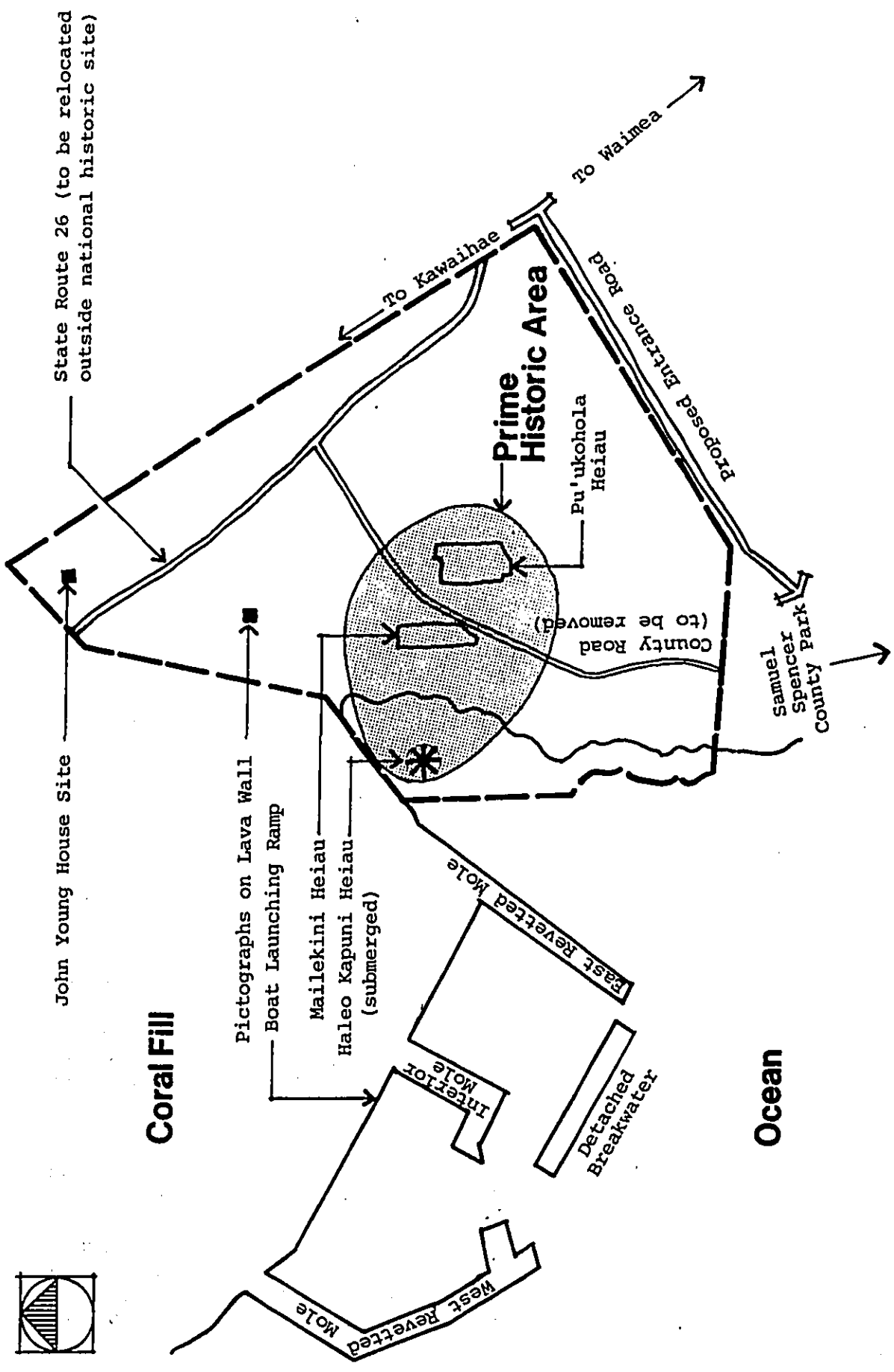
The three resort areas, all located south of the harbor, are the Mauna Kea Beach Hotel, located approximately 2.2 miles from the harbor, having 310 rooms with an 18-hole golf course and clubhouse; the Mauna Lani Resort, eight miles from the site, having an 18-hole golf course and clubhouse; and the Waikoloa Beach Resort, ten miles from the harbor, having an 18-hole golf course and clubhouse.

3.11. HISTORICAL/ARCHAEOLOGICAL SETTING

No historical or archaeological sites listed with the National Register of Historic Places lie within the project landfill or water area. Approximately 600 feet to the south, however, is the Pu'ukohola Heiau National Historic Site, a 77-acre area consisting of three ceremonial Hawaiian temples (heiaus), petroglyphs, and the John Young Homesite (Figure 5). Two of the temples, the Pu'ukohola Heiau and the Mailekini Heiau, are located 700 feet from the project site near the beach at the mouth of the Makeahua Gulch. The third is the Haleokapuni Heiau, which is believed to be submerged and buried offshore, its exact location having been lost.

The Pu'ukohola Heiau is the largest of the three, dominating the site 135 feet above the nearby beach. It is a massive lava-rock structure measuring 225 by 100 feet which is walled on the ends and mauka side by 40- to 50-foot sloping walls. The seaward side is open with three long, narrow terraces extending the entire length of the heiau. The structure is partially restored and in excellent condition, walks and steps rendering it accessible to the public.

The Pu'ukohola Heiau was built by King Kamehameha, his chiefs and his workers, in 1791 for the war god Kukailimoku in order to win his favor and conquer all of the Big Island of Hawaii. It was during and after this time that King Kamehameha the Great rose in power, eventually to become the first king in Hawaii to rule all of the major islands in the chain. Because Pu'ukohola played a significant part in Kamehameha's accumulation of power, the temple is listed in the National Register of



RELATIONSHIP OF RECOMMENDED KAWAIHAE SMALL BOAT HARBOR
TO PU'UKOHOLA HEIAU NATIONAL HISTORIC SITE

(REF. 6)

FIGURE 5

Historic Places. During Project Tugboat detonations, precautions were taken to monitor and minimize structural damage to the heiau, and the explosions did not appear to cause any visible damage (Ref. 2).

The Mailekini Heiau, immediately below Pu'ukohola, was erected earlier as a large, high-walled, court-type luakini (state or royal) heiau and represents the inter-chiefdom and inter-island warfare of the period before 1780 when it served as the principal temple of the ruling chief Kohala. The main platform measures 300 by 400 feet, but only the partially restored ruins remain today.

The Haleokapuni Heiau was dedicated to the shark gods and is said to have been used by Kamehameha as a heiau for feeding sharks. The heiau is now submerged under silt, although positive evidence of a structure and its exact locations is lacking. Personal accounts recall a structure about 30 meters offshore and directly in line with the Pu'ukohola and Mailekini Heiaus. During the construction of the large harbor, a quarry was opened in the uplands between the Makeahua and Makahuna gulches. The size and configuration of the harbor resulted in the relocation of the gulches which now converge between the harbor fill area and the proposed historic site. It is believed that sediment from the quarry operations buried the Haleokapuni Heiau immediately following the period of major construction (1957-1962). Recent archaeological surveys have failed to produce the presence of any subsurface structures in the area. The site currently an area of concentrated shark activity, which reinforces the historic significance of the shark heiau.

Directly below the Mailekini Heiau is the large, five-foot-high upright stone known locally as "Kamehameha's chair." The seat was said to be used by Alapai-Kupalupalu-mano, one of Kamehameha's staff chiefs and also by Kamehameha as he observed the proceedings at Haleokapuni Heiau, which the seat faces.

Other historical features within the proposed national historic site include pictographs recently discovered on the lava outcroppings north of the Pu'ukohola Heiau. The archaeological or historical value of the pictographs has not yet been established.

Further to the north, on the other side of State Route 26 and within the proposed historic site, lies the John Young Homesite. John Young was a British seaman who took part in Kamehameha's many battles and represented the alii (royalty) in their dealings with foreign visitors. Young remains an especially important figure in Hawaiian history because he was associated with events which led Hawaii

into the American sphere of influence. Little remains of the homesite except the foundations of two western-style houses and two Hawaiian-style houses. The homesite reflected the first European-type structures built in the Hawaiian Islands, and is considered a "transition" site. The remaining structures have been damaged over a period of time as a result of earthquakes, highway traffic vibrations, and blasting operations from the nearby quarry (Ref. 14).

Plans for the Pu'ukohola Heiau National Historic Site include providing an orientation and cultural center with walks and trails leading to the heiaus and other related exhibits. Plans also call for relocating Route 26 outside the historic site and providing parking and an entrance road connecting Route 26 and Spencer County Park (Ref. 3).

3.12. VISUAL SETTING

The proposed project site currently is seen from surrounding sites as mostly barren, flat white coral fill area with a hedgerow of coconut palms and beach naupaka, the manmade shoreline being constructed of volcanic boulders. The site views and is seen from the opposite shores to the south of the curving Kawaihae Bay, including Spencer Beach Park down the shore to the Mauna Kea Beach Resort and the existing Kawaihae deep-draft harbor to the west. The site is also in close visual proximity to the Pu'ukohola National Historic Site, including the Mailekini and Pu'ukohola Heiaus.

Expanded site views include the surrounding volcanoes of Mount Hualalai to the south, Mauna Kea to the southeast, and the Kohala Mountains to the northeast.

3.13. LAND USE PLANS, POLICIES AND CONTROLS

3.13.1 Land Use

The State Land Use Designation at the Kawaihae Boat Harbor is Urban (Figure 6). Nearby Pu'ukohola and Mailekini Heiaus of the Pu'ukohola Heiau National Historic Site are in the Conservation district (Ref. 43).

3.13.2. Zoning

The Hawaii County zoning calls for MG, General Industrial, RM, Multiple Family residential and O, Open uses at the harbor (Figure 7). The General Industrial use area lies on the northwest side of the boat harbor and extends to the two sides of the Kawaihae Deep-Draft Harbor.

On the northeasterly side of the harbor there are two areas with a total area of approximately 14 acres calling for Multiple Family Residential use.

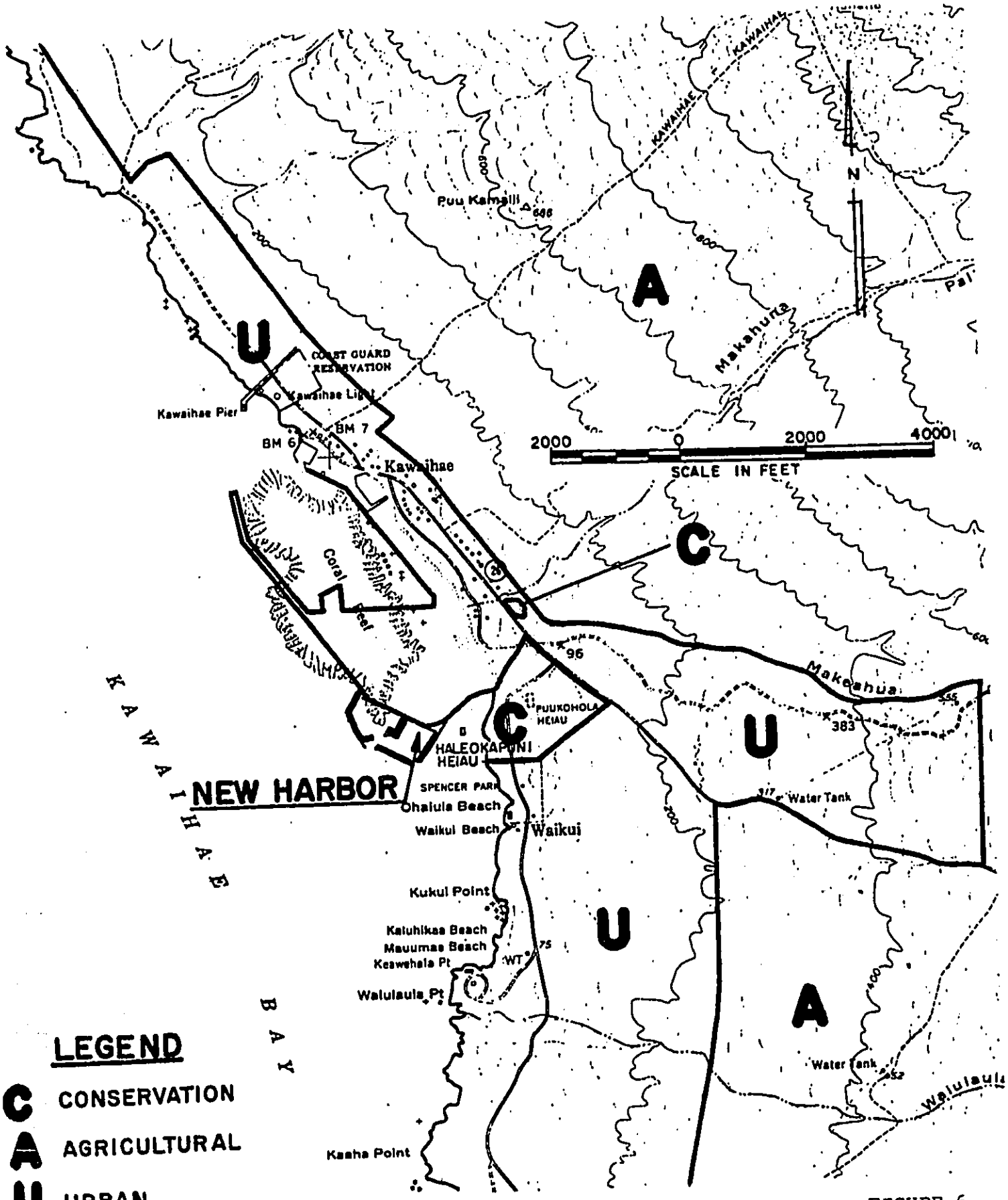
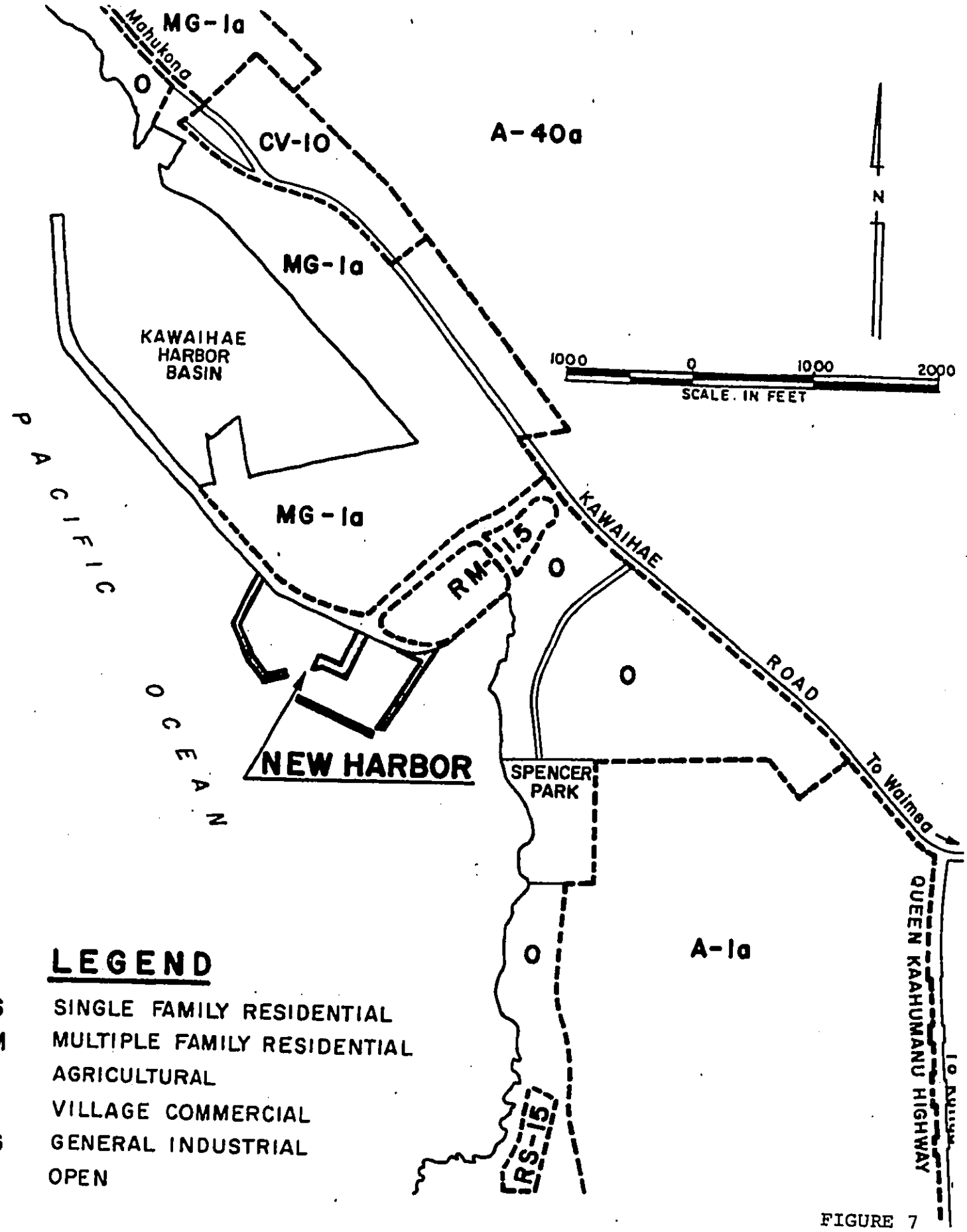


FIGURE 6

LAND USE MAP



LEGEND

RS	SINGLE FAMILY RESIDENTIAL
RM	MULTIPLE FAMILY RESIDENTIAL
A	AGRICULTURAL
CV	VILLAGE COMMERCIAL
MG	GENERAL INDUSTRIAL
O	OPEN

FIGURE 7

ZONING MAP

Separating the General Industrial and Multiple Family Residential uses is a strip of Open area. This strip extends along the coastline and up to the public road leading to the County's Spencer Park.

Harbor facilities and uses are permitted within a General Industrial district. In a Multiple Family Residential district, the Ordinance is explicit in not allowing harbor facilities. However, the Ordinance is vague in an Open district. If the Planning Department considers harbor facilities and uses as recreational, as they did at Honokohau Harbor, then harbor activities within the Open district may not be a problem. To ensure that land usage will not be a problem in the future, this development plan recommends that steps be taken to rezone the Multiple family Residential and Open areas to General Industrial use (Ref. 43).

3.13.3 Land Ownership

Except for an 6.84-acre portion owned by the United States of America, all of the land seaward of Kawaihae Road is owned by the State of Hawaii, Department of Transportation, Harbors Division (Figure 8) (Ref. 43).

3.13.4 Special Management Area

The project site is within the boundaries of the Hawaii County Special Management Area (SMA), the site occupying the area within 40 feet of the shoreline. Thus, a Special Management Area permit is required by the County.

3.13.5 Related Plans

A. State Recreation Plan
The proposed deep-draft harbor and the related activities are in compliance with the State Recreation Plan which recommends improvement and expansion of coastal facilities such as the proposed project.

B. Kawaihae Deep-Draft Harbor
Kawaihae Harbor will require additional expansion beyond 1984 primarily to accommodate increased inshipments of inter-island cargo (some of which is expected to be rerouted from Hilo Harbor). The early development of RO/RO capability for containerized inter-island cargo is also a recommended improvement at the harbor.

3.14. RELATED PUBLIC AND PRIVATE PROJECTS

The Master Plan for the improvement of Kawaihae Harbor as proposed by the Department of Transportation, but not

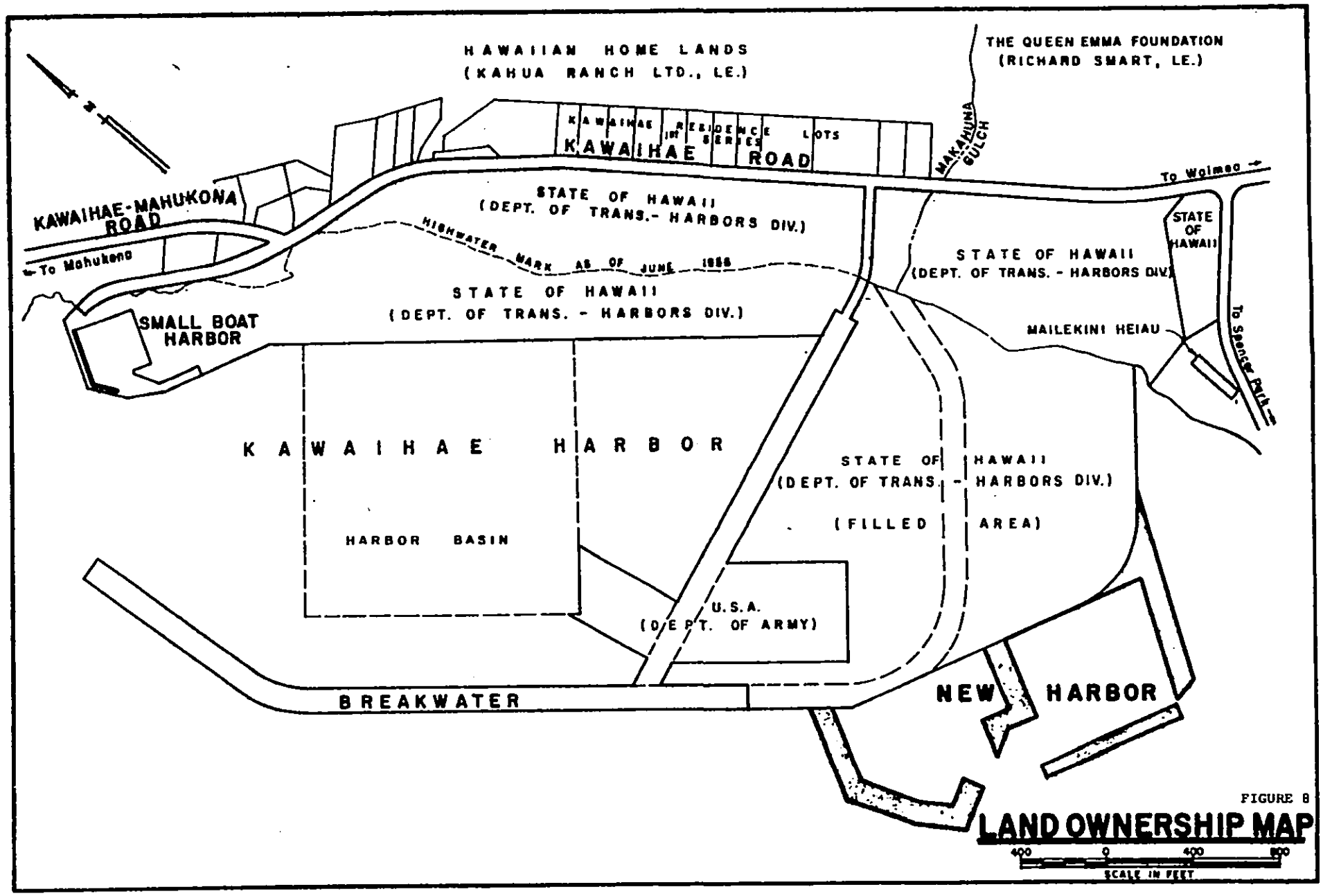
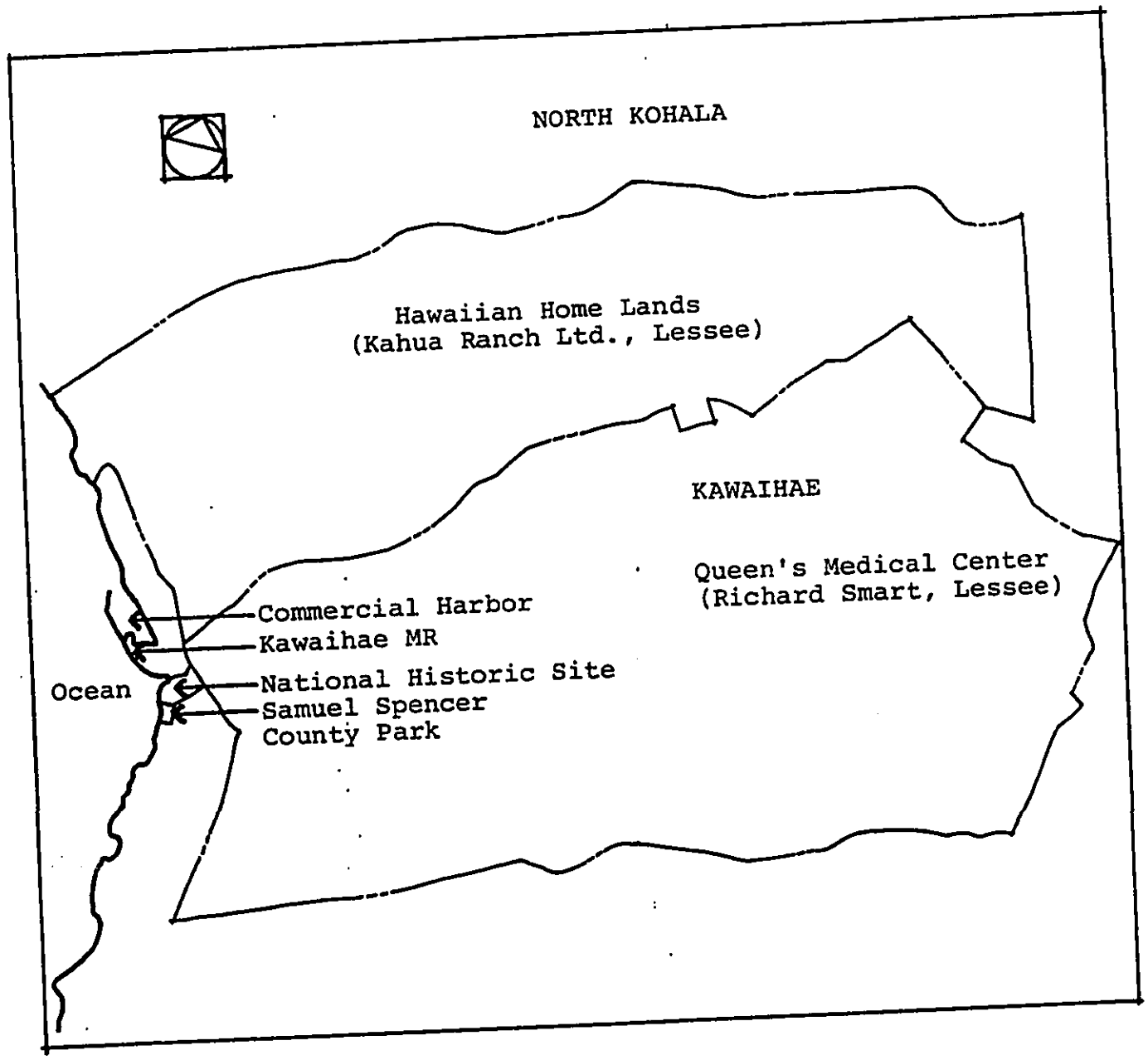


FIGURE 8

LAND OWNERSHIP MAP



LAND OWNERSHIP AND LESSEES IN THE VICINITY OF KAWAIHAE

(Other owners and lessees of small parcels are included within the large parcels shown, but are not called out.)

FIGURE 9

(REF. 6)

yet been approved, recommends the following development priorities between 1984 and the year 2000 (see Figure 10):

- Construction immediately after 1984, of a 450-foot barge berth and RO/RO ramp on the south end of the overseas terminal wharf, and relocation of all inter-island containerized and breakbulk cargo operations to that area. This facility would initially consist of three breasting dolphins for the mooring of barges, a RO/RO ramp, two acres of paved backup areas, and possibly one of the transit sheds relocated from the existing inter-island terminal wharf;

- Paving of an additional three acres at the relocated inter-island terminal between 1990 and 1995; and

- Construction of a permanent 450-foot wharf extension for the inter-island terminal between 1995 and the year 2000.

As mentioned in section 3.9.2, the economic base of the Kohala area is shifting toward a tourist/recreation base. Existing and planned real estate development directed toward vacation, retirement, and second home markets will further accelerate the change in the socio-economic fabric. With this additional infiltration of hotel and commercial development into the Kohala area, an increased labor force will cause secondary growth of the permanent residential population. This current trend in tourist and permanent residential population growth will supplement the need for the small boat harbor and will further stimulate commercial development of harbor-related and other community-related facilities. The recreational facilities in the Kohala region, including the Pu'ukohola National Historic National Site, will have additional pressures placed upon them due to increased population.

(REF. 46)

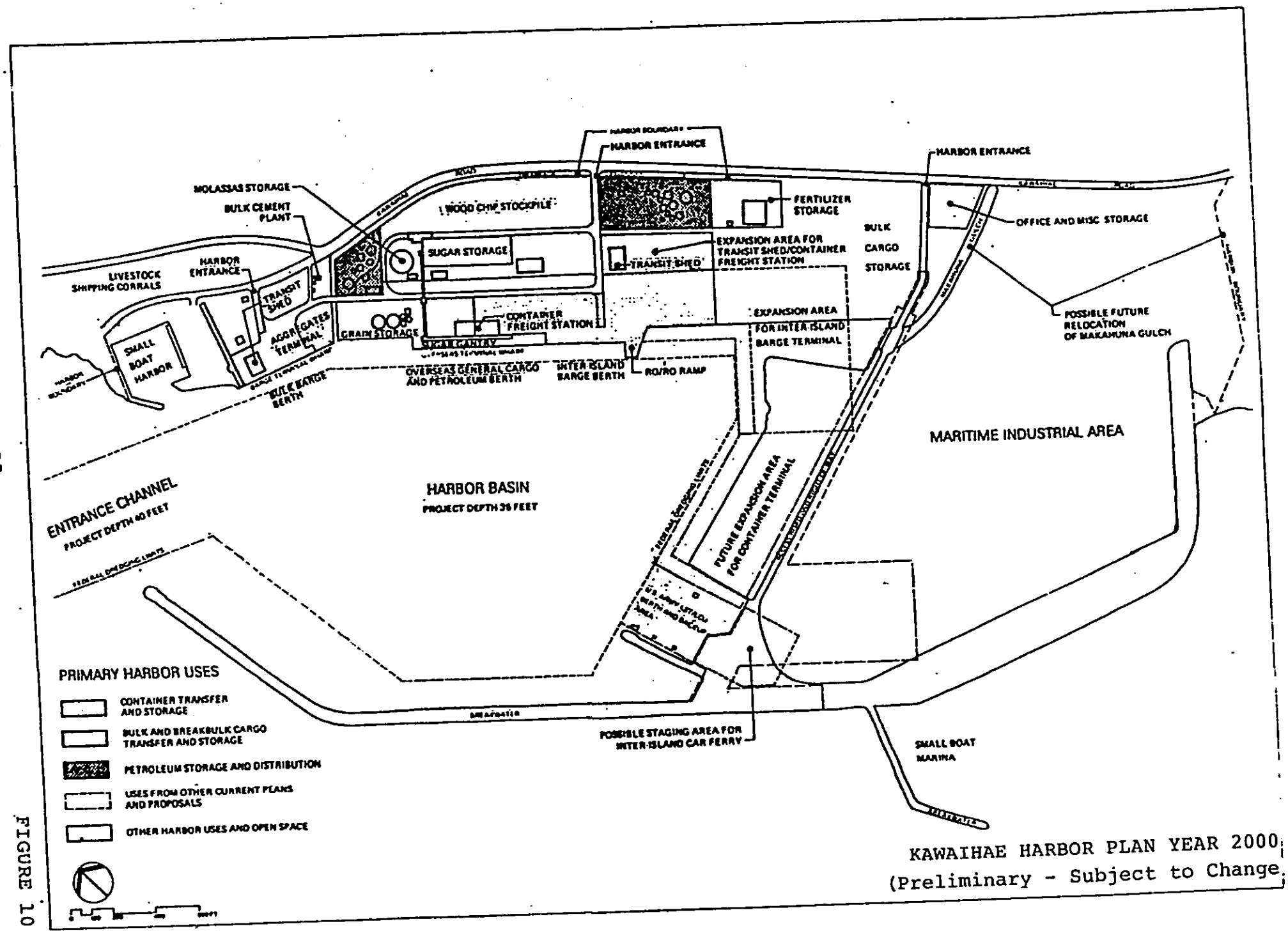


FIGURE 10

KAWAIHAE HARBOR PLAN YEAR 2000
(Preliminary - Subject to Change)

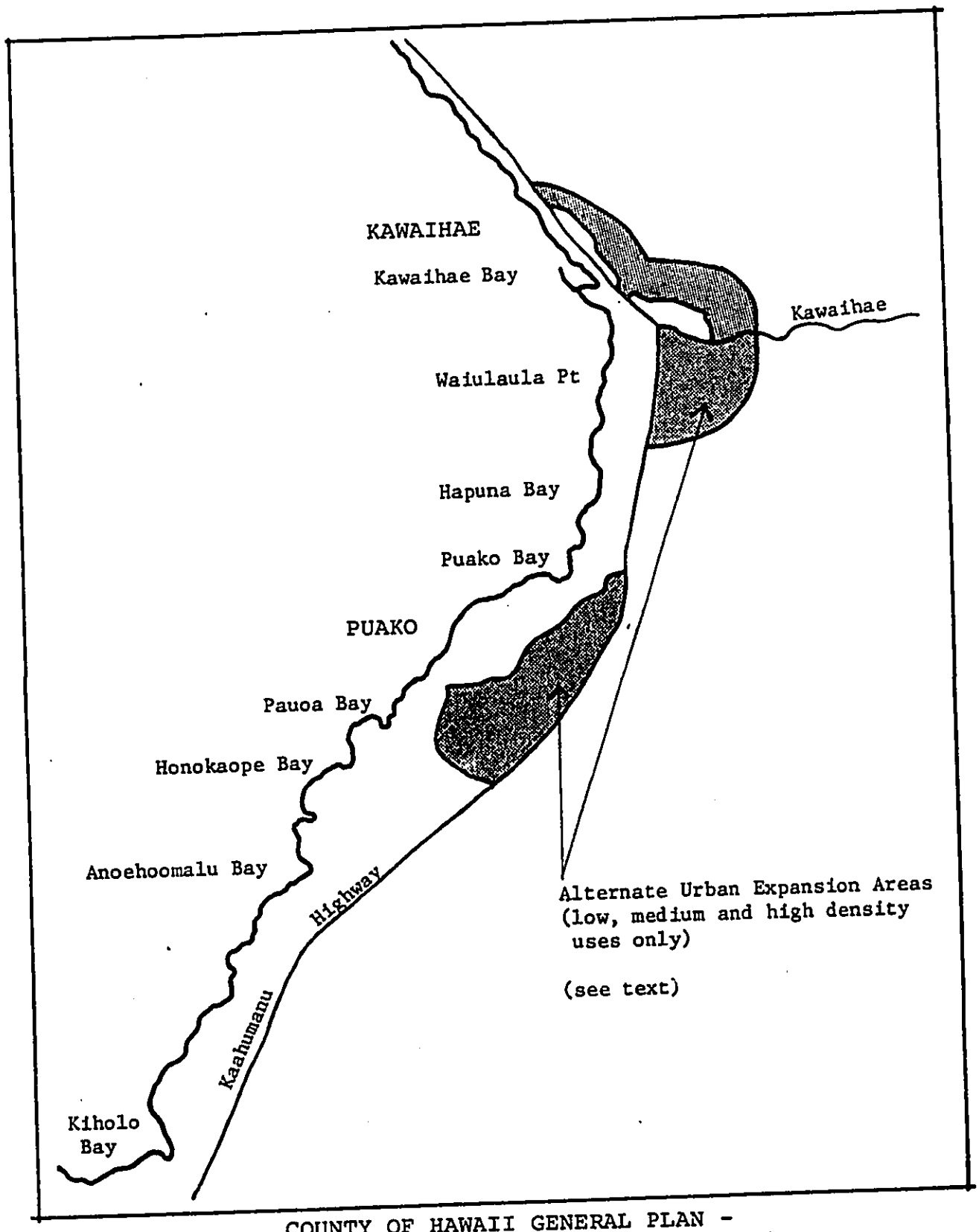
4. RELATIONSHIP OF THE PROPOSED ACTION TO LAND USE PLANS, POLICIES, AND CONTROLS FOR THE AFFECTED AREAS

4.1. LAND USES AND ZONING

A narrow strip along the Kawaihae coastline is designated as an Urban District by the State of Hawaii. To the mountainside (mauka) of this strip the land is designated as an Agriculture District by the State of Hawaii (Figure 6). Land uses in the Kawaihae Urban District consist of a commercial harbor, an industrial area, a National Historic Site, a County Park, and small residential lots mainly along the highways, and a residential development, Kawaihae Village. The Agriculture District consists mostly of vacant land use for grazing. Land south of the commercial harbor and seaward of the highway is open land with non-commercial forest. Samuel Spencer County Park is located in the midst of this land. Hapuna Beach Park is three miles south and Kaunao Beach is two miles south and has public access. There is boat landing at Puako about four miles south of Kawaihae, and there are plans to develop much of the area between Puako and Kawaihae into recreational areas, according to the State Parks Planning Department. The new Honokohau Boat Harbor is 35 miles away while the Lapakahi historical site and the Mahukona boat launch are 12 miles north.

Some minor development in the area surrounding the harbor has already occurred such as the existing small community of Kawaihae at the northwestern end of the harbor along the highway, and Kawaihae Village located near the intersection of Kaahumanu Highway 19 and Kawaihae Road (Highway 27). On approximately 2,000 acres of land located between the Mauna Kea Beach property and the commercial harbor, resort/urban areas have been developed by private developers. These areas, namely Mauna Lani and Waiokoloa Beach Resort, include residences, hotels and condominiums and golf courses. Their development has been stimulated by the success of nearly Mauna Kea Beach Hotel.

The Draft General Plan Revision Program of Hawaii County, 1978 (Ref. 50) states that the coastal area from Kawaihae to Anaehoomalu Bay is suitable for tourist-related development. The projected resort use pattern in that document indicates several County designated Alternate Urban Expansion areas around Kawaihae and the Project site (see Figure 11). Areas for future Alternate Urban Expansion around the harbor and at the Kawaihae Road-Kaahumanu Highway intersection is intended to provide for more support uses.



COUNTY OF HAWAII GENERAL PLAN -
LAND USE PATTERN ALLOCATION GUIDE MAP*

*(Partial map excerpted from original map prepared by Planning Department, County of Hawaii. Ordinance 439 as amended, Ordinance 456, 475, 484 and 538, February 7, 1980.)

FIGURE 11

(REF. 50)

These Alternate Urban Expansion designations as well as the area further south are intended to provide for timely reassessment and better flexibility over the long-range application of specific urban land uses.

In summary, the proposed changes within the coastal resort destination are deemed to further promote the General Plan goal of guiding resort functions by centralizing and containing resort uses in an orderly manner (Ref.50).

The proposed small boat harbor will conform with Federal, State and County land use plans, policies, and controls and there will be no conflicts or inconsistencies with these plans. Factors in the area currently favor urban or resort development and it appears the area will continue to develop further as an urban/resort area (Ref.50).

4.2. COASTAL ZONE MANAGEMENT PROGRAM

The project is subject to the Hawaii Coastal Zone Management Program requirements. The project must also comply with Hawaii County Special Management Area Permit requirements.

4.3 STATE COMPREHENSIVE OUTDOOR RECREATION PLAN

As stated in the State Comprehensive Outdoor Recreation Plan, there is a shortage of mooring spaces for the island of Hawaii. Kawaihae Small Boat Harbor will satisfy the needs for some of these mooring spaces.

4.4 LAND OWNERSHIP AND SURROUNDING AREAS

The existing commercial deep-draft harbor and the fill and water areas of the proposed boat harbor are owned by the State of Hawaii (Figure 8). The Pu'ukohola National Historic Site to the south of the harbor is owned by Queen's Medical Center (52.2 acres), the State of Hawaii (18.07 acres), and the offshore water area by the State of Hawaii.

Samuel Spencer Park, bordering the historic site on the south is owned by the County of Hawaii. The land bordering the harbor on the east is owned by the Hawaiian Home Lands, and is leased to Kahua Ranch, Ltd. Hawaiian Home Lands' Kawaihae property was originally crown land and was acquired through the Hawaiian Home Lands Act of 1920 enacted by the U.S. Congress. The land south of the harbor is owned by Queen's Medical Center (10,000 acres), and the minority of this land is leased to Richard Smart (owner of the Parker Ranch). This land was originally crown land and was bequeathed

to the Medical Center by Queen Emma Kaleleonalani Rooke (Figure 9). Some small parcels are owned or leased by other individuals or organizations in both the Hawaiian Home Lands parcel and Queen's Medical Center parcel.

5. PROBABLE IMPACT OF THE PROPOSED ACTION ON THE ENVIRONMENT

5.1 INTRODUCTION

In evaluating probable impacts, actions and activities associated with any or all of the alternates are considered separately. Impacts which vary because of location or extent of the action have been identified and discussed.

Secondary impacts of separate actions are included in this section and secondary impacts of cumulative actions associated with each alternate are discussed in Section 7.6.

5.2 IMPACTS ON TERRESTRIAL GEOLOGY AND SOILS

Grading operations will modify existing terrestrial land forms within the project area to accommodate the various proposed facilities and parking areas. There will also be trenching and grading operations associated with utility installation and construction of onshore facilities.

There will be a secondary impact created by quarry operations for offshore construction fills. Approximately 40,000 cubic yards of rock will be required. Previous quarrying for Kawaihae harbor construction has taken place at Makeahua quarry which is one potential source. Other sources are currently being investigated by the U.S. Corps of Engineers (see section 2.4.12). Quarrying operations involving blasting could have an effect on nearby structures, including historic/archaeological features (see Section 5.11). Noise from blasting and transportation would impact any nearby residential areas. Downstream sedimentation and visual unattractiveness are also potential impacts of any quarrying operation. Until the source of rock is finally decided it is not possible to evaluate specific impacts. If the source is Makeahua Quarry, there are potential adverse impacts to nearby historic and recreational facilities.

5.3 IMPACTS ON GROUNDWATER HYDROLOGY, WATER QUALITY AND DRAINAGE

Local runoff quantities will be increased and concentrated due to onshore paving structures. Because of high percolation in adjacent unpaved areas which will receive runoff and the relatively low precipitation rate, insignificant increases to ocean discharges are expected. Groundwater quality will be degraded by runoff from paving, structures and landscaping which are likely to contain small quantities of pollutants such as petroleum waste, chemicals from paint and solvents, and nutrients, insecicides, and herbicides from landscape improvements. Groundwater within the areas scheduled for construction is not currently suitable for domestic use and impact therefore is considered insignificant. Additionally groundwater may be impacted by effluent from package waste water treatment facilities.

The extent to which marine waters will eventually be impacted by groundwater interaction is expected to be minimal because of very low interchange rates due to minimum groundwater head and low intertidal exchange (Ref. 6).

5.4 IMPACTS ON TERRESTRIAL BIOLOGY

Limited vegetation exists within a small portion of the project onshore area consisting of small weeds, coconut trees, and naupaka groundcover. Nearly all of the onshore area consists of bare coral fill material. The palm trees and naupaka are to remain and are part of the State's previous landscape development for the proposed small boat harbor; consequently there will be no significant adverse impact to vegetation nor will there be any effect upon the remainder of the adjacent barren landfill area. Extensive landscaping is planned by the State during the final phases of harbor completion, which should help reduce local transport and deposition of windborne dust in the small boat harbor area. Urban birds, i.e. those attracted by man's activities, will visit the small boat harbor area during construction and will visit and inhabit the completed small boat harbor. The few marine and shore birds occasionally found in the harbor area will move to less disturbed areas during both construction and use of the harbor. There are no Federally- or State-listed threatened or endangered terrestrial species that utilize the project area as a habitat (Ref. 6).

5.5 IMPACTS ON AIR QUALITY

Ambient air quality will be temporarily degraded by dust and construction vehicle emissions during construction.

Onshore improvements and landscape of existing coral fill areas will have a long-term beneficial impact on air quality by reducing wind-generated dust from this area.

There will be an insignificant long-term impact from vehicular emissions and operational activities due to consistent trade winds which quickly dissipate any potential airborne contaminants and noxious odors normally associated with such maritime activities.

5.6. IMPACTS ON NOISE CONDITIONS

Construction activities will create short-term and localized noise conditions. There are few residences within the area to be affected and no known wildlife habitats which may be adversely affected by such noise.

There will be significant noise generated by quarrying and blasting. The location of the quarry site will determine the significance of this impact.

Operations of the facility will create a long-term noise impact from power boats, increased vehicular traffic, and other onshore activities.

5.7. IMPACTS ON MARINE SETTING

5.7.1. Impacts on Bathymetry and Oceanography

The natural bathymetry of the project area will be permanently altered by the filling of some reef areas for harbor structures and the dredging of the access channel to the eastern basin. It may be necessary for the State of Hawaii to further alter the bathymetry of the small boat harbor area by additional dredging to provide adequate depth clearance for boats moored in the eastern basin, which now has an average depth of four feet. Sedimentation rates at the mouth of Makeahua Gulch may be modified because the location of the completed harbor may further restrict the existing poor circulation. Current studies (Ref. 11) indicate that Spencer Beach Park sand reservoirs will not be affected by the presence of the small boat harbor.

Protective harbor structures may reduce the amount of silt entering the harbor from Makeahua Gulch. Accurate prediction of the siltation rate within the completed small

boat harbor is difficult to assess; however, it is anticipated that maintenance dredging by the Federal government may be performed every five years. Quarrying, if at the Makeahua Quarry, would create particulate matter as a result of blasting and equipment operating in the area. These particulates, if transported into the waters off the mouth of Makeahua Gulch by storm runoff, would tend to aggravate the siltation problem.

Proposed actions will have no significant effect upon the offshore oceanographic regime. In the nearshore area of the project, the southeastern mole of the completed small boat harbor may tend to act as a barrier and may slow and deflect the present wind-induced currents. The deflected currents may lead to minor increased or decreased mixing of the waters within the new embayment created by the southeast mole of the small boat harbor. No evidence was found to indicate that development of the proposed small boat harbor, including additional structures adjacent to the previously constructed breakwater and launching ramp, would noticeably affect current patterns adjacent to Spencer Beach Park (Ref. 11). The waters within the completed harbor may have a different open ocean/harbor exchange rate than the preconstruction exchange rate for the area. The two deep channels and basin within the harbor may increase the volume of exchange (Ref. 6).

5.7.2. Tsunami Impacts

The proposed harbor, as designed, will mitigate the potentially hazardous effects of tsunami action. Revetted moles, breakwaters and wave absorbers will lessen the impact of tsunami wave action.

5.7.3. Impacts on Marine Water Quality

Water quality conditions at the project site will be temporarily degraded during dredge and fill operations as a result of suspended sediments generated. The dredging and filling operations may release nutrients from the disturbed sediments, which may increase the natural productivity rate of plankton. It may also increase the biochemical oxygen demand rate, decreased dissolved oxygen levels and reduce light penetration through the water. The above conditions would be temporary during construction of the harbor and the harbor may return to preconstruction conditions after the completion of construction.

The completed harbor protective structures are not expected to significantly degrade the already poor flushing characteristics of the harbor area. The existing currents are wind-induced and are typically of very low velocity

(0.02 to 0.1 knots). The use of a culvert or channel would not improve circulation in either the existing commercial deep-draft harbor or in the proposed small boat harbor because of insufficient hydraulic head between the existing deep-draft basin and the proposed harbor area, resulting in insignificant volume exchange (Ref. 21). The two dredged channels and the turning basin within the harbor will provide increased water volume which may improve the internal circulation and flushing characteristics of the harbor. Although risks of trash accumulation and fuel spills would increase, they would not be any more significant than for other harbors in the State and risks can be minimized or avoided by proper and alert harbor maintenance and management by the local government. Furthermore, State law prohibits spills and dumping in State harbors. In comparison, water quality in the adjacent deep-draft harbor is considered excellent by researchers (Ref. 7) who have conducted a reconnaissance-level survey of biota and water quality in conjunction with past circulation studies for the Kawaihae Small Boat Harbor project (Ref. 6).

Onshore landscape development and associated runoff may increase nutrient levels within poorly circulating areas. Extensive increases in nutrient levels could lead to algae formation detrimental to marine ecosystems.

Operation of power boats and related activities may increase the level of certain chemicals associated with fuels, paints and solvents.

The State will have the responsibility for disposal and treatment of sanitary wastes, vessel bilge, and vessel ballast water discharges in the completed harbor.

5.7.4. Impacts on Marine Biology

Approximately 33 acres of the proposed small boat harbor site are included within the 256 acres of reef already destroyed as a result of construction during the deep-draft harbor and Project Tugboat projects. Construction of the proposed small boat harbor is expected to have a minimum impact upon the existing depauperate biota within the project area. Most of the small number of coral colonies and macro invertebrates within the boundaries of the project site will perish during dredging and construction activities, while the small population of reef fishes within the boundaries of the project site will either leave the site or perish. The rocks and interstices of the completed harbor protective structures will provide a new environment for possible colonization by motile and sessile biota. Turbidity during dredging operations can extend into adjacent areas and possibly affect marine life. In

addition, the planned maintenance dredging within the proposed facility at five-year intervals may be frequent and severe enough to adversely affect or disrupt recolonization processes by marine life.

Existing biological conditions within the project area are not expected to improve significantly since the physical factors that encourage biological recovery of the coral community appear to be absent. A completed small boat harbor may be unfavorable for biological recovery unless existing sedimentation stresses are eliminated or mitigated. Elimination or mitigation of these stresses (either singly or in various combinations) may contribute to the improvement of the marine environment in the project area and possibly provide suitable conditions for the recruitment of biota from the non-affected areas surrounding the project site. Candidate recruitment species for the project site, if improved ecological conditions permit, would include those species previously observed and reported by the State and private researchers. A completed harbor may act as a nursery area for Nehu as in other Hawaiian harbors. The completed harbor with its additional boating, increased population, and onshore recreation will adversely affect shark breeding and spawning ground near the project. However, it is predicted that the sharks will return to the area following construction, as they did after the construction of the deep-draft harbor. Silt laden water does not seem to repel the sharks and may aid in their predatory activities (Ref. 7). Although the completed harbor with its full complement of approximately 300 vessels will almost double the number of boats utilizing the Kona Coast fishing grounds, the increased fishing pressure will be insignificant when compared to the vast potential fish resources present along the 100-mile Kona Coast of the island of Hawaii (Ref. 6).

It is suspected that dredging activities increase the incidence of ciguatera, a disease which results from the eating of fish containing ciguatoxin, a poison that acts on the nervous and digestive systems. Although sometimes fatal to humans, the disease's symptoms include vomiting, diarrhea, tingling of the lips, mouth and fingertips, itching of the skin, loss of motor ability, and reversal of temperature sensation. It is believed that the source of the toxin is a microscopic algae (Gambierdiscus toxicus) that settles on larger algae that is eventually consumed by fish. The toxin then becomes concentrated in the fish that, when eaten, causes the symptoms of ciguatera. At the present time, studies and monitoring of the disease are being undertaken to further investigate the disease.

5.8. IMPACTS ON INFRASTRUCTURE, UTILITIES AND SERVICE SYSTEMS

Transportation of materials for the construction of the small boat harbor will temporarily increase the amount of construction-related traffic within the project area. The completed harbor will create a permanent traffic increase in the area by employees and harbor users. If the nearby Makeahua Quarry is utilized for obtaining armor rock for the project, then some new dirt roads will be constructed halfway between the John Young Homestead and the two heiau in order to minimize any project-generated truck vibrations in the historic area. It is possible that some of this ground vibration will be transmitted into the homestead and heiau areas; however, it will certainly be of less magnitude than the vibration now caused by heavily loaded trucks using State Highway 27 which passes within 50 feet of the John Young Homestead.

Indirectly, the small boat harbor will provide residents with greater access to shoreline areas which are inaccessible by land. The Hawaii Water Resources Regional Study (Ref. 36) has tentatively identified inadequate access to nearshore marine areas as an important factor in the Kawaihae region.

Water transportation utilizing the existing deep-draft harbor will be beneficially impacted by the relocation of small boat traffic.

Excavations for installation of telephone and power poles and water lines will be made in the project area. Water turbidity or fugitive dust may result during these excavations. Waste containers of adequate number and size will probably be distributed throughout the small boat harbor area and collection schedules and facilities will be necessary to efficiently control litter.

There will be an impact on potable water supplies during and after construction. If extensive landscape development requiring irrigation occurs, the long-term impact will be more significant although brackish groundwater and treated effluent could be used to reduce demands on domestic water. There is adequate capacity in existing systems to handle development as proposed.

Since existing infrastructure is adequate to accommodate the proposed improvements, there will be no significant impact on existing utilities. Additional demands on drainage and waste water systems will be mitigated by proposed facilities such as construction of dry wells and a sewage treatment plant.

There will be no significant adverse impact on current fire, police and other social or educational services since existing services will be adequate with the implementation of the development plan. However, present fire fighting capacity, i.e., availability of adequate water, is inadequate in the Kawaihae harbor area.

5.9. SOCIO-ECONOMIC IMPACTS

The project will provide jobs during the construction phase of the project and at the quarry site. Operation of a small boat harbor will provide only one or two permanent positions which may be integrated with similar administrative, maintenance and security positions already existing at the State-operated deep-draft Kawaihae Harbor (Ref. 49). By providing a greater number of safe moorings and other associated facilities for both private and commercial fishing and other boats, the harbor could stimulate the development of new or the expansion of existing marine-related businesses such as dive shops, glass-bottom boat tours, charter tours, marine and fishing supply stores, marine fuel stations, dry docking interests (boat repair and manufacturing), fish markets, restaurants, and boat sales and rentals. The economic effects of these possible developments should be felt primarily within the Kawaihae area. The transfer of existing small craft from the commercial port to the proposed small boat harbor will provide more space for marine transportation enterprises and increasing the capacity for commercial shipments to and from the Kawaihae area. In addition, the amount of conflicting small boat traffic within the commercial port will be greatly reduced.

Economically beneficial impacts (income) would offset both the environmental effects of the proposed and the actual cost of construction, which is presently estimated to be approximately $18,502,700. Income includes revenues from various sources, summarized as follows:

MARITIME AND FISHERY ACTIVITIES INCOME

ACTIVITY AREA	APPROXIMATE AREA, in Sq. Ft.	RENTAL RATE, per Sq. Ft. per Year	AMOUNT, per Year
Charter and Cruise Facilities	19,950	$ 0.58	$ 11,571.00
Shops and Restaurant	58,800	0.53	31,164.00
Boat Club	61,000	0.48	29,280.00
Ice-Fish Dock and Ice Plant Land Area	5,700	0.58	3,306.00
Fuel Service Docks and Fuel Tanks Land Area	6,600	0.58	3,828.00
TOTAL	152,050		$ 79,149.00

The approximate area figures above include the pavement areas adjacent to the activities.

MOORING INCOME

BOAT LENGTH	BERTHS AT KAWAIHAE	HARBOR CLASS I RATE	HARBOR CLASS I INCOME	HARBOR CLASS II RATE	HARBOR CLASS II INCOME
25'	48	$2.05	$ 2,460.00	$1.50	$ 1,800.00
30'	66	2.05	4,059.00	1.50	2,970.00
35'	60	2.05	4,305.00	1.50	3,150.00
40'	56	2.05	4,592.00	1.50	3,360.00
50'	42	2.05	4,305.00	1.50	3,150.00
65'	19	2.05	2,531.75	1.50	1,852.50
TOTAL PER MONTH			$ 22,252.75		$ 16,282.50
TOTAL PER YEAR			$267,033.00		$195,390.00

In addition to the above, mooring charges for use of the ice-fish dock and fuel service docks should be levied on the operators. Based on mooring rates for harbor class I and II the revenues amount to:

Ice-Fish Dock

1 x 65' x $2.05 = $133.25 per month or $1,599.00 per year

1 x 65' x $1.50 = $ 97.50 per month or $1,170.00 per year

Fuel Service Docks

4 x 65' x $2.05 = $533.00 per month or $6,396.00 per year

4 x 65' x $1.50 = $390.00 per month or $4,680.00 per year

Indirect or secondary socio-economic benefits may result from the accessibility of the small boat harbor to the visitors to the region. Sports fishing, tours and other charter activities provide additional access to the visitor dollar and if locally owned and operated increase the percent of tourist expenditures which remain in the local economy. Available boating activities also can extend the length of visits by providing more diverse activity.

While a small boat harbor tends to complement a well-rounded visitor destination area, it is highly unlikely that any significant impact on either the rate or the extent of tourist-related development will result. It is more likely that visitor activities will increase the demand for and the use of a harbor.

5.10. RECREATIONAL IMPACTS

Additional recreational facilities and activities will be generated by the 291-boat harbor. The current unfulfilled demand for 146 berthing spaces will be satisfied and approximately 145 unused berthing spaces will still be available to meet future demand. Navigational aids and safe berthing areas will reduce the likelihood of marine hazards and accidents associated with recreational boating in the area. Boating activity generated by construction and use of the harbor may temporarily or permanently force sharks out of the project area into the Spencer Beach Park area, possibly impacting its use as a recreational water sports area (Ref. 6).

Public use of the historic site can be expected to increase once access and aesthetic improvements are made. Presently gill nets are set in the northern portions of the survey site (biotopes I and II), and hook-and-line fishermen sometimes work through the kiawe trees to fish from the shoreline. The fish species taken most frequently by these fishermen are papio (young of several species of ulua or jacks), mullet, and moanao (Parupeneus multifasciatus). Spear fishermen are common but their catch rates appear to be very low compared with the catch in areas north or south of the site.

Greater use of the intertidal zone is expected with increased public awareness of the historic site and heavier use of the neighboring County park. The organisms in this zone and subtidal areas are relatively resistant to non-consumptive use and should be protected to the limits of the survey site, although some fishing could be permitted (Ref. 37).

5.11. HISTORICAL/ARCHAEOLOGICAL IMPACTS

In consultation with the State of Hawaii Historic Preservation Officer and acting pursuant to Section 106 of the National Historic Preservation Act of 1966 and 39 CFR Part 800 (39 FR January 1974), the proposed plan of improvement was preliminarily evaluated for its effect on the five features of the Pu'ukohola Heiau National Historical Site. A no-effect determination was established by the State Historic Preservation Officer for the underwater Haleokapuni Heiau (Ref. 47). Following preliminary consultation with the National Park Service, there is a possibility that blasting for breakwater construction rock in the adjacent Makeahua Quarry would adversely affect the stability of Pu'ukohola and Mailekini Heiau.

Another possible source of damage to the historic structures and two heiau may come from heavy vehicles passing through the historic site park area. Although such vehicles would include those associated with harbor construction, a recent study conducted by the U.S. Geological Survey for the National Park Service failed to establish any relationship between current vehicular traffic (which includes heavy trucks) and the structural stability of the two heiau (Ref. 48). As noted elsewhere, most previous damage to the prehistoric and historic structures appears to have been caused by earthquakes.

The proposed harbor plan would also present an additional visual intrusion into the existing seascape fronting the National Historical Site. This intrusion is not considered to be adverse in the sense of altering the historic integrity of the site, because the original historic coastline was irreversibly altered in the 1950s by construction of the coral fill area southeast of the existing deep-draft harbor (Ref. 6).

5.12. VISUAL IMPACTS

Additional construction and activity within the project area would alter and increase the diversity of the view from exiting historic and recreational areas. The views of existing harbor facilities are neither spectacular nor consistent with recreational or historic environments and it is unlikely that the addition of recreationally oriented small boat facilities will materially degenerate those already unsatisfactory visual conditions. A completed development, properly landscaped, could improve the recreational atmosphere of the visual environment.

By providing additional vantage points, harbor development could increase the diversity of visual experience, and provide excellent vistas of the historic sites as well as the regional landscape.

Telephone and power poles, if above ground, would become an additional visual intrusion in the project area. This intrusion will be avoided by installation of these utilities underground. Spencer Beach Park, which exists about 1,000 feet from the project site, may also be subjected to some visual impact from the completed harbor. There may be some temporary degradation of aesthetics as a result of water turbidity during construction operations.

6. PROBABLE ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

6.1. SHORT-TERM

- Temporary siltation of water columns due to dredging activities.
- Temporary dust, emissions and noise and erosion due to construction activity.
- Temporary drop in colonization of marine waters during construction and dredging activities.
- Minor temporary traffic disruption during construction of access road intersection.
- Blasting associated with quarrying activities will generate excessive noise and dust levels. The impact may vary depending upon the final location of the quarry site to surrounding residential and historic sites.

6.2. LONG-TERM

- Impact of increased noise and emissions from automobile and boat traffic and various onshore activities.
- Impact of vehicular traffic.
- Impact of dredging live coral colonies on local benthic ecosystems.
- Visual impact of harbor development on historical site.
- Slight degradation of harbor water quality due to boat emissions and site runoff.

7. ALTERNATIVES TO THE PROPOSED ACTION

7.1. INTRODUCTION

Since previous construction activities have significantly and permanently altered the original marine condition within the proposed project location, and since other locations within the service area would require more extensive and environmentally disruptive alterations, the consideration of alternates has been limited to the Kawaihae harbor area.

Four major alternatives to the proposed action have been considered:

Alternative #1:	No action
Alternative #2:	Locate the small boat harbor within the existing deep-draft harbor
Alternative #3:	Corps of Engineers Plan A
Alternative #4:	Corps of Engineers Plan C

7.2. ALTERNATIVE #1: NO ACTION

No further construction or activity having an additional impact on the environment would be undertaken or permitted. Existing conditions and uses would continue.

7.3. ALTERNATIVE #2: LOCATING THE SMALL BOAT HARBOR WITHIN THE LIMITS OF THE EXISTING DEEP-DRAFT HARBOR

This alternative (Figure 13) involves expanding berthing facilities at the existing north boat basin and the south small boat harbor and constructing facilities similar to the proposed action (Corps of Engineers Plan B, Figure 12). No additional dredging would be required.

7.4. ALTERNATIVE #3: CORPS OF ENGINEERS PLAN A

Alternative #3 is similar to the proposed action but substitutes the offshore breakwater for a 2.5-acre offshore island, revetted around its perimeter and filled to the +7-foot elevation. The island would be landscaped to create a park area (Figure 14).

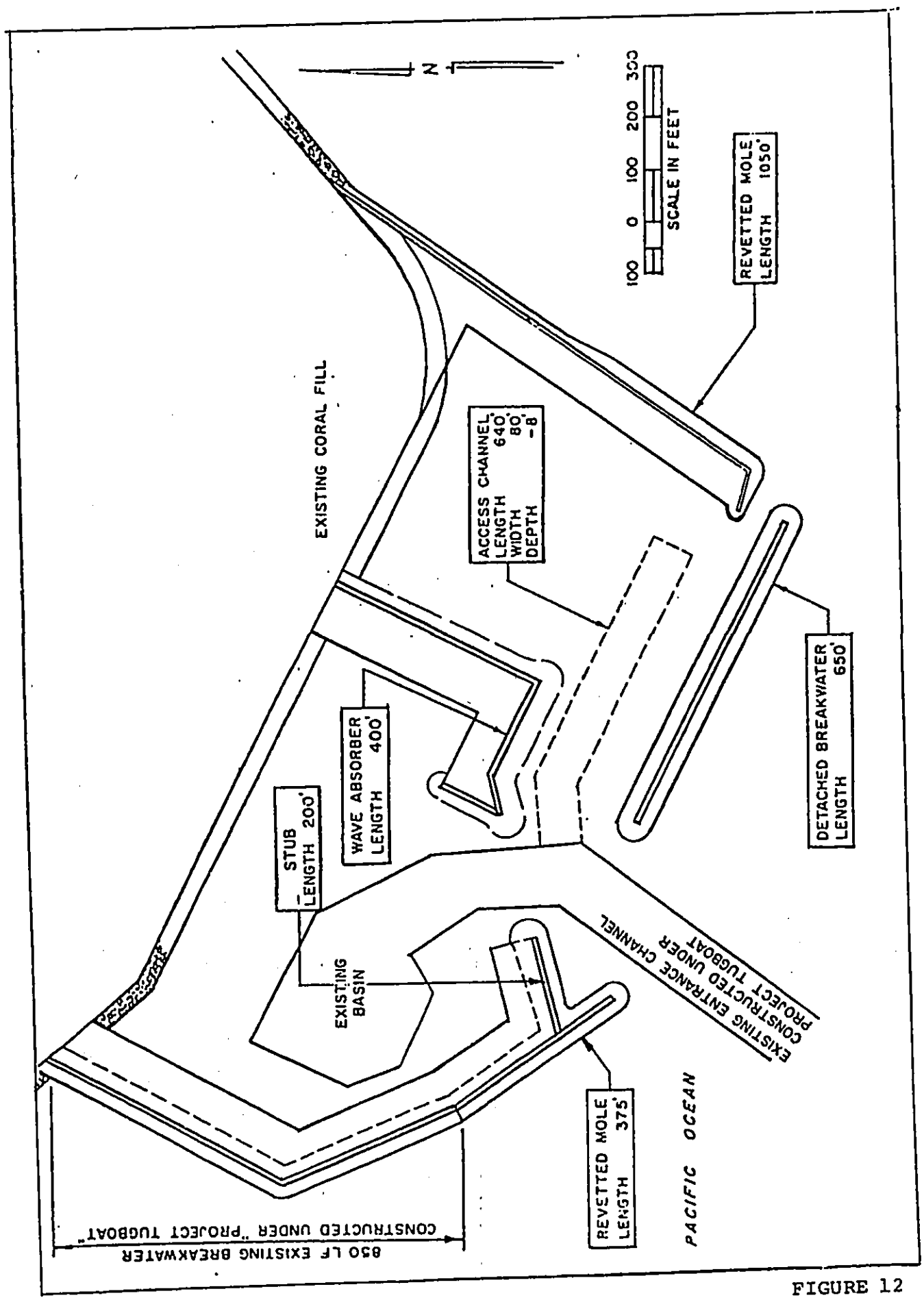


FIGURE 12

KAWAIHAE SMALL BOAT HARBOR - PROPOSED ACTION
(CORPS OF ENGINEERS PLAN B)

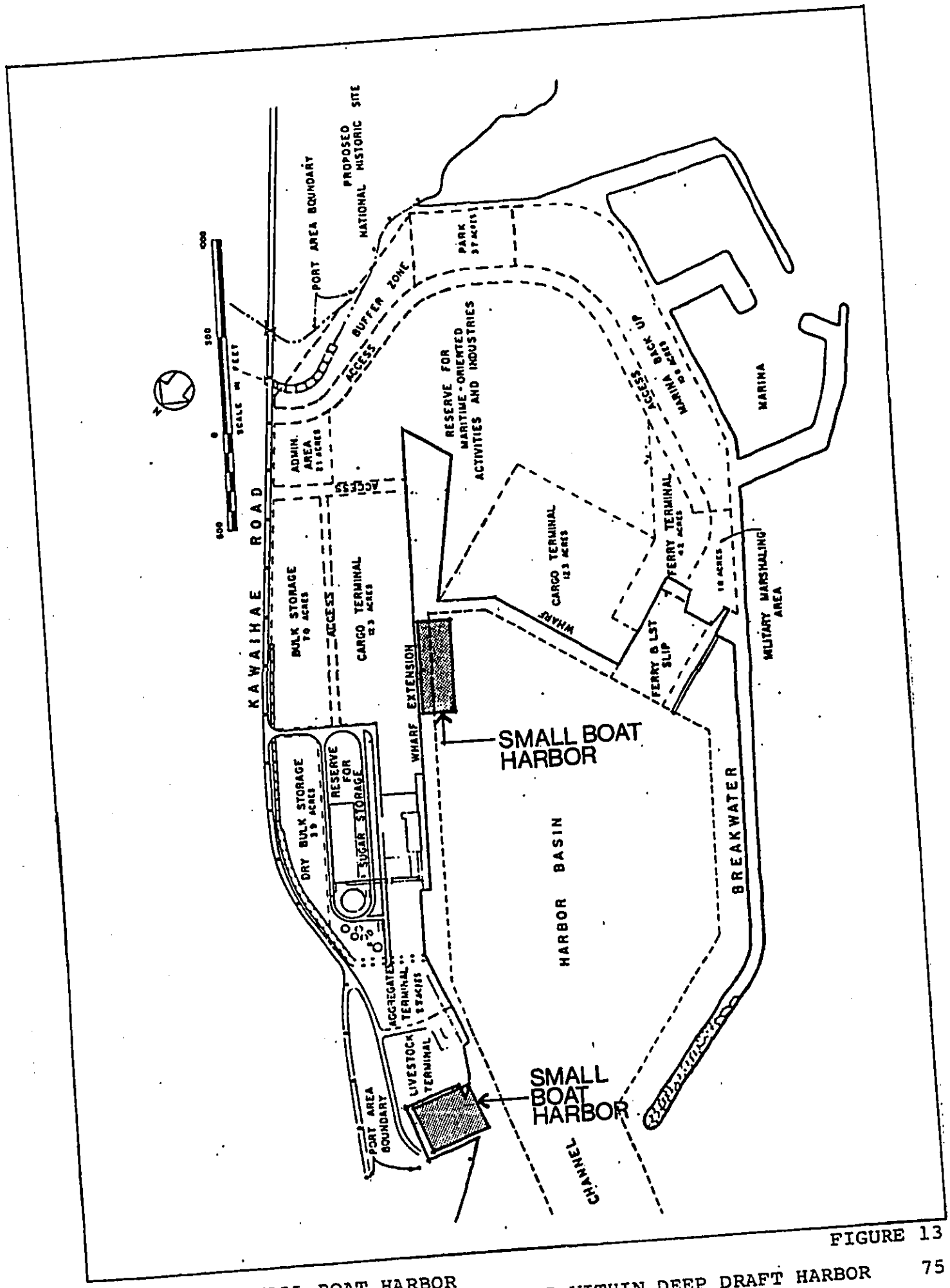


FIGURE 13

KAWAIHAE SMALL BOAT HARBOR
ALTERNATIVE #2 - SMALL BOAT HARBOR WITHIN DEEP DRAFT HARBOR

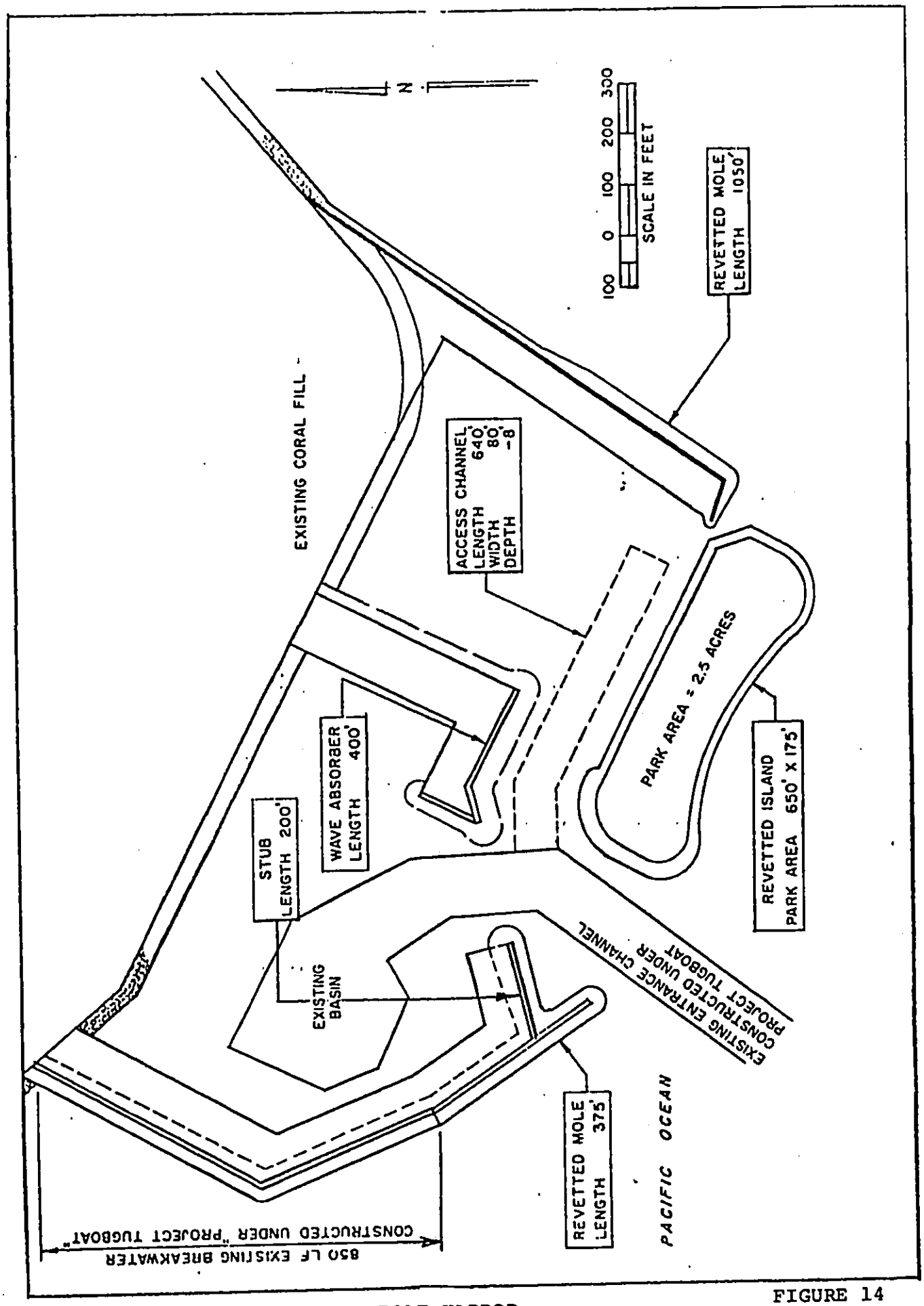


FIGURE 14

KAWAIHAE SMALL BOAT HARBOR
ALTERNATIVE #3 - CORPS OF ENGINEERS PLAN A

7.5. ALTERNATIVE #4: CORPS OF ENGINEERS PLAN C

Alternative #4 is also similar to the proposed action but provides in place of the offshore breakwater a 2.1-acre revetted offshore island which would be filled to the +7-foot elevation. A 650-foot-long, 85-foot-wide beach would extend between two groins along the seaward side of the island. The beach and backshore area would be amenable to the development of a beach park complex by local interests. Landscaping of the backshore area would be carried out for use by the general public (Figure 15).

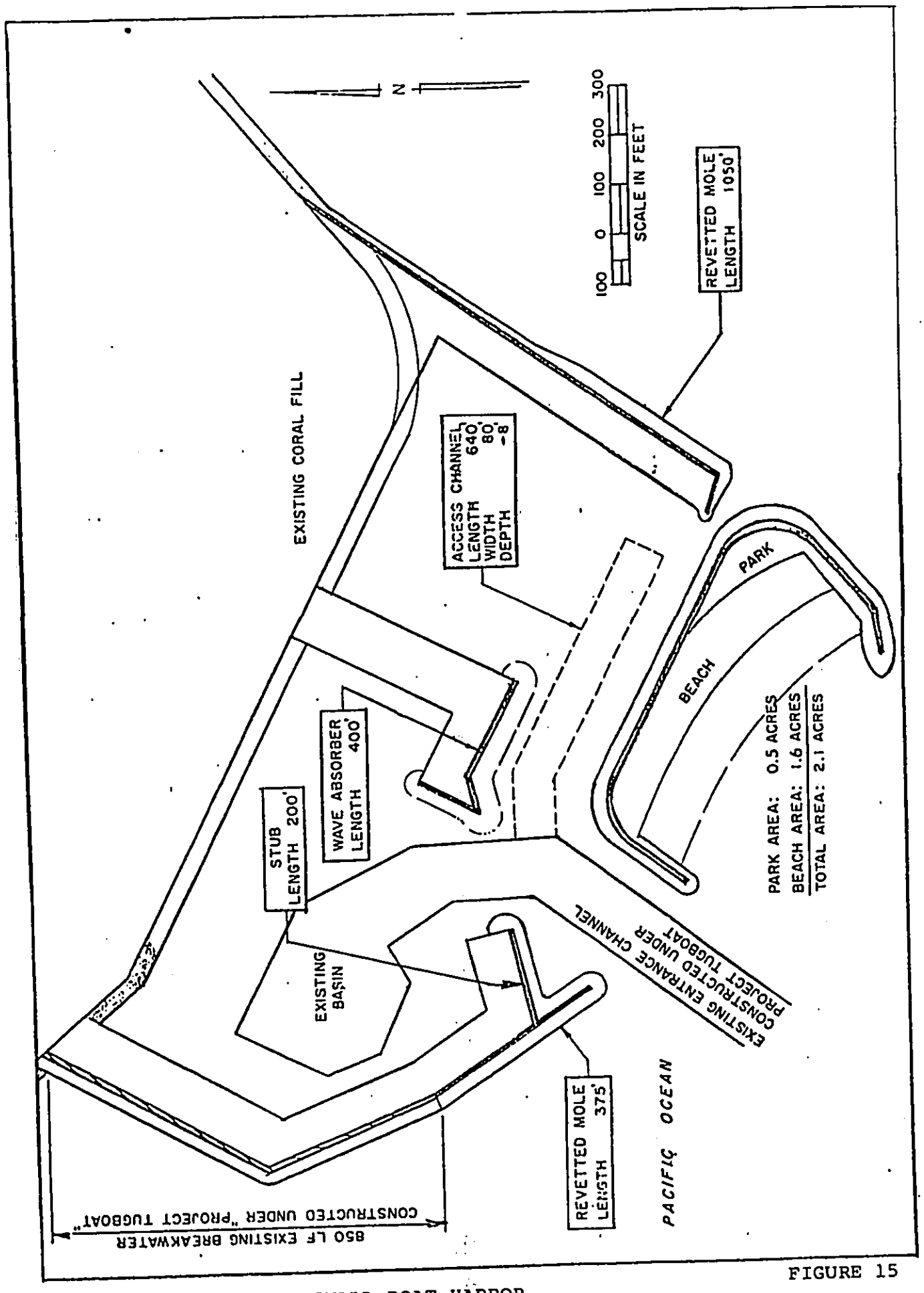


FIGURE 15

KAWAIHAE SMALL BOAT HARBOR
ALTERNATIVE #4 - CORPS OF ENGINEERS PLAN C

7.6. SUMMARY OF PROPOSED ACTION AND ALTERNATIVES

7.6.1. Proposed Action: Corps of Engineers Plan B

The proposed harbor (Figures 2 and 12) would further alter the existing condition of the 33-acre project site from a shallow sedimented, recently altered reef and dredged basin area to a permanent light-draft vessel harbor complex consisting of revetted land areas, channels, basin, and berthing sanctuaries. There are no known threatened or endangered species nor critical habitats within the project.

The oceanographic regime of the new harbor may substantially differ from the existing conditions. The natural bathymetry of the project area will be permanently altered by filling and dredging operations. Also, the completed harbor structures may tend to slow and deflect existing sluggish wind-generated currents, and provide shelter to small boats from the wave and surge regimes of the area. Turbid water will continue to be trapped on the south side of the partially completed breakwater of the proposed harbor, and an increase in turbidity may occur on the south side of the completed small boat harbor. This turbidity can be greatly reduced by controlling windborne sedimentation and constructing sediment traps for major drainage ways. The harbor will be designed so that there will be no significant restriction of the already poor water circulation in the basin.

Noise and hydrocarbon emissions generated by construction equipment will be temporary, and impacts will be minor since the area is sparsely populated. Noise and hydrocarbon emissions will be permanently generated by boats and vehicles utilizing the completed harbor.

Increased sedimentation on the harbor floor because of reduced wave action and project dredging and filling operations may result in the replacement of the already depauperate marine fauna by other organisms more tolerant of a sediment bottom. Complete harbor structures such as moles, breakwaters, etc., should serve as favorable habitats to many fish species, some corals, algae, and other invertebrates.

Possible associated quarrying activities in the Makeahua Quarry upstream from the project site may cause an increase in sedimentation between the project site and the adjacent historic/archaeological site and may continue the sedimentation of the Haleokapuni Heiau.

Recreational opportunities will be greatly enhanced by the project, including boating and related offshore fishing activities, shoreside fishing and passive recreation.

The project will provide temporary construction jobs and permanent operations and maintenance jobs at the completed harbor area. These jobs will enhance the short-term and long-term economic climate of the Kawaihae area and the island of Hawaii. The harbor will also attract additional residents to the area, although the nature of the surrounding developments is not likely to be significantly changed or accelerated because of the harbor.

7.6.2. Alternative #1: No Action

Failure to implement the proposed harbor would not fulfill the goals and objectives of the project: meeting the projected needs of the boaters for the projected life of the project; providing safe, convenient and pleasant harbor facilities; broadening the recreational potential for the area; and enhancing the visual and environmental quality of the site.

No action would also result in the continued use of existing unprotected boat mooring facilities within the deep-draft harbor and in the existing unprotected dredged harbor area at the proposed project site.

All other existing physical, environmental, social, economic, and cultural base conditions remain unchanged with no action.

7.6.3. Alternative #2: Locating the Harbor within the Limits of the Existing Deep-Draft Harbor

Two small boat facilities currently exist within the deep-draft boat harbor: the north boat basin and the south small boat harbor. Both facilities were provided within the harbor to meet the demand for small boat anchorage in the late 1950s. The north boat basin provides relatively well-protected moorings in addition to a launching ramp, but is small and abuts land conflicting with projected uses in the Harbor Master Plan of 1961. The north boat basin is also subjected to large surge factors as well as being in conflict with commercial traffic.

The south small boat harbor is so exposed to surge that a number of concrete mooring piles have snapped off at the base. In addition, permanent installations here would obstruct future expansion of the overseas terminal as proposed by the Department of Transportation.

A problem also arises on current and potential conflicts between commercial and recreational boat traffic. In addition, these recreational craft are a potential hazard and/or hindrance to the larger commercial craft. Recreational boating is often associated with swimming, diving and fishing activities, and smaller sailing rigs have a greater potential for capsizing.

Because no additional dredging or construction of breakwaters would occur, no impacts would result from destruction of marine fauna or sedimentation due to dredging and/or filling operations. Any expansion involving shoreside construction activities may cause some temporary sedimentation within the large-draft harbor. Additional noise and emissions will be permanently generated within the large-draft harbor should the expansion occur. No impacts on the nearby historic/archaeological sites would occur.

No additional recreational opportunities related to the small boat harbor will be created other than increased boating as a result of the possible expansion.

Additional construction-, operation-, and maintenance-related jobs may be created as a result of expansion, though slightly fewer than the jobs created by construction of a new small boat harbor (proposed plan). The expansion may also attract additional residents to the area.

The use and/or expansion of the small boat harbor will have a neutral visual impact on the existing large-draft facility.

The cost for continued use and/or expansion of the small boat moorings within the large-draft harbor remains the lowest of the alternates (other than no action) because construction would be limited to additional berthing and shoreside support facilities.

7.6.4. Alternative #3: Corps of Engineers Plan A

Alternate #3 (Figure 14) presents the same physical impacts as the proposed action. However, an additional 1.75 acres of fill will be deposited in the marine waters to create the 2.5-acre offshore revetted island. This additional fill represents a greater alteration of bathymetry which will result in a coverage of additional previously destroyed coral reef and a greater temporary turbidity factor, but will create a larger perimeter of potential habitats for certain fish and marine fauna.

Recreational opportunities will be further enhanced by the construction of the offshore island. An additional 2.5 acres will become available for fishing, picnicking, and other passive and active uses. Swimming, however, will be restricted due to shark activity in the area.

This alternate will provide more employment than the proposed action due to additional construction, operational, and maintenance requirements of the island park.

Other social and economic impacts will be similar to the proposed action.

The island park would enhance the visual nature of the harbor and reduce the visual impact of the harbor on the shoreline by providing additional landscaping to the breakwater feature.

Costs for the structure and operational maintenance will be higher for this alternate than for the offshore breakwater.

7.6.5. Alternative #4: Corps of Engineers Plan C

Alternate #4 (Figure 15) also presents physical impacts similar to the proposed action. However, an additional 2.75 acres of fill will be required to construct the 3.5-acre offshore island/beach park. Additional previously destroyed coral reef will be covered and the general bathymetry of the immediate area will be altered as a result. Additional filling and deposition into marine waters will also result in a greater temporary turbidity problem, and will create a greater perimeter of potential habitat area for certain fish and marine fauna.

Recreational use will be greater than the proposed alternate due to the construction of the 3.5-acre island/beach park. Fishing, picnicking, sunbathing, and other beach-oriented activities will be made possible, however, swimming will be restricted due to shark activity in the area.

The construction of the island/beach park will result in additional construction, operation and maintenance jobs over the proposed action, and will also create an additional opportunity for private local interests to develop a related beach park complex. The beach park may draw users from the Spencer County Park. The island/beach park may also attract visitors from the adjacent historic site.

The visual impact of the harbor on the shoreline would lie with the additional landscaping for the design alternate.

Costs for the construction, operation and maintenance of the offshore island/beach park are higher than for the proposed project (Alternate #1), and Alternate #4 (Corps of Engineers Plan C).

8. RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF MAN'S ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The establishment of a small boat harbor at Kawaihae will provide additional safe and convenient storage, launching, maintenance and mooring facilities for the useful project life. If the land were to remain in its present use, relationships would be as follows:

- The land would produce no economic revenue versus the proposed project which includes commercial operations providing additional employment and increased tax revenues.

- Marine environmental quality would remain unaffected versus the proposed project which would result in a temporary degradation in water quality and loss of marine life.

- Terrestrial environmental quality would remain in its barren state (coral fill) versus the proposed project which provides topsoil, landscaping and irrigation to enhance the plant community and provide a potential habitat for fauna.

- The implementation of the project would result in enhanced recreational opportunities for the affected area.

9. MITIGATION MEASURES PROPOSED TO MINIMIZE IMPACT

The following measures are proposed to minimize significant adverse environmental impacts. The considerations are grouped according to duration of impact.

9.1. SHORT-TERM IMPACTS

- Implement procedures which lessen water turbidity and the dispersion of sediments and fugitive dust during construction. Monitoring and control methods for turbidity, sedimentation, and impacts on the benthic organisms will be included as part of the contract specifications. The State of Hawaii Department of Health rules and regulations (Chapter 43, Section 10) stipulate the control measures that are to be employed to reduce this type of emission. Key controls include the monitoring of plume and frequent wetting down of loose soil with water, oil, or suitable chemicals, which can reduce particulate emissions from a construction site up to 50 percent. Other potential measures include the use of dust-catching barriers. Where necessary, grassing, hydromulching, or groundcover plantings may be employed to reduce soil erosion. Additional measures should be employed by the State to control wind-driven coral dust from the adjacent harbor fill area into the project site. These include (a) cessation of coral fill mining and grading operations by private contractors; (b) planting and irrigation of cover vegetation; and (c) the removal of the overburden and its storage elsewhere.

  Turbidity of waters within and outside the harbor may be controlled by (a) construction of the east and west moles before dredging operations; (b) placement of rocks during low wave energy periods; (c) placement of rock during low tidal periods; (d) careful placement of rock and fill materials; and (e) use of silt curtains.

- Protect existing vegetative buffer to retard soil erosion. The development plan retains the existing planting of Cocos nucifera and Scaevola taccada.

- Monitor construction noise and equipment emissions, and if necessary the contractor shall take corrective action to comply with appropriate governmental regulations.

- Explore alternative methods of providing adequate fire fighting capability, such as utilizing pumped sea water.

- Schedule construction of the access road intersection during non-peak traffic flows.

- Conduct construction activities during standard hours of operation.

- Require contractor to restore to its natural state or better any damaged or disturbed area that was specified on plans as such.

- Monitor dredging activities to insure that no unnecessary or excessive dredging occurs and noise and emission standards are maintained.

9.2. LONG-TERM IMPACTS

- Landscape unimproved areas altered as a result of construction activities. This measure includes addition of topsoil where disturbed or removed and the planting of grass, groundcovers or other plant materials as necessary to minimize erosion or dust emissions.

- Restrict boat speed limits within harbor to control the noise level and the generation of damaging wakes.

- Minimize impact of harbor on adjacent historical sites (proposed Pu'ukohola National Historic Site) using design controls. Measures entail providing low-profile architectural elements, using natural material and colors of the region for structures and landscape elements, emphasizing the use of native and adapted plant materials, providing underground utilities from Kawaihae Road, and using appropriate landscape buffering between the sites and the proposed historic park. In addition, provisions for access linking passive recreational facilities of the project with the existing and proposed facilities of the adjacent historic site will be made. The proposed harbor site remains one of the best vantage points for viewing the Pu'ukohola Heiau, and provisions for an observation station will be considered.

- Monitor water quality in harbor and adjacent area and take corrective action, if necessary, to maintain State of Hawaii Standards for Harbor Waters which are designated Class B.

10. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The implementation of the proposed small boat harbor would result in the commitment of resources in various forms. The State's resources in terms of land, labor, and capital would be engaged in the construction of the harbor as well as the long-term operation and maintenance.

Natural resources such as rock, sand, wood, and other construction materials would be committed for the life of the project. These materials are replaceable, but the project will utilize them on a long-term basis. Approximately 40,000 cubic yards of rock and sand will be removed from the source and incorporated in the project. In addition, undetermined amounts of other construction materials such as bituminous paving, steel, wood and concrete would be included in the project.

The loss of 33 acres of reef habitat has already occurred at the proposed project site during Project Tugboat operations. Additional dredging of the access channel and basin would result in the further loss of reef formation and related benthic habitats.

In terms of recreational resources, the proposed small boat harbor would commit the immediate area for boating. It should be noted, however, that the area currently acts as a temporary mooring site. Swimming and diving within the interior area of the harbor or access channel would be dangerous and therefore prohibited.

11. OTHER INTERESTS AND CONSIDERATIONS OF GOVERNMENTAL POLICIES THOUGHT TO OFFSET ENVIRONMENTAL EFFECTS OF THE PROPOSED ACTION

All construction, maintenance, and operational activities will be subject to compliance with all applicable State and County environmental protection laws and ordinances. As required, the contractor and Harbors Division staff will monitor activities affecting groundwater and marine water quality, dust, erosion and siltation, air quality, noise levels, and protection of archaeological and unique geological features.

Certain social and cultural benefits also tend to offset some of the environmental effects. Additional offshore and onshore harbor facilities including landscaping provide the users more opportunity for recreational boating and related activities such as fishing, picnicking, etc. Alternative #4 provides for an offshore island park which would provide an even greater recreational potential.

The additional landscaping of the coral fill site will provide enhanced views to and from the proposed Pu'ukohola Heiau National Historic Site and will serve as a visual and physical extension of recreational activity associated with the park.

Economic benefit evaluations have not been recently examined, however a cost/benefit analysis by the Corps of Engineers in 1970 showed a cost/benefit ratio of 1.5. These recreational boating benefits were computed by subtracting the net return to boaters gained from the existing facilities from the net return to boaters gained from the proposed harbor facilities. The net return to boaters was developed as outlined by the Corps of Engineers Recreational Boating Formula.

12. LIST OF NECESSARY APPROVALS

County of Hawaii

1. Special Management Area (SMA) Permit
2. Planning Commission Use Permit
3. Re-zoning of Multiple Family Residential (RM) and Open (O) zones to General Industrial (MG)
4. Shoreline Setback Variance
5. Plan Approval
6. Building and Construction Permits
   - A. Grading
   - B. Electrical
   - C. Water
   - D. Sewer

State of Hawaii

1. Conservation District Use Application (CDUA). Department of Land and Natural Resources
2. Environmental Impact Statement, Chapter 343, HRS
3. Hawaii Coastal Zone Management Program, Chapter 205A, HRS

Federal

1. U.S. Army Corps of Engineers
2. National CZM Act of 1972, as amended

13. COMMENTS AND RESPONSES MADE DURING THE CONSULTATION PROCESS

HEADQUARTERS
NAVAL BASE PEARL HARBOR
BOX 110
PEARL HARBOR, HAWAII 96860 -5020

IN REPLY REFER TO:
9510
Ser 002A/310

14 FEB 1985

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

Dear Ms. Uyehara:

Environmental Impact Statement (EIS)
Kawaihae Small Boat Harbor

The EIS for the Kawaihae Small Boat Harbor has been reviewed and the Navy has no comments to offer. As this command has no further use for the EIS, the EIS is being returned to your office.

Thank you for the opportunity to review the EIS.

Sincerely,

Henry J. Rinnert

HENRY J. RINNERT
Captain, CEC, U. S. Navy
Facilities Engineer
By direction of the Commander

Enclosure

Copy to:
Mr. David Higa, Chief
Harbors Division, Dept of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813

GEORGE R. ARIYOSHI
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

WAYNE J. YAMASAKI
DIRECTOR

DEPUTY DIRECTORS
JONATHAN K. SHIMADA, Ph.D.
WALTER T.M. HO
CHERYL D. SOON
ADAM D. VINCENT

IN REPLY REFER TO

JUN 18 1985

HAR-EP 4406

Captain Henry J. Rinnert
Facilities Engineer
Department of the Navy
Commander Naval Base
Box 110
Pearl Harbor, HI 96860-5020

Dear Captain Rinnert:

EIS for Kawaihae Boat Harbor
Job H. C. 6102

We appreciate your review of the document. Your letter will be incorporated into the revised Environmental Impact Statement.

Thank you.

Very truly yours,

Wayne J. Yamasaki
Director of Transportation

MM/DT:jm

bcc: HAR-H
HAR-B

GEORGE R. ARIYOSHI
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF DEFENSE
OFFICE OF THE ADJUTANT GENERAL
3949 DIAMOND HEAD ROAD, HONOLULU, HAWAII 96816

ALEXIS T. LUM
MAJOR GENERAL
ADJUTANT GENERAL

DANIEL K. C. AU
COLONEL
DEPUTY ADJUTANT GENERAL

HIENG

FEB 15 1985

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

Dear Ms. Uyehara:

Kawaihae Small Boat Harbor
at Kawaihae, Hawaii

Thank you for providing us the opportunity to review your proposed project, "Kawaihae Small Boat Harbor Environmental Impact Statement."

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

Yours truly,

JERRY M. MATSUDA
Major, HANG
Contr & Engr Officer

Enclosure

cc: Chief, DOT, Harbors Division

GEORGE R. ARIYOSHI
GOVERNOR

WAYNE J. YAMASAKI
DIRECTOR

DEPUTY DIRECTORS
JONATHAN K. SHIMADA Ph.D
WALTER T.M. HO
CHERYL D. SOON
ADAM D. VINCENT

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

IN REPLY REFER TO

HAR-EP 4404

JUN 18 1985

MEMORANDUM

TO: Major Jerry M. Matsuda
Office of the Adjutant General
Department of Defense

FROM: Director of Transportation

SUBJECT: EIS for Kawaihae Boat Harbor
Job H. C. 6102

We appreciate your review of the document. Your letter will be incorporated into the revised Environmental Impact Statement.

Thank you.

for Wayne J. Yamasaki

MM/DT:jm

bcc: HAR-H
HAR-B

7

GEORGE R. ARIYOSHI
GOVERNOR

HIDEO MURAKAMI
COMPTROLLER

MIKE N. TOKUNAGA
DEPUTY COMPTROLLER

STATE OF HAWAII
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES
DIVISION OF PUBLIC WORKS
P. O. BOX 119, HONOLULU, HAWAII 96810

LETTER NO. (P) 1069.5

FEB 5 1985

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

Dear Ms. Uyehara:

Subject: EIS for Development of Kawaihae Small Boat Harbor, Kawaihae, Hawaii

We have reviewed the subject document and have no comments to offer.

Very truly yours,

TEUANE TOMINAGA
State Public Works Engineer

CT:jk
cc: Mr. David Higa

GEORGE R. ARIYOSHI
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

WAYNE J. YAMASAKI
DIRECTOR

DEPUTY DIRECTORS
JONATHAN K. SHIMADA, Ph.D.
WALTER T.M. HO
CHERYL D. SOON
ADAM D. VINCENT

JUN 27 1985

IN REPLY REFER TO:

HAR-EP 4405

MEMORANDUM

TO: Teuane Tominaga
Division of Public Works
Department of Accounting and General Services

FROM: Director of Transportation

SUBJECT: EIS for Kawaihae Boat Harbor
Job H. C. 6102

We appreciate your review of the document. Your letter will be incorporated into the revised Environmental Impact Statement.

Thank you.

/s/ Wayne J. Yamasaki
Wayne J. Yamasaki

MM/DT:jm

bcc: HAR-H
HAR-B

United States Department of the Interior

FISH AND WILDLIFE SERVICE
300 ALA MOANA BOULEVARD
P. O. BOX 50167
HONOLULU, HAWAII 96850

IN REPLY REFER TO:

ES
Room 6307

FEB 1 9 1985

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

Re: EIS, Kawaihae Small Boat Harbor,
Kawaihae, Hawaii

Dear Ms. Uyehara:

Due to current manpower and budget restrictions, the Office of Environmental Services cannot devote the time necessary to conduct a thorough review of fish and wildlife concerns associated with the referenced action at this time. We strongly recommend that you consult directly with the State of Hawaii, Department of Land and Natural Resources, Division of Aquatic Resources and consider their recommendations in your project planning.

Please be advised that this notification does not abrogate your responsibilities to comply with the requirements of the Fish and Wildlife Coordination Act, nor does it represent Service approval of, or support for, the proposed activity. The Service may review future actions related to this proposal should administrative constraints be alleviated or if adverse impacts to significant fish and wildlife resources are identified. Please continue to keep this office apprised of the project's status.

Sincerely yours,

William R. Kramer

William R. Kramer
Acting Project Leader
Office of Environmental Services

cc: NMFS-WPPO
HDF&W
HDAR
EPA, San Francisco
Harbors Div., State DOT

CONSERVE AMERICA'S ENERGY

Save Energy and You Serve America!

GEORGE R. ARIYOSHI
GOVERNOR

WAYNE J. YAMASAKI
DIRECTOR

DEPUTY DIRECTORS
JONATHAN K. SHIMADA, Ph.D.
WALTER T.M. HO
CHERYL D. SOON
ADAM D. VINCENT

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

IN REPLY REFER TO

HAR-EP 4098

JUN 18 1985

Mr. William R. Kramer
Office of Environmental Services
Fish and Wildlife Service
300 Ala Moana Boulevard
P.O. Box 50167
Honolulu, HI 96850

Dear Mr. Kramer:

EIS for Kawaihae Boat Harbor
Job H. C. 6102

We appreciate your review of the Environmental Impact Statement document and understand your current manpower and budget limitations.

We will continue to work and consult with appropriate agencies such as the Department of Land and Natural Resources and incorporate applicable recommendations.

We will keep your office apprised of the status of the project.

Very truly yours,

for Wayne J. Yamasaki
Director of Transportation

MM/DT:jm

bcc: HAR-H
HAR-B

DANTE K. CARPENTER
Mayor

HUGH Y. ONO
Chief Engineer

BRUCE C. McCLURE
Deputy Chief Engineer

DEPARTMENT OF PUBLIC WORKS

COUNTY OF HAWAII - 25 AUPUNI STREET - HILO, HAWAII 96720 - TELEPHONE (808) 961-8321

February 20, 1985

MS LETITIA N UYEHARA DIRECTOR
OFFICE OF ENVIRONMENTAL QUALITY
CONTROL
550 HALEKAUWILA STREET ROOM 301
HONOLULU HI 96813

SUBJECT: KAWAIHAE SMALL BOAT HARBOR
Environmental Impact Statement
Kawaihae, South Kohala, Hawaii

Thank you for the opportunity to review the Environmental Impact Statement.

Our comments pertain to the access and are as follows:

1. At what point in this development would turning lanes on Kawaihae Road be needed?

2. When or at what point in the overall development will the access road be paved?

HUGH Y. ONO
Chief Engineer

cc: Planning Department
David Higa, DOT Harbors Div.

GEORGE R. ARIYOSHI
GOVERNOR

WAYNE J. YAMASAKI
DIRECTOR

DEPUTY DIRECTORS
JONATHAN K. SHIMADA, Ph.D.
WALTER T.M. HO
CHERYL D. SOON
ADAM D. VINCENT

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

IN REPLY REFER TO

HAR-EP 4100

JUN 18 1985

Mr. Hugh Y. Ono
County of Hawaii
Department of Public Works
Hilo, HI 96720

Dear Mr. Ono:

EIS for Kawaihae Boat Harbor
Job H. C. 6102

We appreciate your review of the Environmental Impact Statement document and provide the following response to your comments:

COMMENTS:

"1. At what point in this development would turning lanes on Kawaihae Road be needed?

2. When or at what point in the overall development will the access road be paved?"

RESPONSE:

The turning lanes on Kawaihae Road and paving of the access road are recommended to take place during Phase III of the development plan.

Your letter will be included in the revised Environmental Impact Statement.

Very truly yours,

for Wayne J. Yamasaki
Director of Transportation

MM/DT:jm

bcc: HAR-H
HAR-B

6

DEPARTMENT OF WATER SUPPLY • COUNTY OF HAWAII
25 AUPUNI STREET • HILO, HAWAII 96720

February 21, 1985

Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, HI 96813

KAWAIHAE SMALL BOAT HARBOR

We reviewed the Environmental Impact Statement for the proposed small boat harbor and have the following comments.

Water services are restricted to one 5/8-inch meter per existing lot, or 600 gallons per day. No additional services or larger services shall be granted until such a time that a more adequate water source is developed.

The developer shall look into other means of providing landscape irrigation rather than being dependent upon the domestic water system.

William Sewake
H. William Sewake
Manager

CS

cc - Mr. David Higa, Chief - Dept. of Transportation, Harbors Division

GEORGE R ARIYOSHI
GOVERNOR

WAYNE J YAMASAKI
DIRECTOR

DEPUTY DIRECTORS
JONATHAN K SHIMADA, Ph D
WALTER T M HO
CHERYL D SOON
ADAM D VINCENT

IN REPLY REFER TO

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

JUN 18 1985

HAR-EP 4093

Mr. H. William Sewake
Department of Water Supply
County of Hawaii
25 Aupuni Street
Hilo, HI 96720

Dear Mr. Sewake:

EIS for Kawaihae Boat Harbor
Job H. C. 6102

We appreciate your review of the Environmental Impact Statement document and provide the following response to your comment:

COMMENT:

"The developer shall look into other means of providing landscape irrigation rather than being dependent upon the domestic water system."

RESPONSE:

At this time, the most feasible method of providing landscape irrigation water is use of domestic water.

The alternative of developing an independent well source on or near the site would prove too costly for the amount of irrigation required. Also, no formal testing has been done to determine the quality of available groundwater.

Since water service presently is limited, major landscape improvements may be postponed until such time that adequate water sources are developed. This matter will continue to be closely coordinated with your agency as the project progresses.

HAR-EP 4093

Your letter will be incorporated into the revised Environmental Impact Statement.

Very truly yours,

for Wayne J. Yamasaki
Director of Transportation

MM/DT:jm

bcc: HAR-H
HAR-B

DEPARTMENT OF PARKS & RECREATION
COUNTY OF HAWAII

Dante K. Carpenter, Mayor
Patricia Engelhard, Director

February 25, 1985

Ms. Letitia N. Uyehara, Director
Office of Environmental Quality Control
550 Halekauwila St., Room 301
Honolulu, HI 96813

Subject: Kawaihae Small Boat Harbor - EIS

Section 5.10, Recreational Impacts (page 70) states that "...use of the harbor may temporarily or permanently force sharks out of the project area into the Spencer Beach Park area..."

Should such a situation occur, the report should include possible protective measures, e.g., shark barrier nets, etc., to minimize the impact of such an occurrence on water recreational activities.

We have no other comments to offer and we thank you for the opportunity to review the report.

Pat Engelhard
Patricia Engelhard
Director

PE:GM:ai

cc: Mr. David Higa, Chief, Harbors Division

• 25 AUPUNI STREET • HILO, HAWAII 96720 • TELEPHONE 961-8311

GEORGE R. ARIYOSHI
GOVERNOR

WAYNE J. YAMASAKI
DIRECTOR

DEPUTY DIRECTORS
JONATHAN K. SHIMADA, Ph D
WALTER T M. HO
CHERYL D SOON
ADAM D VINCENT

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

IN REPLY REFER TO

HAR-EP 4097

JUN 27 1985

Ms. Patricia Engelhard, Director
Department of Parks & Recreation
County of Hawaii
Hilo, HI 96720

Dear Ms. Engelhard:

EIS for Kawaihae Boat Harbor
Job H. C. 6102

We appreciate your review of the Environmental Impact Statement document and provide the following response to your comment:

COMMENT:

"...the report should include possible protective measures, e.g., shark barrier nets, etc., to minimize the impact of such an occurrence on water recreational activities."

RESPONSE:

There is no known permanent resident shark population at or near the proposed harbor site. The possible displacement of sharks refer to cruising sharks which would not be expected to relocate to Spencer Beach Park on a permanent basis.

Your letter will be incorporated into the revised Environmental Impact Statement.

Very truly yours,

/s/ Wayne J. Yamasaki
Wayne J. Yamasaki
Director of Transportation

MM/DT:jm

bcc: HAR-H
HAR-B

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

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

LESLIE S. MATSUBARA
DIRECTOR OF HEALTH

In reply, please refer to:
EPHSD

February 26, 1985

MEMORANDUM

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

From: Deputy Director for Environmental Health

Subject: *Environmental Impact Statement (EIS) for Kawaihae Small Boat Harbor, Kawaihae, Hawaii*

Thank you for allowing us to review and comment on the subject EIS.

We recommend that the public be informed of ciguatera poisoning from Po'ou (primarily), Roi, Papio and Barracuda fishes caught in the surrounding area of Kawaihae Harbor.

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.

MELVIN K. KOIZUMI

cc: Mr. David Higa, Harbors Division, DOT
DHSA, Hawaii

GEORGE R. ARIYOSHI
GOVERNOR

WAYNE J. YAMASAKI
DIRECTOR

DEPUTY DIRECTORS
JONATHAN K. SHIMADA Ph.D
WALTER T.M. HO
CHERYL D. SOON
ADAM D. VINCENT

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

IN REPLY REFER TO

HAR-EP 4096

JUN 18 1985

MEMORANDUM

TO: Mr. Melvin K. Koizumi
Department of Health

FROM: Director of Transportation

SUBJECT: EIS for Kawaihae Boat Harbor
Job H. C. 6102

We appreciate your review of the Environmental Impact Statement document and provide the following response to your comment:

COMMENT:

"We recommend that the public be informed of ciguatera poisoning from Po'ou (primarily), Roi, Papio and Barracuda fishes caught in the surrounding area of Kawaihae Harbor."

RESPONSE:

Records obtained from the State Department of Health from 1980 to 1984 show that the project area has experienced incidences of ciguatera poisoning in the past involving the following fish species:

DATE AND SITE OF OUTBREAK	FISH AND PLACE CAUGHT
August 6, 16, 18 and 19, 1980 - Honolulu	Po'ou - Kawaihae
July 8, 1981 - Hilo	Po'ou - Kawaihae*
June 8, 1983	Po'ou - Puako
August 23, 1983 - Waimea	Po'ou - Kawaihae

*Test results negative.

HAR-EP 4096

Other fish, as mentioned in your letter, have been associated with the disease in other cases throughout the State.

Your letter will be incorporated into the revised Enviromental Impact Statement.

for Wayne J. Yamasaki

MM/DT:jm

bcc: HAR-H
HAR-B

GEORGE R. ARIYOSHI
GOVERNOR

JACK K. SUWA
CHAIRMAN, BOARD OF AGRICULTURE

SUZANNE D. PETERSON
DEPUTY TO THE CHAIRMAN

State of Hawaii
DEPARTMENT OF AGRICULTURE
1428 So. King Street
Honolulu, Hawaii 96814

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

February 26, 1985

MEMORANDUM

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

Subject: Environmental Impact Statement (EIS) for
Kawaihae Small Boat Harbor
Department of Transportation
TMK: 6-1-03: 26 Kawaihae, Hawaii
Acres: 33

The Department of Agriculture has reviewed the subject EIS and does not have any comments to offer. We are returning the document for your further use.

Thank you for the opportunity to comment.

Jack K. Suwa

JACK K. SUWA
Chairman, Board of Agriculture

Encl.

cc: DOT, Harbors Division

GEORGE R. ARIYOSHI
GOVERNOR

WAYNE J. YAMASAKI
DIRECTOR

DEPUTY DIRECTORS
JONATHAN K. SHIMADA Ph.D.
WALTER T. M. HO
CHERYL D. SOON
ADAM D. VINCENT

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

IN REPLY REFER TO

HAR-EP 4403

JUN 18 1985

MEMORANDUM

TO: The Honorable Jack K. Suwa
Chairman, Board of Agriculture
Department of Agriculture

FROM: Director of Transportation

SUBJECT: EIS for Kawaihae Boat Harbor
Job H. C. 6102

We appreciate your review of the document. Your letter will be incorporated into the revised Environmental Impact Statement.

Thank you.

Wayne J. Yamasaki

MM/DT:jm

bcc: HAR-H
HAR-B

MAR 1 3 34 PM '85

HARBORS DIVISION

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
FT. SHAFTER, HAWAII 96858-5440

February 26, 1985

Mr. David Higa, Chief
Harbors Division
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Higa:

Thank you for the opportunity to review and comment on the EIS for Development of Kawaihae Small Boat Harbor, Kawaihae, Hawaii. The following comments are offered:

a. A Department of the Army permit is required and we suggest that a meeting be arranged between the Operations Branch and Harbors Division to discuss the need for and desirability of a joint Federal-State EIS for the action.

b. For information purposes, the area in the vicinity of the existing breakwater at Kawaihae is shown in the Flood Insurance Study for Hawaii County conducted by the Federal Insurance Administration (Encl 1). The 100-year tsunami elevation at the project location, referenced to the breakwater is 9 feet above mean sea level. The 100-year event has a one percent chance of being equalled or exceeded in any given year.

c. Page 5, 3rd paragraph, line 12. The 1971 EA should be changed to read the 1971 Final Environmental Statement.

d. Page 6, 2nd paragraph, line 9. The statement should be amended to read, "...detonations using conventional ammonium nitrate explosives..."

e. Page 6, 3rd paragraph, line 8. The statement should be amended to read, "...upon coral fill created during the initial deep draft harbor construction in 1958-60..."

f. Page 7. The recommended berthing and mooring plan appears to have an inordinate supply of berths for large boats while the boat size breakdown of page 43 indicates boat ownership of large boats is small. Was a market analysis done? A discussion in the EIS to address this matter should be given.

g. Page 9, Trailered Vessels. The minimum criteria for parking is 40 stalls per launching ramp. Since there are two double ramps, the minimum criteria is 160 stalls. The plan provides 200 stalls which is more than the basic requirement. The EIS should discuss the reasons for 200 stalls and the basis for four launching lanes.

h. Page 10, Domestic Water. In addition to increasing the size of the fire-fighting capabilities, consideration should be given on using sea water for fire-fighting.

i. Page 16, Source of Rock. The EIS indicates that the Corps is investigating potential sources of rock for construction. We have not done any analyses for 6-8 years.

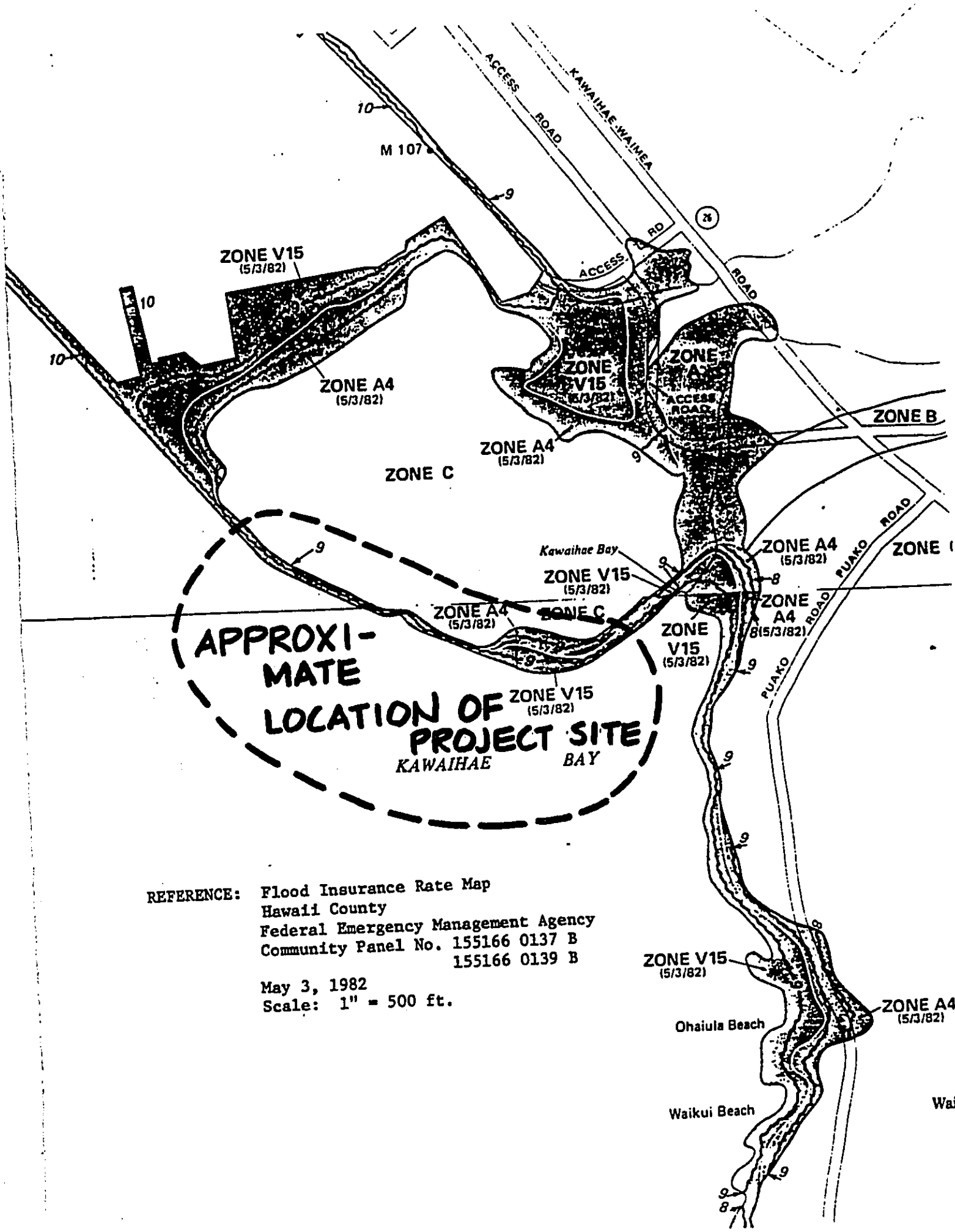
j. Page 79. One of the previously stated reasons for selection of the breakwater is boating and other recreational activities do not mix due to security problems. Is this the basis for selecting this plan (Corps of Engineers, Plan B)?

k. Page 82, Alternative 3. The economic impact of creation of a 2.5 acre island could increase benefits for recreation by $10,000-$20,000 annually. Suggest that this be corrected and addressed in the EIS.

Sincerely,

Howard S. Kobayashi
Actg C, Engineering Division

Enclosure



REFERENCE: Flood Insurance Rate Map
Hawaii County
Federal Emergency Management Agency
Community Panel No. 155166 0137 B
155166 0139 B

May 3, 1982
Scale: 1" = 500 ft.

GEORGE R. ARIYOSHI
GOVERNOR

WAYNE J. YAMASAKI
DIRECTOR

DEPUTY DIRECTORS
JONATHAN K. SHIMADA, Ph.D.
WALTER T.M. HO
CHERYL D. SOON
ADAM D. VINCENT

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

JUL 31 1985

IN REPLY REFER TO:

HAR-EP 4401

Mr. Kisuk Cheung, Chief
Engineering Division
Department of the Army
Fort Shafter, HI 96858-5440

Dear Mr. Cheung:

EIS for Kawaihae Boat Harbor
Job H. C. 6102

We appreciate your review of the Environmental Impact Statement document and provide the following responses to your comments:

COMMENT:

"a. A Department of the Army permit is required and we suggest that a meeting be arranged between the Operations Branch and Harbors Division to discuss the need for and desirability of a joint Federal-State EIS for the action."

RESPONSE:

The need for a U.S. Army C.O.E. permit is recognized and included under the list of necessary approvals.

A joint Federal-State EIS was discussed during the initial stages of the project. It was decided at that time that a joint EIS would not be feasible due to conflicting funding and scheduling requirements of the respective parties.

COMMENT:

"b. For information purposes, the area in the vicinity of the existing breakwater at Kawaihae is shown in the Flood Insurance Study for Hawaii County conducted by the Federal Insurance Administration (Encl 1). The 100-year tsunami elevation at the project location, referenced to the breakwater is 9 feet above mean sea level. The 100-year event has a one percent chance of being equalled or exceeded in any given year."

RESPONSE:

The map is included for information purposes.

COMMENT:

"c. Page 5, 3rd paragraph, line 12. The 1971 EA should be changed to read the 1971 Final Environmental Statement."

"d. Page 6, 2nd paragraph, line 9. The statement should be amended to read, "...detonation using conventional ammonium nitrate explosives..."

"e. Page 6, 3rd paragraph, line 8. The statement should be amended to read, "...upon coral fill created during the initial deep draft harbor construction in 1958-60..."

RESPONSE:

These amendments have been incorporated into the revised Environmental Impact Statement.

COMMENT:

"f. Page 7. The recommended berthing and mooring plan appears to have an inordinate supply of berths for large boats while the boat size breakdown of page 43 indicates boat ownership of large boats is small. Was a market analysis done? A discussion in the EIS to address this matter should be given."

RESPONSE:

Analyses of boat size ownership within the tributary areas of North and South Kohala, North Kona and Hamakua districts were made from boat register printouts furnished by the Harbors Division, from May 1981 through May 1983.

In addition, the desire to have smaller boats moored within the much calmer east basin and larger boats moored within the less calm west basin contributed to the final berthing and mooring plan.

COMMENT:

"g. Page 9, Trailered Vessels. The minimum criteria for parking is 40 stalls per launching ramp. Since there are two double ramps, the minimum criteria is 160 stalls. The plan provides 200 stalls which is more than the basic requirement. The EIS should discuss the reasons for 200 stalls and the basis for four launching lanes."

RESPONSE:

The criteria of 40 stalls per launching ramp was used as a minimum requirement. Based on use patterns at other existing facilities throughout the state, it was determined that the additional stalls were warranted. The amount of launching ramps are required to accommodate the needs of present and future area boaters, as well as actual use demonstrated at other existing harbor facilities of similar size.

COMMENT:

"h. Page 10, Domestic Water. In addition to increasing the size of the fire-fighting capabilities, consideration should be given on using sea water for fire-fighting."

RESPONSE:

Use of sea water for emergency fire-fighting purposes via portable pumps is recommended to be available at the harbor.

COMMENT:

"i. Page 16, Source of Rock. The EIS indicates that the Corps is investigating potential sources of rock for construction. We have not done any analyses for 6-8 years."

RESPONSE:

This has been corrected and will be reflected in the revised EIS.

COMMENT:

"j. Page 79. One of the previously stated reasons for selection of the breakwater is boating and other recreational activities do not mix due to security problems. Is this the basis for selecting this plan (Corps of Engineers, Plan B)?"

RESPONSE:

There were a number of reasons for the selection of the proposed plan. Among those were potential conflicts and security problems; however, other factors included degree of environmental impact, initial construction costs, and operational requirements.

COMMENT:

"k. Page 82, Alternative 3. The economic impact of creation of a 2.5 acre island could increase benefits for recreation by $10,000-$20,000 annually. Suggest that this be corrected and addressed in the EIS."

RESPONSE:

Alternative #3, as well as Alternative #4, as pointed out, will increase and enhance the recreational benefits to the public. Additionally, the creation of additional land and attendant real estate value will accrue increased economic benefit. Since the expressed purpose of the new lands would be for public recreational use, it is unlikely that the potential income would be realized.

HAR-EP 4401

There are, however, both short-term as well as long-term costs that were considered. These include additional construction cost and material, additional landscaping and irrigation demands, increased maintenance responsibility (possibly additional manpower), as well as increased environmental impacts relative to a breakwater. Pedestrian access, potential conflicts with the primary boating use of the facility, and safety and security were also considered in evaluating the various alternatives.

Your letter will be included in the revised Environmental Impact Statement.

Very truly yours,

for Wayne J. Yamasaki
Director of Transportation

University of Hawaii at Manoa

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

27 February 1985

Ms. Letitia N. Uyehara
Director
Office of Environmental
Quality Control
550 Halekauwila Street, Rm. 301
Honolulu, Hawaii 96813

Dear Ms. Uyehara:

Subject: Environmental Impact Statement for Development of
Kawaihae Small Boat Harbor, Kawaihae, Hawaii
January 1985

We have reviewed the subject EIS and have no comments to offer. Thank you for the opportunity to comment. This material was reviewed by WRRC personnel.

Sincerely,

Edwin T. Murabayashi

Edwin T. Murabayashi
EIS Coordinator, WRRC

ETM:jmn

cc: David Higa

GEORGE R ARIYOSHI
GOVERNOR

WAYNE J YAMASAKI
DIRECTOR

DEPUTY DIRECTORS
JONATHAN K SHIMADA Ph D
WALTER T M HO
CHERYL D SOON
ADAM D VINCENT

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

IN REPLY REFER TO

HAR-EP 4402

JUN 18 1985

MEMORANDUM

TO: Mr. Edwin T. Murabayashi
EIS Coordinator
Water Resources Research Center
University of Hawaii at Manoa

FROM: Director of Transportation

SUBJECT: EIS for Kawaihae Boat Harbor
Job H. C. 6102

We appreciate your review of the document. Your letter will be incorporated into the revised Environmental Impact Statement.

Thank you.

Wayne J. Yamasaki

MM/DT:jm

bcc: HAR-H
HAR-B

United States Department of Agriculture

Soil Conservation Service

P.O. Box 50004
Honolulu, Hawaii
96850

3

March 4, 1985

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

Dear Ms. Uyehara:

Subject: EIS for Development of Kawaihae Small Boat Harbor
Kawaihae, Hawaii

We have reviewed the subject environmental impact statement and have no comments to make.

Thank you for the opportunity to review the document.

Sincerely,

FRANCIS C.H. LUM
State Conservationist

cc:
David Higa, Chief
Harbors Division
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

GEORGE R. ARIYOSHI
GOVERNOR

WAYNE J. YAMASAKI
DIRECTOR

DEPUTY DIRECTORS
JONATHAN K. SHIMADA, PH.D.
WALTER T.M. HO
CHERYL D. SOON
ADAM D. VINCENT

IN REPLY REFER TO

HAR-EP 4407

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

JUN 18 1986

Mr. Francis C.H. Lum
State Conservationist
Soil Conservation Service
P.O. Box 50004
Honolulu, HI 96850

Dear Mr. Lum:

EIS for Kawaihae Boat Harbor
Job H. C. 6102

We appreciate your review of the document. Your letter will be incorporated into the revised Environmental Impact Statement.

Thank you.

Very truly yours,

for Wayne J. Yamasaki
Director of Transportation

MM/DT:jm

bcc: HAR-H
HAR-B

sent cc to DOT 3/11/85

U.S. Department of Transportation
United States Coast Guard

(dpl)
Commander
Fourteenth Coast Guard District

Prince Kalanianaole
Federal Building
300 Ala Moana Blvd.
Honolulu, Hawaii 96850
Phone: (808) 546-2861

16475
Serial No. 5/080
March 5, 1985

Letitia N. Uyehara, Director
Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, HI 96813

Dear Ms. Uyehara:

The Coast Guard has reviewed the Environmental Impact Statement for the KAWAIHAE SMALL BOAT HARBOR and has no objections to the proposed project.

We do have plans to install two daybeacons to mark the entrance to the harbor when it is completed. Please ensure that the appropriate agencies keep the Coast Guard advised as the planning and implementation of this project progresses.

Sincerely,

J. F. MILBRAND
Commander, U. S. Coast Guard
District Planning Officer
by direction of Commander
Fourteenth Coast Guard District

GEORGE R. ARIYOSHI
GOVERNOR

WAYNE J. YAMASAKI
DIRECTOR

DEPUTY DIRECTORS
JONATHAN K. SHIMADA Ph.D.
WALTER T.M. HO
CHERYL D. SOON
ADAM D. VINCENT

IN REPLY REFER TO

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

HAR-EP 4095

JUN 18 1985

Commander J.F. Milbrand
District Planning Officer
United States Coast Guard
300 Ala Moana Boulevard
Honolulu, HI 96850

Dear Commander Milbrand:

EIS for Kawaihae Boat Harbor
Job H. C. 6102

We appreciate your review of the document. Your letter will be incorporated into the revised Environmental Impact Statement.

We will keep the Coast Guard apprised of developments in the planning and implementation of this project.

Very truly yours,

for Wayne J. Yamasaki
Director of Transportation

MM/DT:jm

bcc: HAR-H
HAR-B

GEORGE R. ARIYOSHI
GOVERNOR

LETITIA N. UYEHARA
DIRECTOR

TELEPHONE NO.
548-6915

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
550 HALEKAUWILA STREET
ROOM 301
HONOLULU, HAWAII 96813

March 8, 1985

Mr. David Higa, Chief
Harbors Division
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Higa:

Subject: Kawaihae Small Boat Harbor Draft EIS

Our primary concern regarding this project is the protection of the archaeological structures in the adjacent Puukohola Heiau National Historical site. We wish to know what mitigating measures will be employed to protect the heiaus from blasting effects during construction of the harbor as well as from increased traffic through the historic site area resulting from the existence of the harbor.

Sincerely,

Letitia N. Uyehara

Letitia N. Uyehara
Director

GEORGE R ARIYOSHI
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

WAYNE J YAMASAKI
DIRECTOR

DEPUTY DIRECTORS
JONATHAN K SHIMADA, Ph D
WALTER T M HO
CHERYL D SOON
ADAM D VINCENT

IN REPLY REFER TO

HAR-EP 4417

1985

MEMORANDUM

TO: The Honorable Letitia N. Uyehara
Director, Office of Environmental Quality Control

FROM: Director of Transportation

SUBJECT: EIS for Kawaihae Boat Harbor
Job H. C. 6102

We appreciate your review of the Environmental Impact Statement document and provide the following response to your comment:

COMMENT:

"...We wish to know what mitigating measures will be employed to protect the heiaus from blasting effects during construction of the harbor as well as from increased traffic through the historic site area resulting from the existence of the harbor."

RESPONSE:

Blasting may not be required during construction of the harbor; however, in the event blasting is employed, every effort will be made to minimize any potential damage to surrounding historic sites such as the Puukohola Heiau. Mitigative measures include limiting the strength of the charge used and installing temporary protective reinforcement at the heiau prior to any scheduled blasting. In any case, we will work closely with the National Park Service as well as the State Historic Preservation Office in this matter.

HAR-EP 4417

The increased vehicular traffic generated by this project will occur primarily on the existing Kawaihae/Waimea Road located approximately 600 feet to the north of the heiau site. The potential damage due to the effects of pneumatic wheeled vehicles is considered to be insignificant, especially in light of the distance from the heiau site.

The only additional traffic which enters into the immediate historic area is along the existing road to Puako. The increase in traffic due to the proposed project along this road is expected to be minimal.

Your letter will be incorporated in the revised Environmental Impact Statement.

for Wayne J. Yamasaki

MM/DT:jm

bcc: HAR-H
HAR-B

DEPARTMENT OF THE ARMY
HEADQUARTERS UNITED STATES ARMY SUPPORT COMMAND, HAWAII
DUNNING HALL
FORT SHAFTER, HAWAII 96858 -5000

11 MAR 1985

REPLY TO
ATTENTION OF:
Directorate of Facilities Engineering

Ms. Letitia N. Uyehara
Director
Office of Environmental Quality Control
550 Halekauwila Street, Rm. 301
Honolulu, Hawaii 96813

Dear Ms. Uyehara:

The Environmental Impact Statement (EIS) for Development of Kawaihae Small Boat Harbor, Kawaihae, Hawaii has been reviewed.

The proposed small boat harbor will be located next to the Kawaihae Military Reservation (KMR), through which is shipped a significant quantity of vehicles, equipment, and ammunition required for military training exercises at the Pohakuloa Training Area (PTA). At KMR the items are off-loaded, staged in available harbor areas, and then convoyed to PTA. We are concerned that the proposed action may conflict with operations at KMR, resulting in disruptions to critical military training at PTA. Our concerns include possible impacts to:

a. Current and future operations of Army vessels at the LST landing ramp;

b. Locations of staging and storage areas, especially for ammunition, relative to the small boat harbor;

c. Use of the existing access road for wheeled vehicles to reach Kawaihae Road;

d. Use of the existing tank trail route for tracked vehicles, especially where the tank trail crosses the proposed access road to the small boat harbor;

e. Increased traffic congestion in the harbor area and on the existing access and Kawaihae Roads; and

f. Increased physical security and liability concerns at KMR.

The above concerns are not addressed in the EIS and should be resolved prior to the start of construction of the small boat harbor. A meeting with involved Army activities may be helpful in clarifying the issues and may be arranged by contacting Mr. B.D. Billingsley, Chief, Real Estate Management Division, at 655-4955.

Thank you for the opportunity to comment on the EIS.

Sincerely,

Ronald A. Borrello
Colonel, Corps of Engineers
Director of Facilities Engineering

Copy Furnished:

Mr. David Higa, Chief
Harbors Division
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813

GEORGE R. ARIYOSHI
GOVERNOR

WAYNE J. YAMASAKI
DIRECTOR

DEPUTY DIRECTORS
JONATHAN K. SHIMADA, Ph.D.
WALTER T.M. HO
CHERYL D. SOON
ADAM D. VINCENT

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

IN REPLY REFER TO:

HAR-EP 4091

JUL 31 1985

Colonel Ronald A. Borrello
Director of Facilities Engineering
Department of the Army
Dunning Hall
Fort Shafter, Hawaii 96858-5000

Dear Colonel Borrello:

EIS for Kawaihae Boat Harbor
Job H. C. 6102

We appreciate your review of the Environmental Impact Statement document and provide the following responses to your comments:

COMMENT:

"a. Current and future operations of Army vessels at the LST landing ramp;"

RESPONSE:

The proposed project is located well away from the LST ramp and would not affect current or future operations of Army vessels.

COMMENT:

"b. Locations of staging and storage areas, especially for ammunition, relative to the small boat harbor;"

RESPONSE:

The proposed project would not impact upon existing staging and storage areas.

COMMENT:

"c. Use of the existing access road for wheeled vehicles to reach Kawaihae Road;"

RESPONSE:

The proposed project will not impact on the use of the existing access road to Kawaihae Road.

COMMENT:

"d. Use of the existing tank trail route for tracked vehicles, especially where the tank trail crosses the proposed access road to the small boat harbor;"

RESPONSE:

The proposed project would not prohibit the crossing of the small boat harbor access drive by tracked vehicles provided adequate measures are undertaken to prevent damage to roadways and to promote safety during times of operation.

COMMENT:

"e. Increased traffic congestion in the harbor area and on the existing access and Kawaihae Roads;"

RESPONSE:

The anticipated increase in traffic due to the project would not prevent or limit the capability of the KMR during periods of operation.

COMMENT:

"f. Increased physical security and liability concerns at KMR."

RESPONSE:

The project would not require extraordinary security and liability measures than are already utilized during the operations at KMR.

HAR-EP 4091

Notwithstanding our responses to your comments, we find that the Army is responsible for resolving any conflicts resulting from the development of the boat harbor and the commercial harbor expansion proposals. It should be noted that the parcel under encumberance as a staging area for intermittent storage of ammunition and equipment, and construction of safety security barricades is regulated by the conditions set forth under Corps of Engineers' Contract No. DACW 84-4-79-1 as amended. In addition, a June 4, 1985 meeting was held between, among others, Lt. Colonel Kenneth P. Roland II of the U.S. Army Support Command Hawaii, apparent spokesperson for the agency charged with transshipping and transporting munitions to the Pohakuloa military training camp on the Big Island. The meeting identified the military's responsibility for the safety aspects of their handling of explosives within Kawaihae Harbor. It was agreed that physical security would increase and other safety measures, including erecting of warning signs and providing appropriate media announcements, effectuated during periods when the munitions are being off-loaded in the harbor by the Army.

Your letter will be incorporated into the revised Environmental Impact Statement.

Very truly yours,

fw

Wayne J. Yamasaki
Director of Transportation

E

SOCIETY FOR HAWAIIAN ARCHAEOLOGY
P.O. Box 22911 • Honolulu, Hawai'i • 96822

March 11, 1985

Letitia N. Uyehara, Director
Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, Hawai'i 96813

RE: Draft EIS for Kawaihae Small Boat Harbor

Dear Ms. Uyehara,

The Peer Review Committee of the Society for Hawaiian Archaeology has reviewed the above document and we are disturbed at the Department of Transportation's apparent lack of serious assessment of the impacts this proposed project will have upon the Pu'ukohola Heiau National Historic Site.

The first area of concern centers around the impacts of the propsed blasting at the Makeahua Quarry and the increased heavy vehicle traffic, both of which may adversely effect the stability of the stacked stone structures that makeup the National Historic Site. We strongly recommend that blasting not be permitted at the adjacent Makeahua Quarry and that another source of rock be utilized.

As for increased vehicular traffic, this may be a more serious and long-term problem. The Draft EIS cites a U.S. Geological Survey study that "failed to establish any relationship between current vehicular traffic (shich includes heavy trucks) and the structual stability of the two heiau" (p. 71; emphasis is ours). The proposed harbor can only dramatically increase all kinds of vehicular traffic into this area and a study at current levels does not sufficiently address this problem.

Finally, our committee was concerned by the opinion expressed in the Draft EIS that the "additional visual intrusion" of the proposed harbor "into the existing seascape fronting the National Historic Site" is somehow lessened or that it negates the adverse effects of this project "because the original historic coastline was irreversibly altered in the 1950's by construction of the coral fill area southeast of the existing deep-draft harbor" (p.71). While it is true that these changes have occurred, we strongly object to their conclusions, and we do not accept the logic that

SOCIETY FOR HAWAIIAN ARCHAEOLOGY
P.O. Box 22911 • Honolulu, Hawai'i • 96822

some change permits any and all change. This project will dramatically intrude upon the present historic and archaeological scene, and will most definitely introduce "visual...elements that are out of character with the propery (and will) alter its setting" (see Section 800.9.c Criteria of Adverse Effect, 36 CFR 800).

We therefore recommend that the location of this project be seriously reconsidered. The impact of this project will be to forever change the cultural and historic setting of the Pu'ukohola Heiau National Historic Site, and will probably cause progressive structural damage to one of Hawai'i's most valuable cultural resources. If this project is approved, we strongly recommend that blasting not be permitted at the Makeahua Quarry and that provisions be made to monitor and repair any and all damage related to increased vehicular traffic.

Sincerely,

David J. Welch

David J. Welch, Chairperson
Peer Review Committee

cc: Keeper of the National Register of Historic Places
Advisory Council on Historic Preservation
National Park Service, Pacific Area Office
State Historic Preservation Officer
Chief, Harbors Division, Hawai'i State Department of Transportation

GEORGE R. ARIYOSHI
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DEPUTY DIRECTORS
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WALTER T.M. HO
CHERYL D. SOON
ADAM D. VINCENT

IN REPLY REFER TO

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

JUN 27 1985

HAR-EP 4099

Mr. David J. Welch, Chairperson
Peer Review Committee
Society for Hawaiian Archaeology
P.O. Box 22911
Honolulu, HI 96822

Dear Mr. Welch:

EIS for Kawaihae Boat Harbor
Job H. C. 6102

We appreciate your review of the Environmental Impact Statement document and provide the following responses to your comments:

COMMENT:

"...We strongly recommend that blasting not be permitted at the adjacent Makeahua Quarry and that another source of rock be utilized."

RESPONSE:

All efforts will be made to utilize quarry sites other than Makeahua Quarry should they prove feasible. However, if blasting occurs at Makeahua Quarry in conjunction with the project, measures will be taken to minimize potential damage to the heiaus. These include temporarily reinforcing the heiaus during blasting operations. In any case, we are prepared to work closely with the National Park Service and the State Historic Preservation Office to establish final mitigative measures and monitoring methods.

COMMENT:

"...The proposed harbor can only dramatically increase all kinds of vehicular traffic into this area and a study at current levels does not sufficiently address this problem."

RESPONSE:

The statement in the Environmental Impact Statement regarding increased traffic should be clarified. While the project will generate increased traffic both short-term construction related vehicles as well as long-term user traffic, this increase will occur primarily along Kawaihae/Waimea road which is located approximately 600 feet from the heiau area and outside of the prime historic area.

The existing Puako Road traffic, which does enter into the prime historic area will not be used by heavy vehicles related to construction of the harbor. Since the increase in traffic will occur on the Kawaihae/Waimea Road, the current level of traffic directly affecting the heiau sites will not be significantly increased.

COMMENT:

"Finally, our committee was concerned by the opinion expressed in the Draft EIS that the "additional visual intrusion" of the proposed harbor "into the existing seascape fronting the National Historic Site" is somehow lessened or that it negates the adverse effects of this project "because the original historic coastline was irreversibly altered in the 1950's by construction of the coral fill area southeast of the existing deep-draft harbor" (p. 71)."

RESPONSE:

The assessment of the visual impact of the project is based on its effect on the visual character in the regional context. In other words, in relation to surrounding areas and activities the project is visually compatible with its immediate and regional environment. The project, which includes landscaping and architectural

HAR-EP 4099

design guidelines consistent with the area, may be viewed as an improvement to the existing barren landfill area.

In addition, the relocation of the project to an alternate pristine area may result in greater visual impacts to another area than utilizing a site that has already been altered.

This is not to say that we advocate wholesale development in the area simply because change has taken place. We recognize the importance of the historic sites and the need to maintain their historic interest and feel the project does not significantly impact upon them.

Your letter will be incorporated in the revised Environmental Impact Statement.

Very truly yours,

/s/ Wayne J. Yamasaki

Wayne J. Yamasaki
Director of Transportation

MM/DT:jm

bcc: HAR-H
HAR-B

DEPARTMENT OF PLANNING AND ECONOMIC DEVELOPMENT
KAMAMALU BUILDING, 250 SOUTH KING ST, HONOLULU, HAWAII
MAILING ADDRESS P.O. BOX 2359, HONOLULU, HAWAII 96804 • TELEX 7430250 HIDPED

GEORGE R. ARIYOSHI
GOVERNOR
KENT M. KEITH
DIRECTOR
MURRAY E. TOWILL
DEPUTY DIRECTOR
LINDA KAPUNIAI ROSEHILL
DEPUTY DIRECTOR

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PLANNING DIVISION
RESEARCH AND ECONOMIC ANALYSIS DIVISION

OFFICES
DIRECTOR'S OFFICE
ADMINISTRATIVE SERVICES OFFICE
INFORMATION OFFICE

Ref. No. P-1205

March 11, 1985

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

Dear Ms. Uyehara:

Subject: EIS for Kawaihae Small Boat Harbor, Kawaihae, Hawaii

We have reviewed the subject environmental impact statement (EIS) and offer the following comments with respect to the relevant objectives and policies of the Hawaii Coastal Zone Management (CZM) Program.

Coastal Ecosystems: Promote water quantity and quality planning and management practices which reflect the tolerance of freshwater and marine ecosystems and prohibit land and water uses which violate State water quality standards. (Chapter 205A-2(c)(4)(D), HRS)

The subsurface fuel tanks in the center mole will be exposed to saltwater infiltrating from the ocean. To preclude the possibility of eventual fuel leakage and subsequent water contamination, storage tanks should be constructed of materials resistent to oxidation by saltwater.

Dredging is required to construct and maintain the proposed harbor. The EIS does not indicate what machinery will be used, what or whether turbidity controls will be employed, what or whether contaminants will be present in the dredger spoils, and where the spoils will be disposed.

Other potential sources of water contamination are the various sewage systems that will be associated with the facility. These include both the terrestial wastewater treatment system and the marine sanitation devices (MSD) on recreational vessels. The interrelationship of the wastewater treatment system and marine sanitation devices (e.g., MSDs will/will not be emptied at dockside) and the location and condition of waste materials when disposed are of particular concern.

Scenic and Open Space Resouces: Insure that new developments are compatible with their visual environment by designing and locating such developments to minimize alteration of natural land forms and existing public views to and along the shorelines. (Chapter 205A-2 (c)(3)(B), HRS)

The EIS acknowledges the usefulness of landscaping to improve the project's appearance and to visually divide the project area into development zones of low and moderate intensity. However, the proposal should also discuss the use of vegetation to hide areas that will be visually objectionable. In this regard, it would be appropriate to vegetatively screen the dry dock/repair yard from surrounding areas. This will also help to mitigate noise impacts.

Economic Uses: Concentrate in appropriate areas the location of coastal dependent development necessary to the State's economy. (Chapter 205A-2(c)(5)(A), HRS)

Coastal sites are usually in short supply as an area becomes more developed. Such shortages can be reduced in severity, however, by reserving shorefront lands for activities which depend on water access. Consideration should be given to redesigning the proposed shoreside component--specifically the shops, the restaurant, and associated parking--so that they are set back away from the waterfront or are at least reoriented to minimize their frontage along the shore.

Recreational Resources: Improve coordination of coastal recreation planning and management. (Chapter 205A-2(c)(1)(A), HRS)

The proposed activity is expected to displace grey reef and white-tip shark populations from their traditional breeding and spawning grounds. A possible consequence is the relocation of the sharks to areas offshore of Spencer Beach Park, which would probably affect this area's suitability for recreational water sports. There should be a discussion of measures that would mitigate this impact.

Recreational Resources: Provide adequate, accessible, and diverse recreational opportunities in the coastal zone management area by encouraging expanded public recreational use of County, State, and Federally owned or controlled shoreline lands and waters having recreational value. (Chapter 205A-2(c)(1)(B)(v), HRS)

The project is proposed for an area that is used increasingly for recreational purposes. It might be appropriate, therefore, to diversify the possible recreational uses of the project. One such change would be to construct an elevated public fishing pier from the detached breakwater, and to place an artificial reef nearby.

Other Concerns

Inasmuch as water will be in short supply, it might be worthwhile to consider using seawater for activities where quality is not a concern, for example, firefighting and the conveyance of sewage to treatment systems.

Finally, projects which utilize Federal funds, require Federal approval, or involve a Federal agency as a co-sponsor are required to achieve Federal consistency under the CZM program. It appears that the proposed project falls within at least one of these categories.

Thank you for the opportunity to review and comment on the subject document.

Very truly yours,

Kent M. Keith

cc: Dept. of Transportation, Harbors Division

GEORGE R. ARIYOSHI
GOVERNOR

WAYNE J. YAMASAKI
DIRECTOR

DEPUTY DIRECTORS
JONATHAN K. SHIMADA, Ph.D.
WALTER T.M. HO
CHERYL D. SOON
ADAM D. VINCENT

IN REPLY REFER TO

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

JUN 27 1985

HAR-EP 4089

MEMORANDUM

TO: The Honorable Kent M. Keith, Director
Department of Planning and Economic Development

FROM: Director of Transportation

SUBJECT: EIS for Kawaihae Boat Harbor
Job H. C. 6102

We appreciate your review of the Environmental Impact Statement document and provide the following responses to your commments:

COMMENT:

"...To preclude the possibility of eventual fuel leakage and subsequent water contamination, storage tanks should be constructed of materials resistent to oxidation by saltwater."

RESPONSE:

The underground storage tanks will be of materials resistant to oxidation by saltwater.

COMMENT:

"Dredging is required to construct and maintain the proposed harbor. The EIS does not indicate what machinery will be used, what or whether turbidity controls will be employed, what or whether contaminants will be present in the dredger spoils, and where the spoils will be disposed."

RESPONSE:

The actual construction method and use of specific machinery is normally at the discretion of the Contractor, provided all operations are in compliance with applicable codes and regulations. The spoils will be used as fill and/or disposed of at an approved spoil disposal site.

COMMENT:

"Other potential sources of water contamination are the various sewage systems that will be associated with the facility. These include both the terrestial wastewater treatment system and the marine sanitation devices (MSD) on recreational vessels. The interrelationship of the wastewater treatment system and marine sanitation devices (e.g., MSDs will/will not be emptied at dockside) and the location and condition of waste materials when disposed are of particular concern."

RESPONSE:

All sewage treatment and disposal methods and operations will comply with State and Federal health code requirements.

COMMENT:

"...the proposal should also discuss the use of vegetation to hide areas that will be visually objectionable. In this regard, it would be appropriate to vegetatively screen the dry dock/repair yard from surrounding areas. This will also help to mitigate noise impacts."

RESPONSE:

Visually objectionable areas, such as the dry dock/boat repair area, will be screened from surrounding areas through the use of appropriate plant materials such as Ironwoods and shrub material.

COMMENT:

"...Consideration should be given to redesigning the proposed shoreside component--specifically the shops, the restaurant, and associated parking--so that they are set back away from the waterfront or are at least reoriented to minimize their frontage along the shore."

RESPONSE:

The harbor is designed to give water access dependent activities maximum frontage to the water. The proposed shops and restaurant complex has been sufficiently setback to allow for these uses.

COMMENT:

"The proposed activity is expected to displace grey reef and white-tip shark populations from their traditional breeding and spawning grounds. A possible consequence is the relocation of the sharks to areas offshore of Spencer Beach Park, which would probably affect this area's suitability for recreational water sports. There should be a discussion of measures that would mitigate this impact."

RESPONSE:

There is no known permanent shark population at or near the proposed project. The possible displacement of sharks refer to cruising sharks which would not be expected to relocate to Spencer Beach Park on a permanent basis.

COMMENT:

"The project is proposed for an area that is used increasingly for recreational purposes. It might be appropriate, therefore, to diversify the possible recreational uses of the project. One such change would be to construct an elevated public fishing pier from the detached breakwater, and to place an artificial reef nearby."

RESPONSE:

Occasional shoreline fishing activities which normally take place at facilities similar to the proposed project would not be prohibited. Since it is the charge of this Department to facilitate harbor development, proposals related more directly to general shoreline recreational activities would be better served under the purview of appropriate agencies such as the Department of Land and Natural Resources, Aquatic Resources Division. This Department would cooperate in any recreational development proposals which are compatible with the project goals and objectives.

COMMENT:

"Inasmuch as water will be in short supply, it might be worthwhile to consider using seawater for activities where quality is not a concern, for example, firefighting and the conveyance of sewage to treatment systems."

RESPONSE:

Seawater is being recommended for use in firefighting within the proposed project. Further, should the technology to utilize seawater for conveyance of sewage become available, we would explore this possibility to reduce the demand on domestic water.

COMMENT:

"Finally, projects which utilize Federal funds, require Federal approval, or involve a Federal agency as a co-sponsor are required to achieve Federal consistency under the CZM program. It appears that the proposed project falls within at least one of these categories."

RESPONSE:

A Federal consistency is required and will be filed at the appropriate time.

Your letter will be incorporated in the revised Environmental Impact Statement.

/s/ Jonathan K. Shimabukuro
for Wayne J. Yamasaki

MM/DT:jm

bcc: HAR-H
HAR-B

University of Hawaii at Manoa

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

March 13, 1985

RE:0411

Ms. Letitia Uyehara
Office of Environmental Quality Control
550 Halekauwila Street
Honolulu, Hawaii 96813

Dear Ms. Uyehara:

Draft Environmental Impact Statement
Kawaihae Small Boat Harbor
Kawaihae, Hawaii

The project for which this Draft Environmental Impact Statement (DEIS) has been prepared involves the construction of a small boat harbor with a detached breakwater, moles, wave absorber, navigational channel and various related onshore facilities at Kawaihae, Hawaii. The Environmental Center review has been prepared with the assistance of Frans Gerritsen, Ocean Engineering; Robert Grace, Civil Engineering; Joseph Halbig, Geology at UH Hilo; and Jacquelin Miller, Environmental Center.

In general, the DEIS for the Small Boat Harbor adequately discusses the setting and impacts related to the proposed harbor. There are a few questions or concerns however, related to the harbor design and operations which should be addressed further in the revised document.

Bathymetry/Dredging

The present plan calls for a channel entrance depth of 8 ft. (p. 17). Whether this depth is measured below mllw and whether it is a minimum or an average depth is not indicated. (The term "average water depth" is applied to the depths cited for the northwestern and southeastern basins). An 8 ft. channel depth seems marginal for the boats of the size that are to be berthed. We note (p. 7) that 117 berths (50 percent) will be for boats 40 ft. and over and 61 (21 percent) for boats 50 ft. to 65 ft. If the 8 ft. is an 'average' depth then at low tide one would expect not more than 6 to 7 ft. of clearance. We also note frequent reference throughout the DEIS to sedimentation in the harbor and the need for periodic maintenance dredging. An 8 ft. depth would not provide much if any safety factor to the larger boats, particularly in areas subject to significant sediment input. We would strongly suggest that the Revised EIS discuss the basis for the 8 ft. depth decision and the alternative of increasing the depth of the entrance channel to 10 ft.

In the discussion of dredging requirements (p. 17), no mention is made of the need to blast in the channel or harbor. Because of the potential affects of blasting on humpback whales or sea turtles, we suggest that, unless it can be definitively indicated that blasting in coastal waters will not occur, appropriate time and surveillance restrictions on the use of blasting should be included in the EIS. Compliance with these restrictions can be assured by incorporating the EIS into the construction contract.

Landscaping

We note that landscaping of the shoreside area is the last item proposed for the last phase V (p. 19). Since the Draft EIS makes repeated reference to the problems of siltation and wind blown sediments from the adjacent denuded lands, it would seem far more appropriate to install sufficient irrigation systems and landscaping at the beginning of the phase II development so that soil/sediment loss will be minimized.

Harbor design

Turbidity is cited (p. 31) as high at times within the proposed harbor basin, due primarily to silt and sediments blown in or carried in by runoff from exposed land and the nearby Makeahua Quarry. Circulation is cited as generally minimal, encouraging the harbor to serve as a sediment trap. The potentially for a significant problem for operation and maintenance seems quite apparent.

Model studies at Look Laboratory, such as those required for the West Beach Marina project, should be required to examine the flushing and surge characteristics of the various harbor configurations. The costs for any model studies that led to decreases in sedimentation rates, or improved flushing, or safety would surely be more than offset by the reduction in maintenance dredging costs.

Tsunami haàzard

The discussion of tsunami hazard (p. 30) is based directly on the meager record of the higher runups at Kawaihae of historic tsunamis—in general runup heights above mllw. The hazard would be better indicated by the statistics derived by the Waterways Experiment Station from the historic record using, in the case of tsunamis from some source areas, a model producing tsunami runup patterns (Houston et al., 1977). The data, available from the Corps of Engineers at Fort Shafter, suggest that, for Kawaihae, (Hawaii Area 1, Station 2), the relationship between runup height and exceedence frequency is:

$$h = -9.1 - 9.1 \log_{10} F$$

where h = runup height, feet msl.

F = exceedence frequency, per year

The 100-year runup height indicated by this relationship is 9.1 ft. msl.

It is concluded (p. 63) that: "The proposed harbor, as designed, will mitigate the potentially hazardous effects of tsunami action." Because resonant amplification of tsunami waves in a harbor of this size seems unlikely, the conclusion is probably valid for the area within the harbor. How much reduction in runup height in the harbor area will actually result from the construction of the breakwaters seems not to have been estimated, and there is no mention of the vulnerability of the breakwaters to tsunami damage. Tsunami runup heights may be somewhat increased on the shore between the proposed harbor and the Kawaihae Deep-Draft Harbor, but the increase may be slight. Whether an increase or decrease in tsunami hazard results along the shore to the south of the small boat harbor would be difficult to determine without model studies.

Yours truly,

Doak C. Cox
Director

cc: David Higa, DOT
Frans Gerritsen
Robert Grace
Joseph Halbig
Jacquelin Miller

GEORGE R ARIYOSHI
GOVERNOR

WAYNE J YAMASAKI
DIRECTOR

DEPUTY DIRECTORS
JONATHAN K SHIMADA Ph D
WALTER T M HO
CHERYL D SOON
ADAM D VINCENT

IN REPLY REFER TO

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

JUN 19 1985

HAR-EP 4092

MEMORANDUM

TO: The Honorable Doak C. Cox, Director
Environmental Center
University of Hawaii at Manoa

FROM: Director of Transportation

SUBJECT: EIS for Kawaihae Boat Harbor
Job H. C. 6102

We appreciate your review of the Environmental Impact Statement document and provide the following responses to your comments:

COMMENT:

Bathymetry/Dredging

"...We would strongly suggest that the Revised EIS discuss the basis for the 8 ft. depth decision and the alternative of increasing the depth of the entrance channel to 10 ft."

RESPONSE

All depths noted in the EIS document refer to mllw or mean lower low water. The 8-foot depth referred to in the document is for new channels and basins and is considered sufficient for the type of craft expected to be berthed. The existing harbor entrance and access channels and turning basin, previously dredged during Project Tugboat, has a depth of 12 feet.

COMMENT:

"In the discussion of dredging requirements (p. 17), no mention is made of the need to blast in the channel or harbor. Because of the potential affects of blasting on humpback whales or sea turtles, we suggest that, unless it can be definitively indicated that blasting in coastal waters will not occur, appropriate time and surveillance restrictions on the use of blasting should be included in the EIS. Compliance with these restrictions can be assured by incorporating the EIS into the construction contract."

RESPONSE:

It has not been determined that blasting for dredging purposes is required. In the event of blasting activities, which would occur only in the initial stages of the project, such activities would be limited to periods when particular species such as the humpback whales and sea turtles would not be in the affected area. In addition, all State and Federal environmental protection laws will be strictly adhered to.

The U.S. Fish & Wildlife Service and the State Division of Aquatic Resources will be consulted to determine the proper scheduling of blasting activities, if required.

COMMENT:

Landscaping

"We note that landscaping of the shoreside area is the last item proposed for the last phase V (p. 19). Since the Draft EIS makes repeated reference to the problems of siltation and wind blown sediments from the adjacent denuded lands, it would seem far more appropriate to install sufficient irrigation systems and landscaping at the beginning of the phase II development so that soil/sediment loss will be minimized."

RESPONSE:

Landscaping was placed in the last phase because of the uncertainty of obtaining adequate irrigation water. Should the present situation change and water becomes

available and funding secured, the landscape improvements will be moved up in priority.

COMMENT:

Harbor design

"Model studies at Look Laboratory, such as those required for the West Beach Marina project, should be required to examine the flushing and surge characteristics of the various harbor configurations...."

RESPONSE:

The present harbor configuration is based upon alternative designs developed by the U.S. Army Corps of Engineers (COE) in 1970-1971. Studies were done at that time by the COE and determined that the flushing action would be adequate for a facility of this type. It was concluded that detailed model studies were not necessary.

COMMENT:

"It is concluded (p. 63) that: "The proposed harbor, as designed, will mitigate the potentially hazardous effects of tsunami action." Because resonant amplification of tsunami waves in a harbor of this size seems unlikely, the conclusion is probably valid for the area within the harbor. How much reduction in runup height in the harbor area will actually result from the construction of the breakwaters seems not to have been estimated, and there is no mention of the vulnerability of the breakwaters to tsunami damage. Tsunami runup heights may be somewhat increased on the shore between the proposed harbor and the Kawaihae Deep-Draft Harbor, but the increase may be slight. Whether an increase or decrease in tsunami hazard results along the shore to the south of the small boat harbor woud be difficult to determine without model studies."

RESPONSE:

The construction of the project would reduce the direct impacts of tsunami wave action within the harbor and areas immediately inland. However, shoreside facilities would remain subject to potential damage since it would

not be feasible nor reasonably possible to completely mitigate the sometimes devastating effects of the tsunami phenomenon.

Your letter will be incorporated in the revised Environmental Impact Statement.

for Wayne J. Yamasaki

MM/DT:jm

bcc: HAR-H
HAR-B

114

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

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

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. BOX 621
HONOLULU, HAWAII 96809

MAR 1 5 1985

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

Dear Ms. Uyehara:

We appreciate the opportunity to review the environmental impact statement for the Kawaihae small boat harbor.

We concur with pages 45 through 48, and pages 70 through 71, which deal with historical and archaeological concerns.

The possibility of damage to the three heiau (Haleokapuni, Pu'ukohola, and Mailekini) due to the blasting for breakwater construction rock in the adjacent Makeahua Quarry exists; therefore, we recommend that prior arrangements be made with the National Park Service and the Historic Sites Section of the Department of Land and Natural Resources to monitor these sites during the blasting periods.

We further recommend that if unidentified sites or remains (such as artifacts, shell, bone, or charcoal deposits, human burials, rock or coral alignments, pavings, or walls) are encountered, please direct the contractor to stop work and contact our office at 548-7460, immediately. Work in the immediate area should be stopped until our historic sites office is able to assess the impact and make further recommendations for mitigative activity, if warranted.

Sincerely,

SUSUMU ONO
Chairperson
and
State Historic Preservation Officer

cc: Harbors Division

GEORGE R. ARIYOSHI
GOVERNOR

WAYNE J. YAMASAKI
DIRECTOR

DEPUTY DIRECTORS
JONATHAN K. SHIMADA Ph.D
WALTER T.M. HO
CHERYL D. SOON
ADAM D. VINCENT

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

IN REPLY REFER TO

JUN 18 1985

HAR-EP 4094

MEMORANDUM

TO: Mr. Susumu Ono
State Historic Preservation Officer
Department of Land & Natural Resources

FROM: Director of Transportation

SUBJECT: EIS for Kawaihae Boat Harbor
Job H. C. 6102

We appreciate your review of the Environmental Impact Statement document and provide the following responses to your comments:

COMMENT:

"The possibility of damage to the three heiau (Haleokapuni, Pu'ukohola, and Mailekini) due to the blasting for breakwater construction rock in the adjacent Makeahua Quarry exists; therefore, we recommend that prior arrangements be made with the National Park Service and the Historic Sites Section of the Department of Land and Natural Resources to monitor these sites during the blasting periods."

RESPONSE:

We recognize the potential of damage to nearby heiau sites should blasting activities take place at Makeahua Quarry and will work closely with your office and the National Park Service prior to and during these periods.

HAR-EP 4094

COMMENT:

"We further recommend that if unidentified sites or remains (such as artifacts, shell, bone, or charcoal deposits, human burials, rock or coral alignments, pavings, or walls) are encountered, please direct the contractor to stop work and contact our office at 548-7460, immediately."

RESPONSE:

Since the shoreside area is composed entirely of fill material, it is unlikely that material will be uncovered that would be of historic interest. However, should any unidentified sites or remains be encountered during construction, the contractor will be required to stop work in the immediate area and notify your office for appropriate action.

Your letter will be incorporated into the revised Environmental Impact Statement.

for Wayne J. Yamasaki

MM/DT:jm

bcc: HAR-H
HAR-B

COUNTY OF HAWAII

PLANNING DEPARTMENT

25 AUPUNI STREET • HILO, HAWAII 96720
(808) 961-8288

DANTE K. CARPENTER
Mayor

ALBERT LONO LYMAN
Director

ILIMA A. PIANAIA
Deputy Director

March 18, 1985

Mr. David Higa, Chief
Harbors Division
Department of Transportation
869 Punchbowl Street
Honolulu, HI 96813

Dear Mr. Higa:

Kawaihae Small Boat Harbor
Environmental Impact Statement

Thank you for the opportunity to review this EIS. We have the following comments:

1. The proposed project is being planned in five development phases, however, the caveat in Section 2.4.16 (page 18) stating "the recommended phasing plans may be adjusted to accommodate future economic trends, population shifts and demands, and available public and private funds" suggests that beyond Phase I the construction sequence is uncertain. The environmental impacts associated with the project are directly related to the total length of time required to complete all five phases. For example, the activities planned for Phase V (e.g. paving the access road and parking area) are essential to minimize any impacts on land.

2. There are some jurisdictional questions which need to be resolved. The National Park Service (NPS) currently administers the Puukohola Heiau National Historic Site which we understand includes the John Young House Site. The Hawaii County Planning Department in addition to the NPS and the State Historic Preservation Officer needs to be included as consulted party on the quarry source(s) for this proposed project to fully evaluate the impacts to the historic sites which are listed in our General Plan.

The proposed sewerage and wastewater treatment system(s) need to reviewed by the Department of Health to allow cesspool treated effluent to enter the coastal waters. The water quality standards and the necessary monitoring to maintain these standards also need to be discussed.

Turbidity of the waters within and outside of the harbor is implied as a short term construction related impact. Turbidity, however, is a much longer termed problem which needs to be further discussed with the Department of Health as the water quality monitoring discussed on page 86 developed.

3. The EIS includes a List of Necessary Approvals. It needs to be expanded to include a Use Permit from the County's Planning Commission as well as a Shoreline Setback Variance. Plan Approval must be secured from the Planning Department prior to the issuance of Building and Construction Permits. Determining the appropriate number of parking stalls will be one of the results of Plan Approval.

4. Figure 11 on page 57 is not an accurate excerpt of our General Plan Land Use Pattern Allocation Guide Map. The illustrated Alternate Expansion Areas needs to be amended.

Again, thank you for the opportunity to review this EIS. Should you have any questions, please feel free to contact us.

Sincerely,

ALBERT LONO LYMAN
Planning Director

RN:lv

GEORGE R. ARIYOSHI
GOVERNOR

WAYNE J. YAMASAKI
DIRECTOR

DEPUTY DIRECTORS
JONATHAN K. SHIMADA, PH.D.
WALTER T. M. HO
CHERYL D. SOON
ADAM D. VINCENT

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
869 PUNCHBOWL STREET
HONOLULU, HAWAII 96813

IN REPLY REFER TO

JUN 18 1985

HAR-EP 4090

Mr. Albert Lono Lyman, Director
Planning Department
County of Hawaii
25 Aupuni Street
Hilo, HI 96720

Dear Mr. Lyman:

EIS for Kawaihae Boat Harbor
Job H. C. 6102

We appreciate your review of the Environmental Impact Statement document and provide the following responses to your comments:

COMMENT:

"The proposed project is being planned in five development phases, however, the caveat in Section 2.4.16 (page 18) stating "the recommended phasing plans may be adjusted to accommodate future economic trends, population shifts and demands, and available public and private funds" suggests that beyond Phase I the construction sequence is uncertain...."

RESPONSE:

We iterate the caveat stated in Section 2.4.16 with emphasis on obtaining available funding.

We concur that the environmental impacts are related to the time required to complete the total project. Should the project sequence or character be significantly altered, a supplemental Environmental Impact Statement will be prepared if necessary.

COMMENT:

"...The Hawaii County Planning Department in addition to the National Park Service (NPS) and the State Historic Preservation Officer needs to be included as consulted party on the quarry source(s) for this proposed project to fully evaluate the impacts to the historic sites which are listed in our General Plan."

RESPONSE:

Your department, as well as the NPS and the State Historic Preservation Officer will be consulted with and kept apprised of any activity related to and potentially affecting any historic site.

COMMENT:

"The proposed sewerage and wastewater treatment system(s) need to be reviewed by the Department of Health to allow cesspool treated effluent to enter the coastal waters. The water quality standards and the necessary monitoring to maintain these standards also need to be discussed."

RESPONSE:

Sewage and wastewater treatment systems will be reviewed by the Department of Health and comply with applicable codes and regulations. Water quality standards and ongoing monitoring activities will be maintained as required.

COMMENT:

"Turbidity of the waters within and outside of the harbor is implied as a short term construction related impact. Turbidity, however, is a much longer termed problem which needs to be further discussed with the Department of Health as the water quality monitoring discussed on page 86 developed."

RESPONSE:

Long-term turbidity is a naturally occurring phenomenon and a function of oceanographic conditions. As mentioned

above, State of Hawaii standards and monitoring requirements will be observed.

COMMENT:

"The EIS includes a List of Necessary Approvals. It needs to be expanded to include a Use Permit from the County's Planning Commission as well as a Shoreline Setback Variance.

Plan Approval must be secured from the Planning Department prior to the issuance of Building and Construction Permits. Determining the appropriate number of parking stalls will be one of the results of Plan Approval."

RESPONSE:

The List of Necessary Approvals has been expanded to include those mentioned in your letter.

COMMENT:

"Figure 11 on page 57 is not an accurate excerpt of our General Plan Land Use Pattern Allocation Guide Map. The illustrated Alternate Expansion Areas needs to be amended."

RESPONSE:

Figure 11 has been amended to illustrate current Alternate Expansion Areas.

Your letter will be incorporated into the revised Environmental Impact Statement.

Very truly yours,

for Wayne J. Yamasaki
Director of Transportation

MM/DT:jm

bcc: HAR-H
HAR-B

14. ORGANIZATIONS AND PERSONS TO BE CONSULTED

County of Hawaii

Mayor's Office
County Council
Department of Human Concerns
Department of Public Works
Department of Water Supply
Department of Parks and Recreation
Planning Department
Hawaii County Fire Department
Hawaii County Police Department
Department of Economic Development

State

Department of Agriculture
Department of Education
Department of Health
Department of Land and Natural Resources
Department of Planning and Economic Development
Department of Transportation
Office of Environmental Quality Control
Department of Hawaiian Home Lands
Environmental Center (U.H.)
Water Resources Research Center (U.H.)

Federal

U.S. Army Corps of Engineers
U.S. Department of Agriculture, Soil Conservation Service
U.S. Department of Interior, Fish and Wildlife Services
U.S. Department of Housing and Urban Development

Others

Hawaii Electric Co.
Hawaiian Telephone Co.
The Sierra Club

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