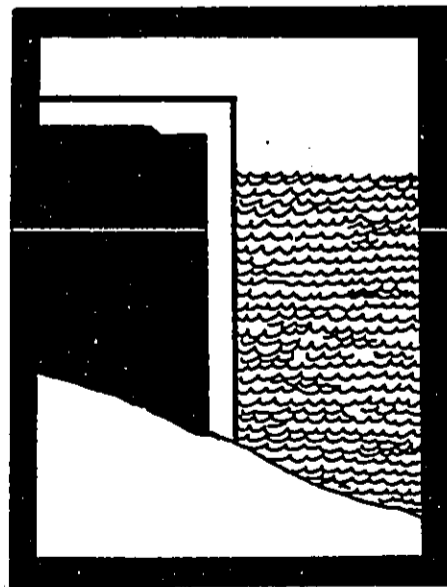


Office Of Environmental Quality Control
Office Of The Governor
550 Halekuanila Street
Tani Office Building, Third Floor
Honolulu, Hawaii 96813

 **environmental
statement**

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**BULKHEAD AND
OTHER
IMPROVEMENTS
KAHULUI
HARBOR
job h.c.3046**



MA

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DEPARTMENT OF TRANSPORTATION
STATE OF HAWAII

Prepared By

Harbors Division

REVISED
ENVIRONMENTAL IMPACT STATEMENT

ADMINISTRATIVE ACTION

for

BULKHEAD AND OTHER IMPROVEMENTS AT
KAHULUI HARBOR, KAHULUI, MAUI
JOB H.C. 3046

THIS STATEMENT FOR IMPROVEMENT WAS DEVELOPED IN ACCORDANCE WITH THE
ENVIRONMENTAL IMPACT STATEMENT REGULATIONS, STATE OF HAWAII, AND IS
SUBMITTED PURSUANT TO:

Chapter 343
Hawaii Revised Statutes

Date

Feb 4, 1977


DAVID HIGA

Acting Chief, Harbors Division

REVIEWED FOR CONTENT AND ACCEPTED BY STATE DOT

Date

Feb 28, 1977


E. ALVEX WRIGHT

for Director

NOTE

The State Department of Transportation has modified the design of the proposed project as was described in the Environmental Impact Statement. This change was brought about by engineering, oceanographic, and environmental concerns expressed during the EIS review period and at a public meeting held on October 21, 1976. The new wharf will be a combination concrete sheetpile bulkhead and pile girder structure. A complete description of the project is contained in Section 2 of this document.

SUMMARY

PROPOSING AGENCY: STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HARBORS DIVISION

PROPOSED PROJECT: CONSTRUCTION OF A BULKHEAD
AND OTHER IMPROVEMENTS AT
KAHULUI HARBOR, KAHULUI,
MAUI, HAWAII
JOB NO. H. C. 3046

ACCEPTING AUTHORITY: GOVERNOR
STATE OF HAWAII

I. PROPOSED ACTION

The proposed action consists of the construction of a 500-foot long wharf perpendicular to Pier 2. The harbor basin surrounding the outboard face will be dredged 18 feet below mean lower low water (MLLW). Additional improvements include the extension of utilities from Pier 2 to the eastern end of the new wharf.

II. DESCRIPTION OF THE PROJECT SITE

The project site is located along the shoreline between Piers 1 and 2. A badly damaged concrete deck resembling a jetty and two stone revetted finger piers are located near the center of the site.

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

The proposed action conforms with the General Plan and zoning designation for the site. The proposed action is subject to Maui County's Interim Coastal Zone Management Rules and Regulations pertaining to construction in special

management areas (SMA's).

IV. ANTICIPATED ENVIRONMENTAL IMPACTS

The project will generate short-term construction related impacts affecting air quality, noise levels, and traffic flow. These impacts will be mitigated by appropriate measures. Furthermore, the project will impact benthic and marine organisms in the port and adjacent areas through dredging and spoil disposal operations.

Beneficial impacts generated by the project include (1) provision of additional berthing space and (2) addition of a new pier to facilitate roll-on/roll-off containerized cargo. Both impacts will improve the efficiency of port operations.

V. ADVERSE IMPACTS WHICH CANNOT BE AVOIDED

Construction activities and dredging operations will alter the marine habitat and cause the loss of rocky intertidal habitats along the shoreline. On-site fishing will be curtailed during construction, but can be resumed after completion of the proposed project.

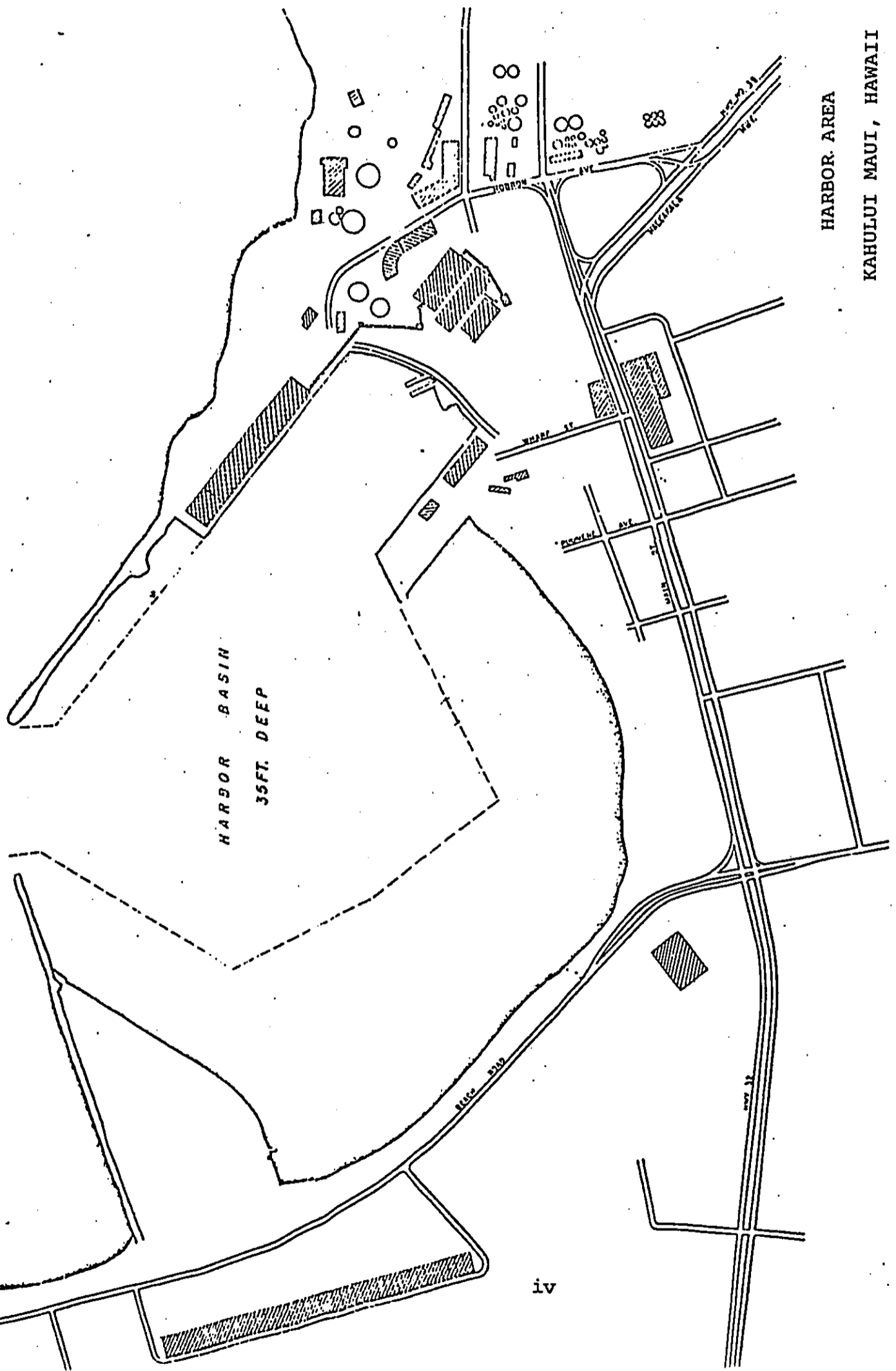
VI. ALTERNATIVES TO THE PROPOSED ACTION

Alternatives include:

- (1) No Action, in which the site remains in its underutilized condition.
- (2) Alternative Location at another site in the harbor.
- (3) Alternative Designs which were considered.

VII. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The proposed project will commit additional land to commercial port activities and allocate scarce shoreline acreage in the port to the same use. Labor, materials, and fuel used during construction will be committed. There will be some destruction of marine organisms.



HARBOR AREA
 KAHULUI MAUI, HAWAII



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SECTION 1
INTRODUCTION

The town of Kahului has developed into the major commercial, industrial, and transportation center of Maui. Fundamental to this role is the almost total dependency Maui has on the Port of Kahului for receiving commodities to sustain its population. Approximately 98.9 percent of all goods coming into Maui are transported by water and arrive at Kahului Harbor--the island's major active commercial port and only deep draft harbor. Goods are then unloaded and transported overland to major population centers. A number of shipping lines and barge companies service Maui through Kahului Harbor with Matson, United States Lines, and Young Brothers Ltd. handling the vast majority of the freight.

During the past fifteen years, there have been marked changes in the shipping industry. The Port of Kahului has been affected by these changes and will be further affected by them as well as by others not yet realized. The majority of these changes have resulted from an effort to reduce the continuously increasing costs of ship operation through a reduction in port turnaround time. This has resulted in the development and use of containerization and an increase in the carriage and transfer of cargo in bulk. Another result has been a reduction in the number of ports-of-call of overseas vessels. This eliminates those ports where only small quantities of cargo are loaded or discharged. This

latter result is evident at Kahului where the number of overseas vessel calls declined from 89 in 1969 to 56 in 1974. Despite the decline in overseas vessels, the port has not experienced a serious decline in cargo received because there has been a subsequent increase in inter-island calls as shown in Table 1-1.

TABLE 1-1
VESSEL CALLS

Fiscal Year	Overseas*		Inter-Island	
	Cargo	Tanker	"Princess"***	Barges
1969	64	25	82	224
1970	48	39	61	254
1971	38	36	95	287
1972	32	42	67	288
1973	32	25	67	311
1974	34	22	74	356

* Missing from the above are tanker barges which cause the fluctuations in tanker calls.

** Matson Container Ship.

Source: Correspondence with Captain P.A. Lilly
Maui District Manager, Department of Transportation
Harbors Division Inter-Island.

While port calls by the Matson inter-island container ship "Princess" have fluctuated, the number of calls by barges increased from 224 in 1969 to 356 in 1974. This is an average of 6 calls a week--a fair indicator of port activity by one vessel class. Another indicator is cargo traffic. Freight traffic in the port exceeded 1,000,000 short tons for the first time in 1970. Since then, a high of 1,297,800 short tons was attained in 1972, as shown in Table 1-2.

TABLE 1-2
FREIGHT TRAFFIC
PORT OF KAHULUI 1969-1973

<u>Year</u>	<u>Freight (Short Tons)</u>
1969	868,500
1970	1,083,400
1971	1,067,900
1972	1,297,800
1973	1,042,800*

*Strike Year

Source: Table 240, State of Hawaii Data Book, 1975.

A study of Kahului Harbor by Tudor Engineering (1972) indicates that while the port is now able to accomodate the present mix of vessel types, improvements are required to increase the operational efficiency of the port and to provide for the changing character of port traffic.

The study suggests that diminishing overseas vessel calls will continue until the only commodities carried in the overseas trade are petroleum products, sugar, molasses, fertilizer, lumber, and perhaps pineapple. This situation has essentially been already achieved.

Liquid bulk and containerized cargo are seen as the areas of greatest growth with petroleum products (liquid bulk) as the largest cargo type.

The amount of containerized cargo entering Kahului can be expected to increase due to both increasing cargo movement and an increasing percentage of the cargo's being handled by this more efficient means. Transshipped containers now move between Honolulu and Neighbor Island ports by two methods: (1) without chassis, on the self-propelled,

container barge of Matson Navigation Company, and (2) on chassis, on the towed barges of Young Brothers, Ltd. The latest innovation in maritime transportation incorporates both methods, resulting in a self-propelled barge carrying containerized cargo on chassis. This is the roll on/roll off ship. Its primary advantage is that anything on wheels can be rolled on and off the vessel, making it much like a giant ocean-going parking garage. This type of vessel is expensive to operate, however, and its efficiency in handling cargo is predicated on taking advantage of its quick turn-around capability. Use of this method streamlines cargo handling because everything is unitized and mobile and can move directly off ship to its destination.

The Tudor report acknowledges that Maui's projected cargo movements can be handled at the Port of Kahului for the next twenty years. However, the increase in inter-island barge service, the increased use of containerized techniques, and the trend towards roll on/roll off vessels necessitates the use of new cargo handling methods and an expansion of port facilities to accommodate anticipated increases in maritime traffic.

The Tudor report further suggests additional berthing space be provided for commercial fishing vessels which comprise the largest single class of vessels arriving at the Port of Kahului. There were 370 such calls in 1974, down from 402 in 1973. In 1971, a high of 436 fishing vessels called on Kahului. These vessels currently berth at Pier 2

where they take on fuel. As such, they are the cause of occasional berthing shortages and because of their low priority in securing berthing space, they get shifted to other berths.

In sum, changing conditions in maritime cargo handling operations and the need for additional berthing space necessitate improvements to Kahului Harbor.

SECTION 2

DESCRIPTION OF THE PROPOSED PROJECT

I. PROJECT OBJECTIVE

The objective of the proposed project is to improve operational efficiency within the Port of Kahului. This objective is realized by (1) providing the necessary facilities to expedite handling of roll on/roll off cargo and (2) accommodating commercial fishing vessels which are the cause of occasional berthing shortages at Pier 2.

II. PROJECT SCOPE

As shown in Figure 2-1, the proposed plan is to construct a 500-foot long wharf extending at a right angle in a northeasterly direction from Pier 2. The width of the new wharf will range from 15 to 90 feet, depending on the measured distance between the shoreline and outboard face. The elevation of the wharf will match that of Pier 2. Beginning at Pier 2, a 36' by 150' long concrete apron will be built on top of the wharf to support roll on/roll off barge ramps. The remaining 350 feet will be paved with concrete.

The project will require dredging the harbor basin to a minimum depth of 18 feet measured from mean lower low water (MLLW) beyond the outboard face of the new wharf. The dredged area will extend an additional 100 feet from the eastern end of the new wharf. Fishing vessels will be berthed two deep and parallel to the wharf at this location.

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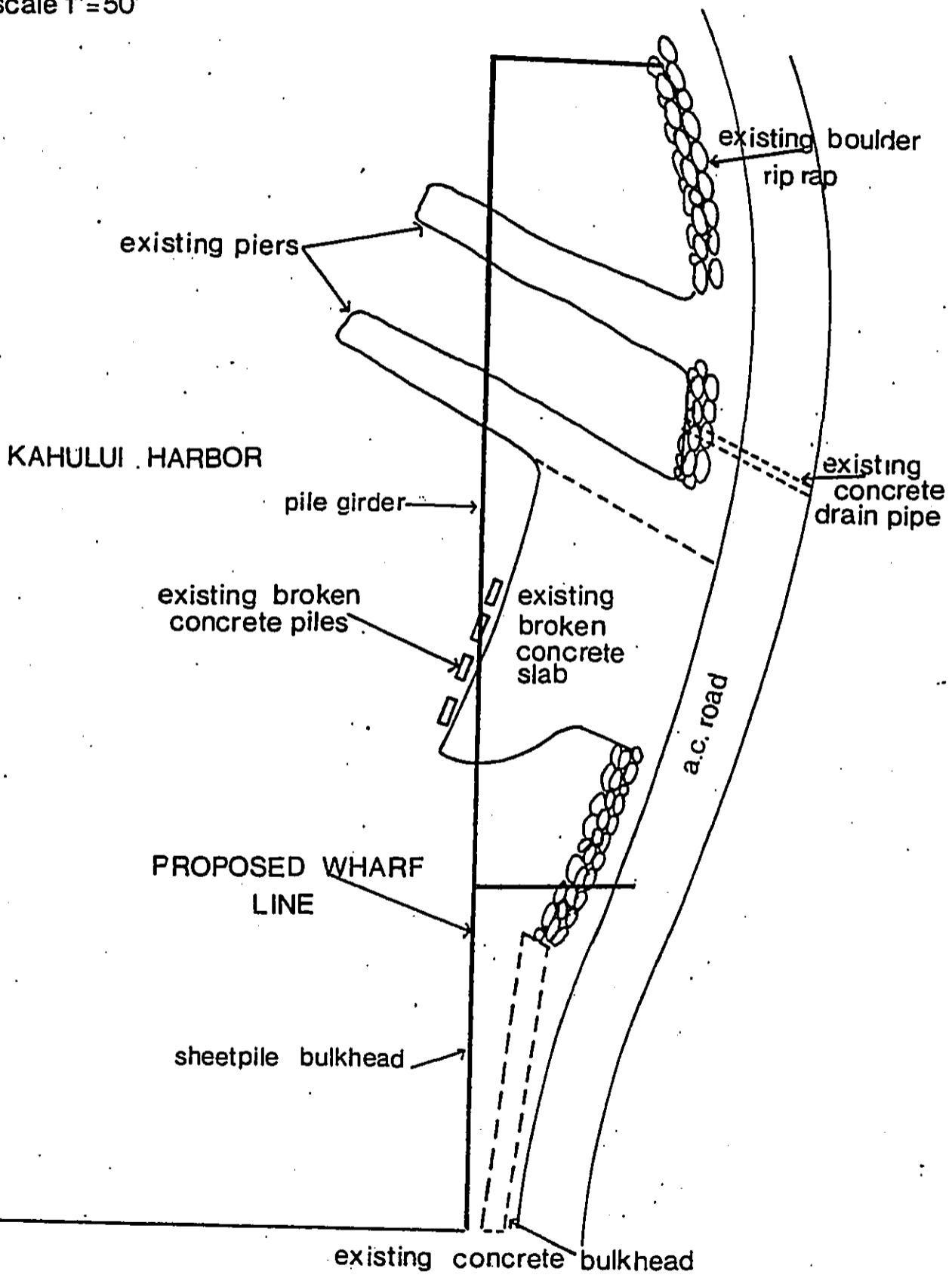


fig.2-1
2-2

Water lines, power facilities, lighting, and an empty telephone duct will be installed at the eastern end of the wharf. Fueling facilities will be provided at a later date.

III. TECHNICAL CHARACTERISTICS

The new wharf will be a combination anchored sheet pile bulkhead and pile-girder structure. A 150-foot long sheet pile bulkhead similar to that shown in Figure 2-2 will be constructed perpendicular to Pier 2 at the site of an existing embedded bulkhead. Sheet piles, capped with concrete to one foot below the low tide mark, will form the outboard face of the wharf and will be anchored with tie-backs.

The remaining 350 feet of the wharf will be a pile girder structure similar to that shown in Figure 2-3. The slope under this structure will be protected by a rock revetment. Approximately 12,500 cubic yards of fill is required to fill in the area between the outboard face of the sheetpile structure and the shoreline and for the rock revetment. Approximately 28,800 square feet of concrete is required for surfacing the entire length of the wharf and for the roll on/roll off barge ramps (36 feet x 150 feet). Approximately 700 square feet of asphaltic concrete pavement is required for decking.

Dredging will remove approximately 40,000 cubic yards of bottom sediment. The dredged material will be disposed of on land. Some of this material will be used to fill the area behind the bulkhead. The remaining material will be stockpiled in an area approximately 350 feet behind (southeast) the proposed bulkhead. The area to be dredged, and the location of the spoil disposal site are shown on Figure 3-1.

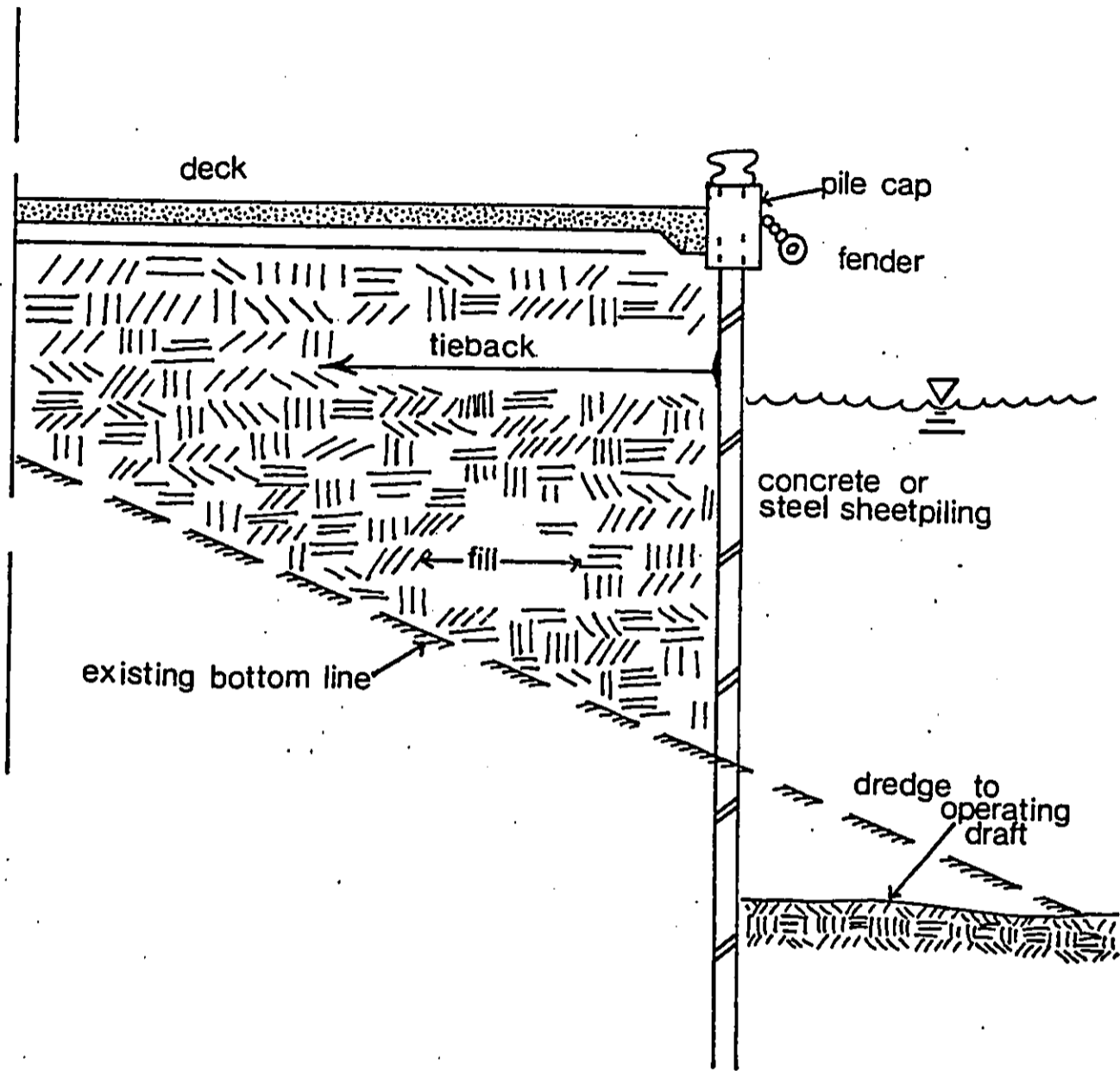


figure 2-2

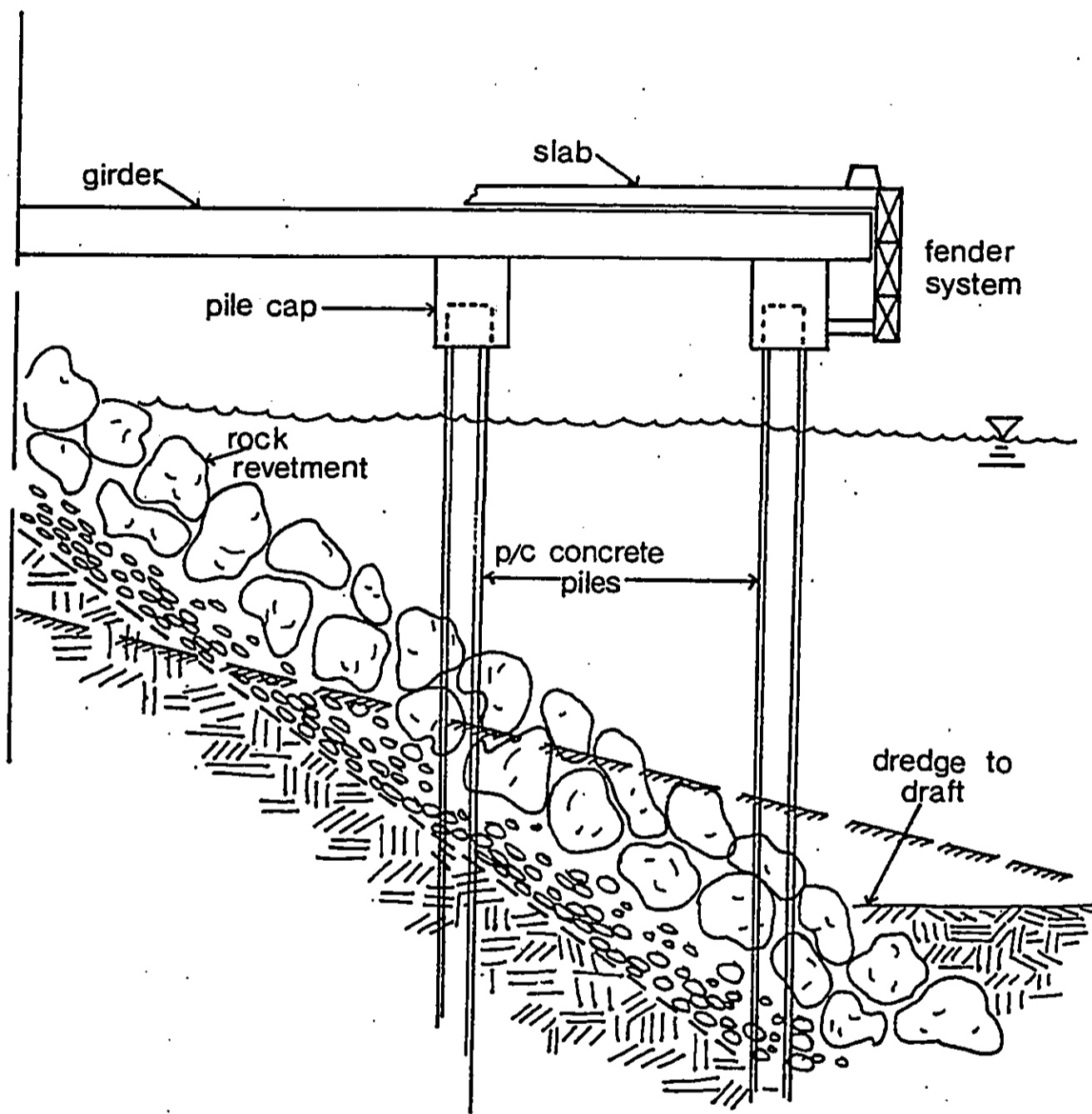


figure 2-3

In addition to wharf construction, a segment of the intra-harbor access road between Piers 1 and 2 will be re-aligned during construction to a route mauka of the cement plants. The proposed realignment is shown on Figure 3-1.

IV. USE OF PUBLIC FUNDS OR LANDS FOR THE ACTION

The project site is on State-owned property under the jurisdiction of the Harbors Division, State Department of Transportation. The entire cost for construction, operation, and maintenance will be borne by the State of Hawaii. Costs for the new pier are estimated at \$1,519,000 and costs for realigning a portion of the intra-harbor access road are estimated at \$100,000.

V. PROJECT PHASING

The project will be carried out in one phase beginning in 1977. Construction will take approximately one year.

VI. HISTORIC PERSPECTIVE

Development of Kahului Harbor is attributable to a series of interrelated actions by the Federal government, Territorial government of Hawaii, and private enterprise.

Development of a harbor at Kahului was initiated by Kahului Railroad Company in 1904. The early harbor consisted of a rubblemound breakwater 1800 feet long, a dredged basin, and terminal facilities including a wharf capable of berthing small vessels. Construction of a second wharf began in 1910 at the present site of Pier 2. Also in 1910, the Kahului Railroad Company ceded its interest in the breakwater to the United States as a condition to ensure federal participation in future harbor development. As a

consequence, the Corps of Engineers became active participants in developing the harbor, a role they began in 1908 with a proposal for pierhead and bulkhead lines.

From 1910 to 1931, the Corps extended the east breakwater to a total length of 2,770 feet, built the 2,330-foot west breakwater, and carried out extensive dredging operations. In recent years, the Corps has repaired and rehabilitated damages to both breakwaters caused by high seas. In 1961, they enlarged the harbor to its present dimensions of 2,050 feet by 2,400 feet by 35 feet.

During the period 1921 to 1924, the Territory directed construction of the first 500-foot section of Pier 1 and a concrete pier shed 132 feet wide and 374 feet long. The pier was subsequently lengthened to 929 feet and then to its present length of 1,113 feet. The transit shed was lengthened in increments to 924 feet. Other improvements to the pier over the years include the addition of pipelines, lighting, a fire sprinkler system, and container handling facilities.

In 1929, Pier 2 was incrementally extended to a length of 891 feet and a steel frame shed 77 feet wide and 242 feet long was constructed. The pier was widened in 1963 by fill placed on its southwest side with provisions for berthing along 290 feet of the seaward face of the pier. The transit shed was extended by 66 feet in 1970.

The existing harbor consists of a rubblemound breakwater on the west and east side of the harbor 2,315 and 2,766 feet long respectively; an entrance channel between the breakwater 600 feet wide; and a harbor basin 35 feet

deep, 2,050 feet wide and 2,400 feet long; a revetted spoil disposal area behind the west breakwater; and two concrete wharves on concrete piles on which storage sheds and other port facilities are located.

Pier 1, located on the northeasterly side of the port, services overseas freighters, tankers, and container ships. The pier is used for handling: containers, bulk sugar and molasses, petroleum products, automobiles, lumber, heavy lifts, bulk fertilizer and general cargo (overseas, break-bulk). The transit shed has a storage area of 122,000 square feet. Pier 1 has a berthing length of 1,080 feet with a berthing depth of 35 feet. It's docking facilities can adequately handle two large freighters at a time.

Pier 2 is parallel to and situated approximately 800 feet southwest of Pier 1. It has a berthing length of 894 feet on the northeast face and a berthing depth of 25 feet. The berthing length along the northwest face is 290 feet with a berthing depth of 30 feet. The pier serves primarily inter-island barges and commercial fishing vessels. The covered transit shed has a storage area of approximately 23,8000 square feet. Cement, fuel oil, diesel oil, gasoline, and liquified petroleum gas are handled at this pier.

Storage facilities for cargo such as bulk sugar, fertilizers, and petroleum are privately owned on land surrounding both piers.

SECTION 3

DESCRIPTION OF THE PROJECT AREA

I. PROFILE OF KAHULUI TOWN

In the last quarter century Kahului has become the major commercial, industrial, and transportation hub of Maui. Together with neighboring Wailuku, the two communities form the dominant urban complex on the island of Maui.

In addition to being the site of Maui's only deep draft harbor and major airport, the island's three major shopping centers, the community college, Maui Memorial Hospital, and the major high schools are located in Kahului. The data which follow are based on the 1970 census as reported in A Socio-Economic Study of Maui County (1972).

The population of Kahului was 8,300 persons or 22 percent of the island's population. The major ethnic groupings were Japanese (49%), Filipino (22.6%) and Caucasian (19.4%). The median age of the population was 29 and almost the entire resident population was native born (87%) rather than mainland or foreign born. For persons 25 years or older, the median number of school years completed was 12.1 as compared with 12.3 for the State and 11.9 years and 10.8 years for Wailuku and Lahaina respectively. Kahului had a density of 1294.8 persons per square mile (second only to Wailuku) but had the highest household density on Maui 3.79 persons per household.

The distribution of family income was concentrated

between \$8,000 to \$25,000 annually with the largest percentage of families in the \$15,000 - \$24,999 range. Median income for all families was \$11,475 as compared with \$9,000-9,999 for Maui island.

Kahului's civilian labor force totaled 3,820 persons of which 3,687 persons (96.5% of the work force) were employed. Males comprised 57 per cent (2,176 persons) of the labor force as compared to 39.6 per cent (1,511 persons) for females. The unemployment rate for males was slightly above 1 percent with female unemployment around 23 per cent.

The major occupations based on the number of employees were clerical and kindred (700), crafts (616), service workers (532), and professionals (462). If employment is categorized by industry type, the largest number of workers were employed in wholesale and retail trade (730), followed by manufacturing (723), health and education (468), transportation and communications (328), and personal services (323).

Population and Employment Trends

The population and employment projections which follow are derived from the Wailuku-Kahului General Plan (1972). These projections were not prepared for individual urban places such as Kahului or Wailuku but were projected on a regional scale encompassing the Wailuku-Kahului Planning Area. The General Plan projected a resident population ranging between 19,400 to 20,300 by 1975, 21,8000 to

25,000 by 1985, and 23,600 to 28,400 by 1995. These figures are predicated on the development of tourism as the economic base.

Future employment projections in the planning area were based on population increases with the minimum and maximum employment parameters corresponding to minimum and maximum population projections. According to projections contained in the Wailuku-Kahului General Plan, employment in 1980 will range between 9,550 to 11,000 persons. Based on the low employment parameter the following trends were projected for 1980: service industries (hotel and others) will increase 89 percent over 1970 (901 to 1710 employees) and wholesale and retail trade will increase 33 percent (1,542 to 2,050) during the same period. The number of self-employed individuals (non-agriculture) will increase 23 percent (355 to 800), and agriculture employment and manufacturing are anticipated to decrease 19 percent (703 to 570) and 28 percent (1215 to 880) respectively.

During 1990-1995, employment projections range from 12,360 to 14,981 persons. Using the low employment parameter, both agriculture and manufacturing were anticipated to decline 50 percent over 1970 levels. Employment in service industries was estimated to increase 217 percent over 1970, and employment in wholesale and retail trade 96 percent over 1970. The accuracy of these figures are unverifiable. They

do, however, forecast continuous increases in the work force with a marked emphasis on service activities.

II. DESCRIPTION OF THE PROJECT SITE

A. LOCATION

The new wharf will be located between Piers 1 and 2 at Kahului Harbor, Maui, as shown in Figure 3-1. Along the shoreline a rock revetment protects the intra-harbor road connecting the two piers. A concrete bulkhead (about 10' by 130') is imbedded at the southwestern end of the site perpendicular to Pier 2. A badly damaged concrete deck resembling a jetty is located near the center of the project site. Two stone revetted finger piers extending outward from shore are positioned at the northeastern end of the site. Depths vary from 3 to 11 feet along the outboard face of the proposed wharf.

B. LAND USE

Most of the proposed site is unused for any type of maritime activities with the exception of boats which occasionally berth along the two finger piers extending from the shoreline into Kahului Harbor.

The uses surrounding the project site consist of light and heavy industrial complexes, a commercial complex (the Maui Mall), storage areas for cement, sugar and molasses, fuel tank farms, and the Maui Electric Company generating facility.

Along the south central portion of the Harbor are

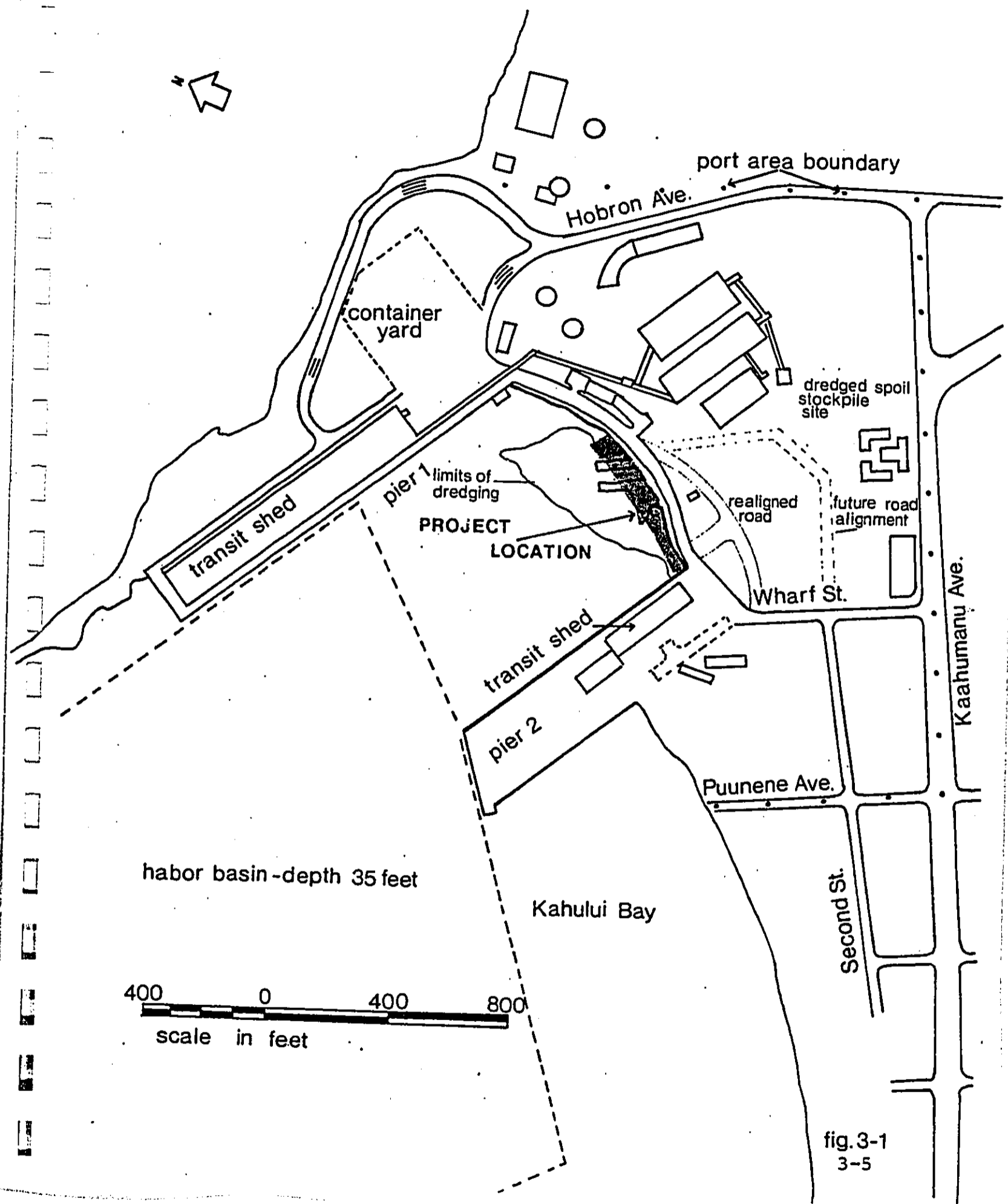


fig. 3-1
3-5

three different hotel developments built on privately owned land.

Inside the harbor and directly adjacent to the western breakwater is a coral fill area that will be developed into a park by the county.

C. CLIMATOLOGY

The climate of the Kahului area is mild with mean annual temperatures varying between 72°F to 75°F. The daily temperature variation ranges from 10 to 20 degrees, with an average high of 83°F and a low of 67°F.

Tradewinds blow between 8 to 18 miles an hour for most of the year and provide a comfortable and pleasant daily breeze. The average humidity is usually high, varying from 77% in January to 71% in July, but the prevailing tradewinds rarely permit the humidity to become oppressive. The average annual rainfall is 20 inches.

D. AIR QUALITY.

Particulate matter and gaseous emissions from the Maui Electric Company (MECO) generating facility contribute to air quality problems in the port. MECO recently completed technical studies for reducing emissions but the problem will probably persist as long as distillate fuel oil is burned and technical improvements are not implemented. The State Department of Health is aware of the emission problem and constantly monitors emission levels in the port.

E. GEOLOGY/SOILS

The harbor bottom is part of a fringing corraline platform or marine shelf which is predominately calcareous and rests on lava flows. The bottom soils at the project site appear to be deposits of loose silty and clayey sand and coral extending to a depth of 50 feet and followed by a dense strata of silt, clay, sand, and coral. Lava formations are found at depths of 65-70 feet.

F. HYDROLOGY

No freshwater streams or significant springs enter the harbor, although there is some seepage into the harbor from basal ground water sources. Iao Stream, one of the major streams of west Maui, discharges into Kahului Bay approximately 4,000 feet northwest of the harbor. The stream drains an area of approximately 10 square miles and its flow is intermittent due to the diversion of water for irrigation purposes.

G. WATER QUALITY

Kahului Harbor is classified by the State of Hawaii Water Quality Standards as Class B waters. Water quality in the harbor is significantly affected by two municipal sewer outfalls located outside the harbor proper. The Wailuku sewer outfall discharges sewage about 1500 feet north of the western breakwater. The major portion of contamination is swept seaward by surface and subsurface currents. It appears that

sewage pollutants do not reach the harbor entrance although high coliform levels have been noted within a cove just north of the landfill area (Corps of Engineers, 1972).

The Kahului sewer outfall is located at the base of the eastern breakwater. Most of the sewage from this outfall is carried northwestward. During flood tide, some of the diluted sewage is carried into the harbor, although the major portion is carried seaward by ocean currents. The Kahului outfall has been identified as the principal source of water quality problems in the harbor (Herschler and Randolph, 1962). In 1971, shoreline areas just outside the harbor were closed for contact water sports because of bacteriological problems.

Bacteriological samplings by the Environmental Health Division, State Department of Health indicate fecal coliform counts at both breakwaters exceed State standards for both Class A and Class B waters. Samples of pH, dissolved oxygen, and nutrient levels along the western and southern shores of the harbor occasionally exceed Hawaii's water quality standards. Discharges from both outfalls will cease upon completion (by 1977) of the Wailuku-Kahului Wastewater Treatment Plant. The elimination of the existing raw sewage discharges will also improve the overall water quality of the harbor's water.

H. TIDES

The observed tidal levels for Kahului Harbor are as follows:

<u>TIDE DESCRIPTION</u>	<u>FEET</u>
Highest Tide Observed (12 Nov. 1958 & 20 June 1959)	3.6
Mean Higher High Water	2.3
Mean High Water	1.9
Mean Tide Level	1.15
Mean Low Water	0.40
Mean Lower Low Water	0.00
Lowest Tide Observed (19-20 June 1955)	-1.2

I. CURRENTS

Currents within the harbor are generally created by tidal fluctuations or offshore rip currents due to wave run-up. Along the northeast shoreline (at Pier 1) tidal currents generally follow a clockwise flow for both ebb and flood tide conditions. Current velocities are usually less than 0.1 knots. In the vicinity of the proposed wharf, very weak currents should be expected, generally moving clockwise along shore to the west.

J. TSUNAMIS

In general, the Kahului area and adjacent coastal areas have been affected by wave action, high surf and tsunamis. Kahului, Sprecklesville, and Paia were extensively damaged during the April 1, 1946 and the May 23, 1960 tsunamis. The 1960 tsunami caused an estimated damage of \$763,000 in Kahului and low-lying coastal areas. The tsunami waves washed inland for a distance of about 3,000 feet to ground elevations of 6 feet. The waves flowed across the highway as a sheet of water

4 feet deep, inundating residential and commercial areas (DLNR, 1971).

The windward location of the harbor has exposed it to high seas since its inception. On many occasions, intense northerly storms generate high waves which damage the breakwaters. In 1956, repairs were completed on the outer portions of both breakwaters which were damaged by a storm in 1954. In 1958, high seas breached the east breakwater and opened a 150-foot gap. In 1966, sections of both breakwaters were rebuilt in an attempt to strengthen these structures to withstand pounding storm waves. The west breakwater was heavily damaged by severe storms in 1969 and again in 1970. Preparations for additional repair work to both breakwaters are currently underway.

K. FLOODS

The port area is not subject to flooding. Flooding occurs within the low-lying sections on the northeast side of Kahului town. The flood problem primarily consists of the inundation of streets and the low-lying County Fairground site. After a heavy rain, low spots along Puunene Avenue are usually flooded with water one to two feet deep. Flooding is a continuing problem to the local residents, although the magnitude and seriousness of the flood conditions are less than those of the Iao Stream Basin. Eleven instances of flooding have been recorded since 1900. These floods have been

caused by the lack of adequate interior drainage facilities and the inability of local dry sump wells to accommodate storm runoff water.

L. FLORA/FAUNA

On site flora is limited to an area between Pier 2 and the broken concrete pad resembling a jetty. The vegetative cover consists of wild tobacco (Nicotiana glauca), naupaka (Scaevola sp.), coconut trees (Cocos nucifera), klu (Acacia farnesiana), bermuda grass (Cynodon dactylon), and finger grass (Chloris radiata). All of these are common to Hawaii. Observed avifauna at the proposed site included the house sparrow (Passer domesticus), common mynah (Acridotheres t. tristis), and two species of doves.

Mammals were not seen at the site but the brown rat (Rattus rattus) and Norway rat (Rattus norvegicus) are known to frequent the area.

M. AQUATIC BIOTA

A biological survey of the marine environment between Piers 1 and 2 indicates the most conspicuous inhabitant of this inshore, sandy-silt bottom are small (1-1/2 inch carapace width) telescope-eyed ghost crabs (Macrotholmus telescopicus), with individual burrows spaced approximately 6 inches apart. Less common are solitary tunicates or sea-squirts, and a few, small (about 1 square foot) solitary heads of Montipera coral. The latter seemed to be dying as many of the

projecting tips were white indicating a lack of living tissue.

The only fishes noted during the survey were a rock fish in the inshore region and a papio in deeper water. However, it is quite common to find mullet (Mugil cephalus), akule (Trachurops crumenophthalmus), and opelu (Decapterus pinnulatus), manini (Acanthurus sandvicensis), makiawa (Etrumeus micropus), aholehole (Kuhlia sandvicensis), papio (Caranx ignobilis), and awa (Chanos chanos) within the harbor and near the docks.

N. INFRASTRUCTURE

1. Access

Access to the harbor is via Wharf Street and Hobron Avenue. The right-of-way for Hobron Avenue is 60 feet wide for most of its length and 80 feet wide at its intersection with Kaahumanu Avenue. Hobron Avenue, however, is basically a two-lane street. It provides an adequate connection from Pier 1 to State Highway 32 (Kaahumanu Avenue) and State Highway 36 (Hana Highway). The Hana Highway also serves as a link between Hobron Avenue and State Highway 37 (Haleakala Highway).

Wharf Street, an improved two-lane street lying within a 60-foot right-of-way, connects the port (primarily Pier 2) with State Highway 32. At its intersection with Wharf Street, Kaahumanu

Avenue has three lanes in each direction plus a short left turn lane for inbound port traffic.

Within the port area, a two-lane road connects the Pier 1 and Pier 2 terminals.

2. Sewage Disposal

The port area uses cesspools for sewage disposal.

3. Utilities

a. Water

The County of Maui supplies potable water to the port. A 6-inch water main is located at Pier 2.

b. Telephone

Piers 1 and 2 are serviced with telephone lines.

c. Power

Maui Electric Company supplies electrical power to the port area from its Kahului plant.

0. PUBLIC SERVICES

1. Police Protection

The Harbors Division provides 24-hour security and the Maui Police Department regularly patrols the harbor.

2. Fire Protection

Both transit sheds have 4-inch Grinnel sprinkling systems. Fire protection is provided by the

Maui County Fire Department. The Wailuku Fire Station is nearest the port and would be the first to respond to any fire. Nine men are on duty at all times at the Wailuku Fire Station. Their equipment includes one 1,250 gallon per minute triple combination fire truck and two 250 gallon per minute mini-pumpers.

The Fire Department does not have foam type fire fighting equipment, however, the Department has a working agreement with airport fire personnel to use their foam equipment if the need ever arises.

A tugboat can be also used as a fireboat if necessary.

3. Refuse Service

Refuse is collected on a once a week basis by the County. Some shipping companies use private collectors to dispose of refuse.

P. FUEL SPILLS

Installation of fueling facilities is not part of the proposed action but will be done at a later date. An existing 6" diesel fuel line at Pier 2 will be tapped and extended to the eastern end of the new wharf.

During the past two years, there have been numerous spills in Kahului Harbor involving Bunker C, diesel, and gasoline. The spills vary in quantity from 5 to 200 gallons as shown in Table 3-1.

TABLE 3-1
FUEL SPILLS IN
KAHULUI HARBOR 1974-1975

Date	Amount of Spill (Gallons)	Type of Spill	Cause
August 22, 1974	5	Diesel	Ruptured Hose
October 22, 1974	20	Diesel	Overflow
July 13, 1975	5	Diesel	Pumping Bilges
August 11, 1975	40	Diesel	Pumping Bilges
October 14, 1975	50	Bunker C	Ruptured Pipeline
November 22, 1975	200	Bunker C	Deballasting Wrong Tank
December 4, 1975	25	-	Asphalt Spill

Source: United States Coast Guard.

In the event of spillage or leakage from ships, the vessel causing the spill is responsible for cleaning up. Cleaning equipment is stored at Pier 1 and includes a new 2,000-foot oil boom, an old 300-foot oil boom section, oil skimmers, and absorbant media.

SECTION 4

RELATIONSHIP OF THE PROPOSED ACTION TO
LAND USE PLANS, POLICIES, AND
CONTROLS FOR THE AFFECTED AREA

I. GENERAL PLAN/ZONING

The Wailuku-Kahului General Plan designates the port area as a site for industrial activities. As such, it is an explicit government policy for concentrating rather than dispersing industrial activities throughout Kahului. For the most part, industrial activities in Kahului are located within a 1-mile radius of the port. The zoning for the project site as well as the port area is heavy industrial (H-2). The proposed action is a permitted use in this zoning district and complies with all pertinent regulations of the aforementioned zoning district.

II. SPECIAL MANAGEMENT AREA

The Port of Kahului lies within a Special Management Area (SMA) and is subject to Maui County's Interim Coastal Zone Management Rules and Regulations pertaining to man-made improvements in coastal areas. A special management area permit is required prior to start of construction.

SECTION 5

ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATIVE MEASURES TO MINIMIZE ADVERSE IMPACTS

I. AIR QUALITY

A. Short-term Impacts

Ambient air quality may be affected by dust and emissions generated during construction which is anticipated to last one year. Dust will be raised during clearing and grubbing activities, excavation, and backfilling operations. Dust will also be generated by the movement of construction vehicles within the project site and by vehicles moving past the site.

Exhaust emissions will be generated during the operation of heavy construction equipment and vehicles and dredging equipment. Combustion emissions from construction vehicles and equipment will be unavoidable, but are not anticipated to cause a significant problem. The contractor will be responsible for the proper maintenance of all construction equipment in order to minimize pollutants from internal combustion engines.

The prevailing winds will disperse dust and emissions in a southerly direction towards Kahului town although emissions from construction machinery are not expected to exceed safe levels at any time.

Dust will be a recurring problem but will be controlled by water-wagons and/or other water sprinkling

systems as required.

B. Long-term Impacts

Ambient air quality will be affected by exhaust emissions from trucks hauling roll on/roll off cargo. The magnitude of the impact is unknown but appears contingent on the number of vehicles engaged in cargo transfers as well as the amount of vehicular traffic in the port area. Long-term increases in the amount of carbon monoxide, nitrogen dioxide, and lead particles can be anticipated. Control of exhaust emissions will depend in part on Federal and State enforcement of air quality regulations and compliance by the automotive industry in meeting exhaust emission standards.

II. NOISE LEVELS

A. Short-term Impacts

Noise will be generated during all phases of construction activities. Conventional construction equipment will be used and noise generated will occur in the ranges presented in Figure 5-1. Pneumatic impact equipment will be used and will be a major nuisance particularly during pile-driving operations. Construction noise may be "masked" by the harbor noise environment which includes aircraft noise from jets on their descent pattern to Kahului Airport.

General construction noise will be mitigated by limiting the hours of construction to 7:00 a.m. to 4:00 p.m., five days a week. In addition, the contractor will

FIGURE 5-1
CONSTRUCTION EQUIPMENT NOISE RANGES

		NOISE LEVEL (dba) AT 50 FT					
		60	70	80	90	100	110
EQUIPMENT POWERED BY INTERNAL COMBUSTION ENGINES EARTH MOVING	COMPACTERS (ROLLERS)		H				
	FRONT LOADERS		-----				
	BACKHOES		-----				
	TRACTORS		-----				
	SCRAPERS, GRADERS		-----				
	PAVERS				H		
	TRUCKS			-----			
EQUIPMENT POWERED BY INTERNAL COMBUSTION ENGINES MATERIALS HANDLING	CONCRETE MIXERS		-----				
	CONCRETE PUMPS			H			
	CRANES (MOVABLE)		-----				
	CRANES (DERRICK)				H		
EQUIPMENT POWERED BY INTERNAL COMBUSTION ENGINES STATIONARY	PUMPS		H				
	GENERATORS		-----				
	COMPRESSORS		-----				
IMPACT EQUIPMENT	PNEUMATIC WRENCHES			-----			
	JACK HAMMERS AND ROCK DRILLS			-----			
	PILE DRIVERS (PEAKS)				-----		
OTHER	VIBRATOR		-----				
	SAWS		-----				

Note: Based on Limited Available Data Samples

Source: Noise From Construction Equipment and Operations
Building Equipment, and Home Appliances, EPA, 1971

ensure that all mufflers on construction equipment are functional and properly maintained.

B. Long-term Impacts

Noise generated from operations at the new wharf is anticipated to range between 70 to 80 dBA. This noise range and duration will vary depending on the size of vehicles used in roll on/roll off operations and the type of noise control measures incorporated.

III. OCEAN WAVES/CURRENTS

Construction of the new wharf will have negligible effects on ocean currents. The net current will continue to be a weak clockwise circulation. There will be little impact on the adjacent harbor shoreline and no significant erosion will occur (See Appendix A).

The proposed project will not contribute to erosion along the south and west shores of the harbor. Erosion along the shoreline fronting the beachside hotels is attributable to the counterclockwise currents that are generated by swells entering the breakwater and being reflected by the stone embankments on the west side of the harbor.

IV. WATER QUALITY

It is difficult to ascertain water quality impairment caused by dredging and construction activities. With the exception of turbidity, water quality indicators used by the State Department of Health will not significantly differ before and after construction. Turbidity due to runoff from grading and erosion is potentially significant, although proper engineering practice and attention to the problem of

erosion control can be expected to keep turbidity increases from this source at a minimal level.

The proposed project requires dredging an estimated 40,000 cubic yards of sedimentary material. Earth movements of this type inevitably increase turbidity in waters surrounding dredged sites. Dredging will create a temporary turbid plume of suspended silty-clay sediment which will generally settle throughout the port basin. Finer and lighter material could create a temporary plume which may move southwest along the shoreline due to normal trade conditions and the westerly ocean currents within the harbor basin. Dredging will destroy some benthic habitats and organisms. The damage will be localized and confined to the dredged area. The agitated bottom material will expose bottom dwelling organisms thus contributing micro-nutrients to the marine environment. Fish and crab density, abundance, and diversity in the immediate dredging area will decrease due to dredging activities. However, an increase in nutrients, organic material, and organisms stirred up by dredging operations and carried to surrounding areas may temporarily increase fish and crab densities. After dredging operations have ceased the dredged area may experience a temporary increase in fish and crab populations due to the exposed nutrients and organisms. Phytoplankton populations may be temporarily depressed because of reduced light penetration caused by increased water turbidity or other factors.

The environmental effects in the area of dredging can be minimized by isolating the dredging site from adjacent

areas. For example, during dredging for the Reef Runway in Honolulu, a series of "turbidity curtains" were installed around the project to limit the transport of turbid water from the operations area. These curtains, made of heavy canvas, were supported at the surface with a string of floats and weighted at the bottom to insure the canvas hung vertically. The curtains were anchored in position, isolating the dredging site from surrounding areas.

V. SPOIL DISPOSAL

Dredged material, if suitable may be used as backfill for the wharf with the unsuitable material hauled away for disposal on land.

VI. FLORA AND FAUNA

A. Short-term Impacts

Grubbing will remove the existing vegetation which provides a habitat and feeding ground for mice, rats and exotic birds. These animals will migrate from the project site and relocate in nearby areas.

B. Long-term Impacts

The project will preclude revegetation of the site.

VII. VISUAL

The project area is a stretch of open shoreline which currently provides excellent view corridors to the outer reaches of the harbor. Portions of the site, however, are covered with broken concrete pavement and riprap which are unsightly as well as hazardous. The proposed action will improve the general appearance of the site by removing all

concrete debris and replacing it with a structure that conforms visually with the other two piers. As the proposed pier will be level with Pier 2, its low profile will not obstruct harbor vistas.

VIII. RECREATION SITES

A. Short-term Impacts

Kahului Harbor is a popular ocean fishing area, particularly along the breakwater and piers. The site of the proposed wharf is frequently populated with anglers during seasonal "fish runs". As a direct result of wharf construction and as a safety precaution, fishermen and crabbers will be deprived of access to the site during construction. The impact will be temporary, lasting no more than one year. Swimming, snorkeling, and surfing are not permitted in the port and will not, therefore, be affected.

B. Long-term Impacts

Upon completion of the project fishing and crabbing will probably continue from atop the wharf. Fish and crab abundance may temporarily increase due to an increase in nutrients and organic material stirred up by dredging operations. Dredging will deepen the harbor bottom which may lure fish into the vicinity of the new wharf. It is unlikely that the new wharf will reduce fish and crab populations in the port area.

IX. TRAFFIC

A. Short-term Impacts

Construction activity and the movement of con-

struction equipment will cause intermittent interference with traffic using the intra-harbor road which links Pier 1 and Pier 2. Intra-harbor traffic will be able to continue to Pier 1 and Pier 2 via Kaahumanu Avenue, or the harbor access road which will be realigned during construction. Necessary cement silo truck movements may be occasionally inconvenienced, but this will be minimized by properly coordinating construction operations with silo operations.

Heavy vehicle traffic to the harbor will increase especially when hauling construction material, quarried rock, and concrete to the construction site. There will be a concurrent increase of heavy vehicle traffic on Kaahumanu Avenue between sources of construction material and the project site. The number of trips and heavy vehicles used in hauling construction material will determine the magnitude of traffic inconvenience.

B. Long-Term Impacts

Upon completion of the project, the intra-harbor access road will be realigned as shown in Figure 3-11 (as Future Road Alignment) to avert potential traffic congestion arising from roll on/roll off operations at the new wharf.

The long-term impacts on traffic will be a function of the number of vehicles utilized in roll on/roll off operations. In the long-run, there should be an increase in heavy vehicle traffic in the port and on adjacent thoroughfares. An increase in roll on/roll

off operations may reduce light vehicle traffic making cargo pick-ups and deliveries.

X. PUBLIC FACILITIES

Water

A. Short-term Impacts

Water will be required during construction for dust control. An existing 6-inch water main at Pier 2 can be tapped and a waterline extended to the project area.

B. Long-term Impacts

The amount of water required to service vessels berthed at the wharf and for fire protection is unknown. No serious long-term impacts are anticipated as water consumption in the port constitutes a small percentage of the total water consumption in Kahului.

Sewage

A. Short-term Impacts

Portable toilets will be provided for convenience of construction workers. No adverse impact on the existing sewage disposal system (cesspools) is anticipated.

B. Long-term Impacts

No significant long-term impacts are anticipated.

Electricity

A. Short-term Impacts

Electrical power is required during project construction. Temporary power lines can be extended from Pier 2 with no adverse effects on the power source.

B. Long-term Impacts

Electrical power for the operation of a 240 volt 3 phase power facility and a 5 foot candle wharf lighting system is required. Adequate power is available from Maui Electric Company.

Gas (Liquid Propane)

A. Short-term Impacts

Gas will not be required during construction.

B. Long-term Impacts

No long-term impacts on gas consumption are anticipated.

XI. PUBLIC SERVICES

Police Protection

A. Short-term Impacts

No additional demand for police protection is anticipated during the construction phase.

B. Long-term Impacts

The project is located within the Kahului beat route of the Maui Police Department and will not create additional demands for police protection. In addition, 24 hour security is provided by the Harbors Division.

Fire Protection

A. Short-term Impacts

No additional demand for fire protection is anticipated during the construction phase.

B. Long-term Impacts

No long-term impacts are anticipated with regard to fire protection.

Refuse Disposal

A. Short-term Impacts

The contractor will be responsible for disposing of construction refuse and debris at County approved disposal areas.

B. Long-term Impacts

No significant long-term impacts are anticipated.

XII. ECONOMIC

A. Short-term Impacts

Construction costs are estimated at \$0.96 million with construction time estimated at one year. The immediate economic benefit of the project will be a short-term infusion of cash and the provision of jobs in Maui County, and particularly in Kahului. The estimated project costs would involve the purchase of labor, materials and services. The direct expenditures will provide direct revenues to the Federal, State, and County governments in the form of payroll taxes, gross income taxes, and general excise taxes paid by the contractor, subcontractors, and suppliers. Wages and salaries will generate an increase in the demand for goods and services from construction workers and suppliers sharing in the project payments with resultant multiplier effects throughout Maui's economy.

B. Long-term Impacts

The long-term impact of the proposed project is an important one. It is also the most difficult one to quantify or evaluate due to the Maui community de-

pendence on shipping. The general anticipated impact will be beneficial since the proposed project is anticipated to increase cargo handling efficiency by minimizing cargo transfers and reducing handling times. An increase in operational efficiency will allow the port to handle more freight traffic and will reduce ship turnaround times thus benefitting maritime operators. An increase in freight traffic will result in an increase in freight receipts for the State. The State, however, will also incur costs for operating and maintaining the new facility.

The economic impact of the project on the Maui community is difficult to evaluate in terms of dollars. The area of significant impact will be on the flow of goods into Maui which is necessary to sustain both population growth and economic expansion.

XIII. FUEL SPILLS

The danger from fuel spills will not be increased by construction of the new port facility. The short and long-term impacts of fuel spills in Kahului Harbor will depend on the type of oil spill and the quantity of spilled fuel. Despite its frequent occurrence, (as shown in Table 3-1), small diesel spills generally constitute a relatively non-significant impact when compared to Bunker C spills. Diesel will dissipate rapidly due to wind and tidal movements, but Bunker C will spread over the waters surface and leave a black oily film on anything it comes into contact with. These spills are costly to clean because everything Bunker C

contacts has to be scrubbed with a solvent detergent.

XIV. EFFECTS ON PIER TWO OPERATIONS

The useability of Pier 2 and the new pier is dependent on the characteristics of the ships moored at the Piers. Based on the wave climate developed for the harbor (see Table 9, Appendix), the effects of the increased wave height were calculated and are shown in Table 5-1 (Table 10 of the Appendix).

In general, for the normal operations expected at the new pier, mooring should be limited to conditions when significant waves are two feet or less. Normal operations could be conducted at the new pier approximately 361 days per year if no intensification of waves due to reflection were to occur. Constructing a reflective sheet-pile structure would reduce this to 354 days, or a loss of 6 operating days per year. The effects on Pier 2 can be estimated by assuming a maximum tolerable wave height of three feet. The loss in operational days at Pier 2 would be 1/2 day (from 364.2 days/year to 363.8 days/year).

NOTE: A combination sheetpile bulkhead/pile girder structure would not significantly change the loss of operating days shown in Table 5-1. The useability of the new pier and Pier 2 approximates the number of operating days shown under "Existing at New Pier Site."

TABLE 5-1

TOTAL SIGNIFICANT WAVE HEIGHT DUE
TO SUMMATION OF INCIDENT AND REFLECTED WAVES
In days of occurrence/year

CONDITION	<u>Maximum Height: Feet</u>				
	0-1	≤ 2	≤ 3	≤ 4	≤ 5
Existing at New Pier Site*	335.0	360.7	364.2	364.78	364.96
Expected after Sheet- Piling Pier Constructed	251.25	354.28	363.33	364.64	364.90
Existing at Midpoint of Pier 2 *	335.0	360.7	364.2	364.78	364.96
At End Pier 2 Expected after New Pier Con- struction	293.1	357.49	363.76	364.71	364.91

SECTION 6

ADVERSE IMPACTS WHICH CANNOT BE AVOIDED

Construction activities will create temporary inconveniences, such as noise, dust, and traffic, which can be minimized with the proper application of noise, dust, and traffic control measures.

Construction activities and dredging operations will alter the existing marine habitat and destroy individual organisms by removal and burial. Dredging will cause a temporary increase in turbidity with adverse aesthetic and environmental effects. Rock debris and silt will damage and stress other organisms in the harbor and surrounding areas.

Construction will also entail the loss of some rocky intertidal habitats along the shoreline of the project site. Upon completion of the project, however, intertidal communities will be reestablished on the concrete and revetment surfaces of the completed improvements.

SECTION 7

ALTERNATIVES TO THE PROPOSED ACTION

I. NO ACTION

If the proposed action is not implemented, the project site would remain in its present unused state. There would be no direct commitment of resources towards improved cargo handling, nor would degradation or destruction of environmental resources be incurred.

A "no action" alternative would be contrary to government policies for improving the harbor given the Maui community dependency on shipping.

II. ALTERNATIVE LOCATION

Construction of a wharf along the shoreline west of Pier 2 would subject the facility to frontal wave action and higher wave heights. The net effect of wave reflection for a structure in this location would affect ship moorings and transfer operations resulting in a loss of operational days and operational revenue.

Construction of a wharf in an area devoid of maritime facilities would not meet the project objective.

III. ALTERNATE DESIGN

Two configurations were considered for the proposed pier. The recommended design was a sheetpile bulkhead, backfilled with an on-grade working surface. The alternative design was a pile-girder framing system with a supported deck area.

Due to engineering, oceanographic, and environmental considerations, the design of the proposed pier has been modified. A description of the new pier design is found in Section 2 of this EIS.

SECTION 8

IRREVERSIBLE AND IRRETRIEVABLE
COMMITMENTS OF RESOURCES

The harbor improvements will commit additional areas to commercial port activities than is presently the case and will allocate scarce shoreline acreage in the port area to the same purpose. Under the circumstances, this action appears to be a productive land use given the community dependence on shipping.

The proposed action will involve an irretrievable commitment of concrete, steel, and other building materials used directly in construction, as well as irretrievable consumption of gasoline, diesel fuel, and other related energy resources required for construction. The performance of the work will commit human resources and capital to meet the project objectives.

The proposed improvements and dredging operations will destroy benthic habitats around the project site. Some of the benthic organisms disturbed during construction will recolonize the bulkhead surface after construction terminates. Turbidity and sedimentation will temporarily disrupt some marine organisms.

SECTION 9

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

The proposed development of the project site as an addition to commercial port activity makes use of the economic value of the access to deep water provided by Kahului Harbor as it presently exists. Development of wharf facilities as proposed will increase the overall efficiency of port operations given the trend towards containerized cargo handling, thereby maximizing the utility of already existing facilities.

Construction of the proposed project in an area of industrial activities has the beneficial effect of concentrating rather than dispersing industrial development. Construction activities will have a number of short-term economic benefits, both as a direct result of job availability during construction, and indirectly through the need for goods and services for the project itself and through those employed in the work. Long-term economic benefits can be expected through profitable use of the facilities in decreasing cargo transfers, handling, and ship turaround times.

SECTION 10

ORGANIZATIONS AND PERSONS CONSULTED

Federal Government

Col. Charles S. Varnum, Director of Facilities
Engineering, Department of the Army

Kisuk Cheung, Chief, Engineering Division,
Department of the Army

State of Hawaii

Dr. Richard Marland, Office of Environmental
Quality Control
Hideto Kono, Director, Department of
Planning and Economic Development
Christopher Cobb, Director, Department of Land and
Natural Resources
E. Alvey Wright, Director, Department of
Transportation
John Farias, Director, Department of Agriculture
Dr. Doak Cox, Environmental Center, University of
Hawaii

County of Maui

The Honorable Elmer Cravalho, Mayor, County of Maui
Lanny Morisake, Maui County Council
Toshio Ishikawa, Director, Department of Planning
Ralph Masuda, Environmental Coordinator, Planning
Department
Eric Soto, Economic Coordinator
Wayne Uemae, Director, Department of Public Works
Shigeto Murayama, Director, Department of Water
Supply
Jan Dapitan, Director, Department of Parks and
Recreation
Abraham Aiona, Chief of Police
Ronald Mokugawa, Deputy Fire Marshall, Wailuku
Fire Station

Other

Colin Cameron, Maui Land & Pineapple Company
Wm. S. Haines, Manager, Hawaiian Commercial
and Sugar Company
Richard Cox, Vice President, Alexander and
Baldwin, Inc.

Garvie Hall, President and Manager, Pioneer
 Mill Co., Ltd.
 Dudley Burchard, Matson Navigation Company
 Jarrett Higashi, Young Brothers, Ltd.
 H. C. Melburg, Shell Oil Company of California
 W. T. Ikemoto, Assistant Manager, Hawaii
 Texaco, Incorporated
 Ken Cole, Standard Oil Company of California
 Jim Haines, Maui Petroleum Co., Inc.
 Mel Bartolome, Station Manager, Aloha Airlines
 Kahului Airport
 Manuel Moniz, Jr., Station Manager, Hawaiian
 Air, Kahului Airport
 Ed. Wilson, Jr., Manager, Hawaii Visitors Bureau
 Shirley Davis, President, Wailuku Business
 & Professional Association
 William Eby, President, Maui Cattlemen's
 Association
 Michael H. Lyons II, President, Kahului Rotary
 Club
 Roger M. Melrose, President, Rotary Club of Maui
 Susumu Matoi, President, Kahului Town Association
 Joseph Heacock, President, Maui Contractors
 Association
 Henry Koga, President, Maui Vegetable Growers
 Association
 Dennis Hinahara, President, Maui Lions Club
 Kihei Community Association
 Dorvin Leis, President, Plumbing & Mechanical
 Contractors Assn.
 Jim Gifford, Kaiser Cement
 Ian Bowman, Manager, Wailuku Sugar Company
 Russ Riley, President, Planners, Architects
 and Landscape Architects of Maui (P.A.L.M.)
 M. Nakamura, Gasco
 Henry Nihei, President, Maui Produce Processing
 Association (MPPA)
 Chester Koga, President, Maui Farmers Cooperative
 John M. Hirashima, President, Maui Flower
 Growers Association
 Roger I. Knox, Manager, Maui Chamber of Commerce
 Frank Makimoto, President, Maui Automotive &
 Retail Gasoline Dealers Association
 Gordon von Tempsky, President, Maui Auto Dealers
 Association
 Rod Hartless, President, Hawaii Hotel Association
 Maui Chapter
 Fred K. Araki, President, Hawaii Society of Pro-
 fessional Engineers,
 Takeshi Iwamoto, President, Kahului Business &
 Professional Association

George P. Ferreira, President, Kihei Canoe Club
Maurice Morita, President, Maui Jaycees
Michio Tanaka, President, Kahului Lions Club

SECTION 11

LIST OF NECESSARY APPROVALS

Federal

Department of the Army

State

Department of Health
Department of Land and Natural Resources
Department of Transportation

County

Department of Public Works
Department of Planning
Planning Commission

SECTION 12

Responses received during the consultation period.



OUR REFERENCE

YOUR REFERENCE

POLICE DEPARTMENT

COUNTY OF MAUI
WAILUKU, MAUI, HAWAII 96793



Address All
Communications to
Abraham Aiona,
Chief of Police
Philibert L. Vierra,
Deputy Chief of Police

December 15, 1975

Marvin T. Miura, Ph.D., President
Environment Impact Study Corp.
Suite 401 American Savings &
Loan Building
915 Fort Street Mall
Honolulu, Hawaii 96813

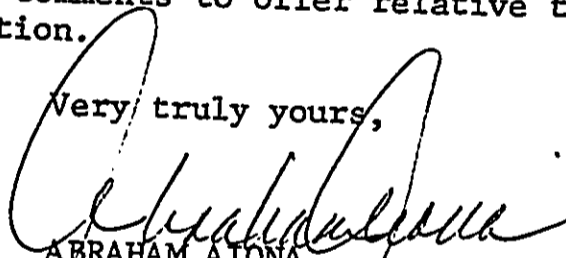
Dear Doctor Miura:

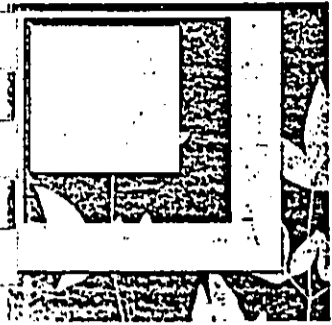
RE: ENVIRONMENTAL IMPACT STATEMENT PREPARATION
NOTICE FOR CONSTRUCTION OF BULKHEAD AND OTHER
IMPROVEMENTS AT KAHULUI HARBOR, MAUI
JOB NO. H.C. 3046

This is to acknowledge your letter dated December 10, 1975
concerning the above-captioned subject.

We have reviewed the copy of the Environmental Assessment/
Determination and have no comments to offer relative to
traffic and police protection.

Very truly yours,


ABRAHAM AIONA
Chief of Police



February 5, 1976

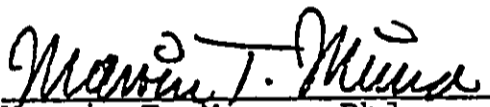
Mr. Abraham Aiona
Chief of Police
County of Maui Police Department
Wailuku, Maui 96793

SUBJECT: CONSTRUCTION OF A BULKHEAD AND OTHER
IMPROVEMENTS AT KAHULUI HARBOR
JOB NO. H. C. 3046

Dear Chief Aiona:

Thank you for your review of the above project.
A copy of the project's E.I.S. will be sent to you
shortly for your further review and comments.

Very truly yours,


Marvin T. Miura, Phd.
President

MTM:cg

ENVIRONMENT IMPACT STUDY CORP.

SUITE 401 AMERICAN SAVINGS & LOAN BLDG. / FINANCIAL PLAZA OF THE PACIFIC / 915 FORT STREET MALL / HONOLULU, HAWAII 96813 / TELEPHONE (808) 521-2587

JAMES S. USHIJIMA
County Clerk



OFFICE OF
COUNTY CLERK
COUNTY OF MAUI
WAILUKU, HAWAII 96793
December 19, 1975

MANUEL K. OISHI
Deputy County Clerk

Dr. Marvin T. Miura, President
Environment Impact Study Corporation
Suite 401
American Savings & Loan Building
915 Fort Street Mall
Honolulu, Hawaii 96813

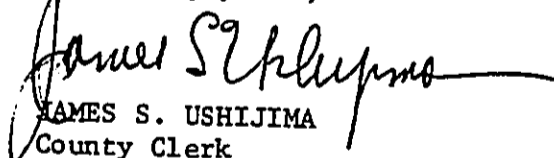
Dear Dr. Miura:

This is to acknowledge receipt of your letter dated December 10, 1975, to the Maui County Council concerning, "ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE FOR THE CONSTRUCTION OF A BULKHEAD AND OTHER IMPROVEMENTS AT KAHULUI HARBOR, MAUI JOB NO. H.C. 3046."

Your communication was presented to the Council on December 19, 1975, and referred to its Economic Development, Environment, and Ecology Committee for review.

The members of the Council deeply appreciated your courtesy in furnishing them with a copy of your NOTICE.

Very truly yours,


JAMES S. USHIJIMA
County Clerk

/lye

GEORGE R. ARIYOSHI
GOVERNOR



RICHARD E. MARLAND, PH.D.
DIRECTOR

TELEPHONE NO.
548-8915

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
OFFICE OF THE GOVERNOR
550 HALEKAUWILA ST.
ROOM 301
HONOLULU, HAWAII 96813

December 19, 1975

Marvin Miura
Environmental Impact Study Corp.
Suite 401
American Savings and Loan Bldg.
Financial Plaza of the Pacific
915 Fort Street Mall
Honolulu, Hawaii 96813

SUBJECT: Environmental Impact Statement Preparation Notice for the
Construction of a Bulkhead and Other Improvements at Kahului
Harbor, Maui.
Job No. H.C. 3046

Dear Mr. Miura,

We appreciate the copy of the environmental impact statement preparation notice. At this time, we will not participate in the consultation period due to inadequate staffing. We do thank you for the opportunity to comment and hope that in the future we will be able to participate in the consultation period.

Sincerely,

A handwritten signature in cursive script, appearing to read "Richard E. Marland".
Richard E. Marland
Director

cc: DOT-Harbors Div.



February 9, 1976

Dr. Richard E. Marland
Director
Office of Environmental Quality Control
Room 301
550 Halekauwila Street
Honolulu, HI 96813

SUBJECT: CONSTRUCTION OF A BULKHEAD AND OTHER
IMPROVEMENTS AT KAHULUI HARBOR
JOB NO. H. C. 3046

Dear Dr. Marland:

Thank you for your review of the above project.
Please note that the proposed pier will be an anchored
sheetpile bulkhead.

Very truly yours,


Marvin T. Miura, Phd.
President

MTM:cg

ENVIRONMENT IMPACT STUDY CORP.

401 AMERICAN SAVINGS & LOAN BLDG. / FINANCIAL PLAZA OF THE PACIFIC / 915 FORT STREET MALL / HONOLULU, HAWAII 96813 / TELEPHONE (808) 521-2567

HAWAII VISITORS BUREAU • Rooms 431-432, 200 High Street • P.O. Box 778 • Wailuku, Maui, Hawaii 96793
Telephone: (808) 244-9141



December 22, 1975

Marvin T. Miura, Ph.D.
Environment Impact Study Corporation
915 Fort Street Mall
Suite 401
American Savings & Loan Building
Honolulu, Hawaii 96813

Dear Dr. Miura:

In reply to your letter dated December 10, 1975 concerning the environmental impact statement on proposed additional construction at Kahului Harbor, I wish to submit the following.


Tourism and the construction industries rely heavily on shipping to Maui's major port, Kahului. The extension of the existing Pier 2 has been long overdue as the volume of cargo to Kahului has increased tremendously causing congestion and confusion at the present facility.

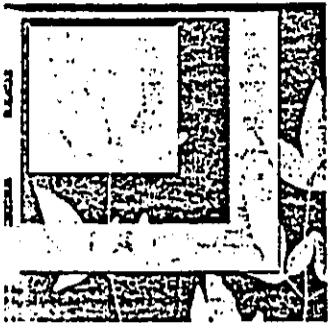
Tourism is demanding more and more in terms of facilities and it is my belief that this project will certainly be beneficial to Maui's largest industry.

In order to submit specific input, further study of the project must be made. If this is so desired, please indicate in future correspondence.

Thank you for looking toward us for comments.

Aloha,


Eddie Wilson, Jr.
District Manager - HVB Maui



February 5, 1976

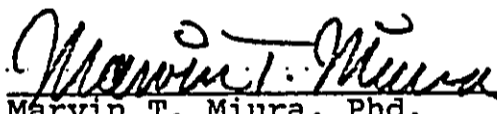
Mr. Eddie Wilson, Jr.
District Manager
Hawaii Visitors Bureau
Rooms 431-432
200 High Street
Wailuku, Maui 96793

SUBJECT: CONSTRUCTION OF A BULKHEAD AND OTHER
IMPROVEMENTS AT KAHULUI HARBOR
JOB NO. H.C. 3046

Dear Mr. Wilson:

Thank you for your review and comments on the above project. Your concerns have been noted and will be addressed in the project's EIS. Upon completion, a copy of the EIS will be sent to you for any additional comments you might have.

Very truly yours,


Marvin T. Miura, Phd.
President

MTM:cg

ENVIRONMENT IMPACT STUDY CORP.

SUITE 401 AMERICAN SAVINGS & LOAN BLDG. / FINANCIAL PLAZA OF THE PACIFIC / 915 FORT STREET MALL / HONOLULU, HAWAII 96813 / TELEPHONE (808) 521-2567

Eric Soto
~~XXXXXXXXXX~~
AGENT



COUNTY OF MAUI
DEPARTMENT OF ECONOMIC DEVELOPMENT
WAILUKU, MAUI, HAWAII

December 22, 1975

Dr. Marvin T. Miura, Ph.D.
Environmental Impact Study Corp.
Suite 401
American Savings and Loan Bldg.
915 Fort Street Mall
Honolulu, Hawaii, 96813

Re: Environmental Impact Statement preparation notice for the construction of A. Bulkhead and other improvements at Kahului Harbor, Maui. Job No. H.C. 3046.

Dear Dr. Miura:

The potential impacts as listed by the Department of Transportation Harbor's Division must be fully discussed and evaluated and substantiated for the E.I.S.

Potential Impacts

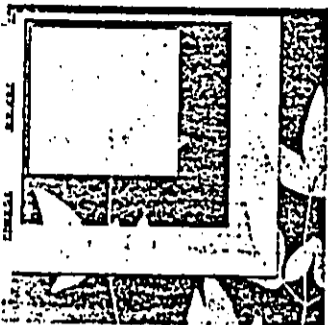
1. The present capacity of public facilities located within the area must be determined; and the effect of the additional burden of the project must be determined.
2. What is the economic significance of the project? What benefits to the community? How will it improve the current method?
3. Is the storage and road area sufficient?

Marvin, I hope this is of some help.

Sincerely,

Eric Soto
Economic Development Specialist

ES:1b



February 5, 1976

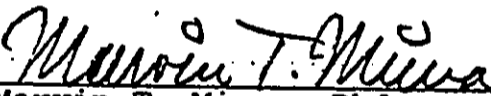
Mr. Eric Soto
Economic Development Specialist
County of Maui
Department of Economic Development
Wailuku, Maui 96793

SUBJECT: CONSTRUCTION OF A BULKHEAD AND OTHER
IMPROVEMENTS AT KAHULUI HARBOR
JOB NO. H.C. 3046

Dear Mr. Soto:

Thank you for your review and comments on the
above project. Your comments have been noted and will
be incorporated in the project's EIS, which will be
sent to you shortly for your further review.

Very truly yours,


Marvin T. Miura, Phd.
President

MTM:cg

ENVIRONMENT IMPACT STUDY CORP.

SUITE 401 AMERICAN SAVINGS & LOAN BLDG. / FINANCIAL PLAZA OF THE PACIFIC / 915 FORT STREET MALL / HONOLULU, HAWAII 96813 / TELEPHONE (808) 521-2567

ELMER F. CRAVALHO
MAYOR



SUGICHI HIRAGA
FIRE CHIEF
MARCO M. MEYER
DEPUTY FIRE CHIEF

COUNTY OF MAUI
DEPARTMENT OF FIRE CONTROL
WAILUKU, MAUI, HAWAII 96793

December 23, 1975

Environmental Impact Study Corp.
Suite 401, 915 Fort Street Mall
Honolulu, Hawaii 96813

Dear Dr. Miura:

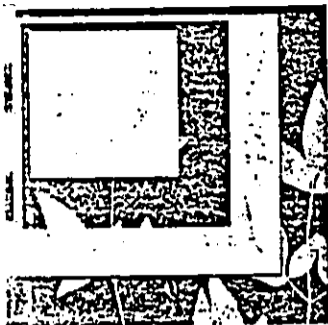
Re: E.I.S. Job No. H.C. 3046, Construction of a Bulkhead
and Other Improvements, Kahului Harbor, Maui

In reviewing your E.I.S. preparation notice of the
above captioned proposed project, the Maui Fire Depart-
ment does not anticipate any adverse impacts caused by
the project.

Very truly yours,

A handwritten signature in cursive script, appearing to read "Ronald Mukogawa".

Ronald Mukogawa
Fire Inspector



February 5, 1976

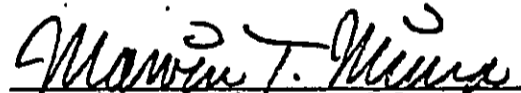
Mr. Ronald Mokugawa
Fire Inspector
County of Maui
Department of Fire Control
Wailuku, Maui 96793

SUBJECT: CONSTRUCTION OF A BULKHEAD AND OTHER
IMPROVEMENTS AT KAHULUI HARBOR
JOB NO. H. C. 3046

Dear Mr. Mokugawa:

Thank you for your review of the above project.
Upon completion, a copy of the project's E.I.S. will
be forwarded to you for your future review and comments.

Very truly yours,


Marvin T. Miura, Phd.
President

MTM:cg

ENVIRONMENT IMPACT STUDY CORP.

SUITE 401 AMERICAN SAVINGS & LOAN BLDG. / FINANCIAL PLAZA OF THE PACIFIC / 915 FORT STREET MALL / HONOLULU, HAWAII 96813 / TELEPHONE (808) 521-2567

KAHULUI TOWN ASSOCIATION

P. O. Box 156
Kahului, Hawaii 96732

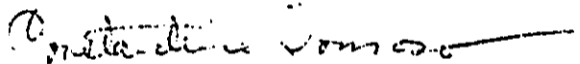
December 23, 1975

Dr. Marvin T. Miura, President
Environmental Impact Study Corporation
Suite 401 American Savings & Loan Bldg.
915 Fort Street Mall
Honolulu, HI 96813

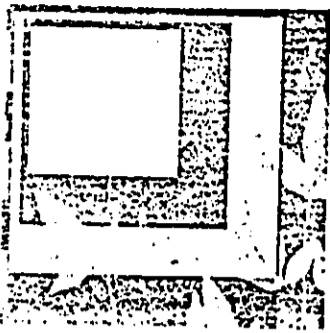
Dear Dr. Miura:

At the regular meeting of the Board of Trustees held yesterday, I was instructed to inform you that the board have no objections to the proposed construction of a bulkhead and other improvements at the Kahului Harbor.

Yours truly,



Constantine Tomoso
Executive Secretary



February 9, 1976

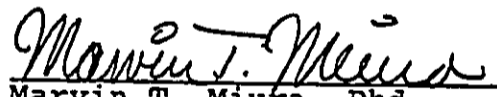
Mr. Susumu Matoi
President
Kahului Town Association
P. O. Box 156
Kahului, Maui 96732

SUBJECT: CONSTRUCTION OF A BULKHEAD AND OTHER
IMPROVEMENTS AT KAHULUI HARBOR
JOB NO. H. C. 3046

Dear Mr. Matoi:

Thank you for reviewing the notice of pre-
paration for the above project. Upon completion, a
copy of the project's EIS will be available for
further public review.

Very truly yours,


Marvin T. Miura, Phd.
President

MTM:cg

ENVIRONMENT IMPACT STUDY CORP.

—JITE 401 AMERICAN SAVINGS & LOAN BLDG. / FINANCIAL PLAZA OF THE PACIFIC / 915 FORT STREET MALL / HONOLULU, HAWAII 96813 / TELEPHONE (808) 521-2567



PETROLEUM PRODUCTS
December 29, 1975

SALES DEPARTMENT—U. S.
LOS ANGELES REGION
W. T. IKEMOTO
ASSISTANT DISTRICT MANAGER

TEXACO INC.
SUITE 1515
PACIFIC TRADE CENTER
180 SO. KING STREET
HONOLULU, HAWAII, 96813
PHONE 533-1886

Mr. Marvin T. Miura, Ph.D.
President
Environment Impact Study Corp.
Suite 401, American Savings & Loan Bldg.
915 Fort Street Mall
Honolulu, Hawaii 96813

Dear Mr. Miura:

Subject: Environment Impact Statement
Preparation Notice For The
Construction of A Bulkhead And
Other Improvements at Kahului
Harbor, Maui, Job No. H.C. 3046

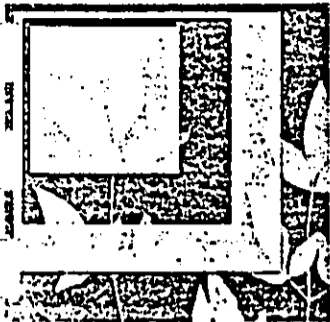
Please reference your letter dated December 18, 1975,
on the above subject.

The proposed project to construct a wharf at Kahului
Harbor, Maui, will not have any adverse affect on Texaco Inc.
We have no objections to this project.

Very truly yours,


W. T. IKEMOTO

WTI:lfi



February 5, 1976


Mr. W. T. Ikemoto
Assistant District Manager
Texaco Inc.
Suite 1515
190 South King Street
Honolulu, HI 96813

SUBJECT: CONSTRUCTION OF A BULKHEAD AND OTHER
IMPROVEMENTS AT KAHULUI HARBOR
JOB NO. H.C. 3046

Dear Mr. Ikemoto:

Thank you for your review of the above project.
A copy of the project's EIS will be available shortly
for further public review.

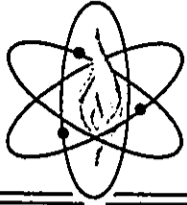
Very truly yours,


Marvin T. Miura, Phd.
President

MTM:cg

ENVIRONMENT IMPACT STUDY CORP.

SUITE 401 AMERICAN SAVINGS & LOAN BLDG. / FINANCIAL PLAZA OF THE PACIFIC / 915 FORT STREET MALL / HONOLULU, HAWAII 96813 / TELEPHONE (808) 521-2567



GASCO, INC.

A SUBSIDIARY OF PACIFIC RESOURCES, INC.

DIVISIONS:
Honolulu Gas Company
Hilo Gas Company
Maui Gas Company
Isle Gas
Honolulu Gas Equipment Co.

P. O. BOX 3379 / HONOLULU, HAWAII 96801

December 30, 1975

Dr. Marvin T. Miura, President
Environment Impact Study Corporation
915 Fort Street Mall
Honolulu, Hawaii 96813

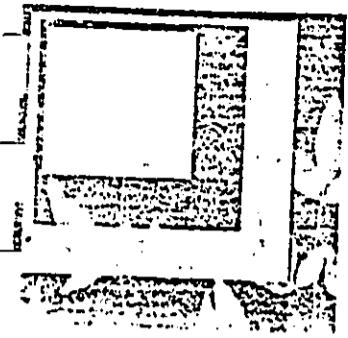
Dear Dr. Miura:

We have examined your environmental assessment on the construction of a bulkhead and other improvements at Kahului Harbor, Maui and find that it will have no impact on our Company.

Very truly yours,

Francis T. Tanaka

FT:jm



February 5, 1976

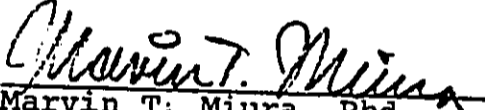
Mr. Francis T. Tanaka
Gasco, Inc.
P. O. Box 3379
Honolulu, HI 96813

SUBJECT: CONSTRUCTION OF A BULKHEAD AND OTHER
IMPROVEMENTS AT KAHULUI HARBOR
JOB NO. H.C. 3046

Dear Mr. Tanaka:

Thank you for your review of the above project. A copy
of the project's EIS will be available shortly for further
public review.

Very truly yours,


Marvin T. Miura, Phd.
President

MTM:cg

ENVIRONMENT IMPACT STUDY CORP.

401 AMERICAN SAVINGS & LOAN BLDG. / FINANCIAL PLAZA OF THE PACIFIC / 915 FORT STREET MALL / HONOLULU, HAWAII 96813 / TELEPHONE (808) 521-2567

GEORGE R. ARIYOSHI
GOVERNOR



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

JAN 2 1976

E. ALVEY WRIGHT
DIRECTOR

DEPUTY DIRECTORS
WALLACE AOKI
RYOKICHI HIGASHIONNA
DOUGLAS S. SAKAMOTO
CHARLES O. SWANSON

IN REPLY REFER TO:
HWY-PA
2.26340

Dr. Marvin T. Miura
President
Environmental Impact Study Corporation
Suite 401
915 Fort Street Mall
Honolulu, Hawaii 96813

Dear Dr. Miura:

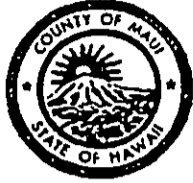
Subject: Environmental Impact Statement
Preparation Notice for the
Construction of a Bulkhead and
Other Improvements at Kahului
Harbor, Maui, Job No. H.C. 3046
Reference: Your letter of
December 10, 1975

We recommend removal of the Highways Division from the agencies to be consulted listing, since we belong to the same department (DOT) as the Harbors Division. We have no other comments on the preparation notice. Future comments on this project should be solicited through internal DOT procedures.

Very truly yours,

T. HARANO
Chief
Highways Division

PLANNING COMMISSION
Kazuo Kage, Chairman
George Murashige, Vice-Chairman
Shiro Hokama
Patrick Kawano
Charles Ota
Leo Polo, Jr.
Harlow Wright
Wayne Uemae, Ex-Officio
Shigeto Murayama, Ex-Officio



Elmer F. Cravalho
Mayor

Tosh Ishikawa
Planning Director

Yoshikazu "Zuke" Matsui
Deputy Planning Director

COUNTY OF MAUI
PLANNING DEPARTMENT
200 S. HIGH STREET
WAILUKU, MAUI, HAWAII 96793

January 2, 1976

Dr. Marvin T. Miura, President
Environment Impact Study Corp.
915 Fort Street Mall
Suite 401
Honolulu, Hawaii 96813

Dear Dr. Miura:

Re: EIS Preparation Notice
Construction of a Bulkhead & Other Improvements
Kahului Harbor

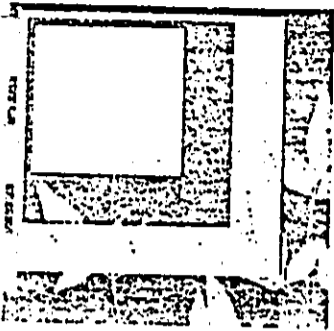
The EIS for the subject project should address the following concerns of our department:

1. Measures to prevent spilling of fuel into the waters of the harbor.
2. Measures for the proper disposal of dredged material if not utilized in the project.
3. Areas that will be taken away from recreational uses.
4. Road improvements to alleviate hazards and congestion.
5. The project will be subject to the County's Interim Coastal Zone Management Rules and Regulations.

Thank you for the opportunity to express our concerns. Please contact me at any time should you have any questions.

Very truly yours,

RALPH N. MASUDA
Environmental Planning Coordinator



February 9, 1976

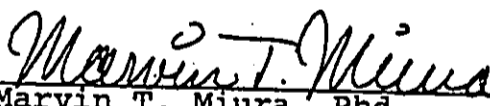
Mr. Ralph Masuda
Environmental Coordinator
County of Maui Planning Department
200 South High Street
Wailuku, Maui 96793

SUBJECT: CONSTRUCTION OF A BULKHEAD AND OTHER
IMPROVEMENTS AT KAHULUI HARBOR
JOB NO. H. C. 3046

Dear Mr. Masuda:

Thank you for your review of the subject project. Your comments are appreciated and will be incorporated into the EIS. Upon completion, a copy of the EIS will be mailed to you for further review. Please note that the proposed pier will be an anchored sheetpile bulkhead.

Very truly yours,


Marvin T. Miura, Phd.
President

MTM:cg

ENVIRONMENT IMPACT STUDY CORP.

SUITE 401 AMERICAN SAVINGS & LOAN BLDG / FINANCIAL PLAZA OF THE PACIFIC / 915 FORT STREET MALL / HONOLULU, HAWAII 96813 / TELEPHONE (808) 521-2567

PIONEER MILL COMPANY, LIMITED

Growers of sugar cane and producers of raw sugar

P. O. Box 727
Lahaina, Hawaii 96761

January 7, 1976

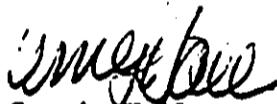
Dr. Marvin T. Miura, President
Environment Impact Study Corporation
Suite 401, American Savings and Loan Bldg.
Financial Plaza of the Pacific
915 Fort Street Mall
Honolulu, Hawaii 96813

Subject: Environmental Impact Statement Preparation Notice
for the Construction of a Bulkhead and Other
Improvements at Kahului Harbor, Maui
Job No. H. C. 3046

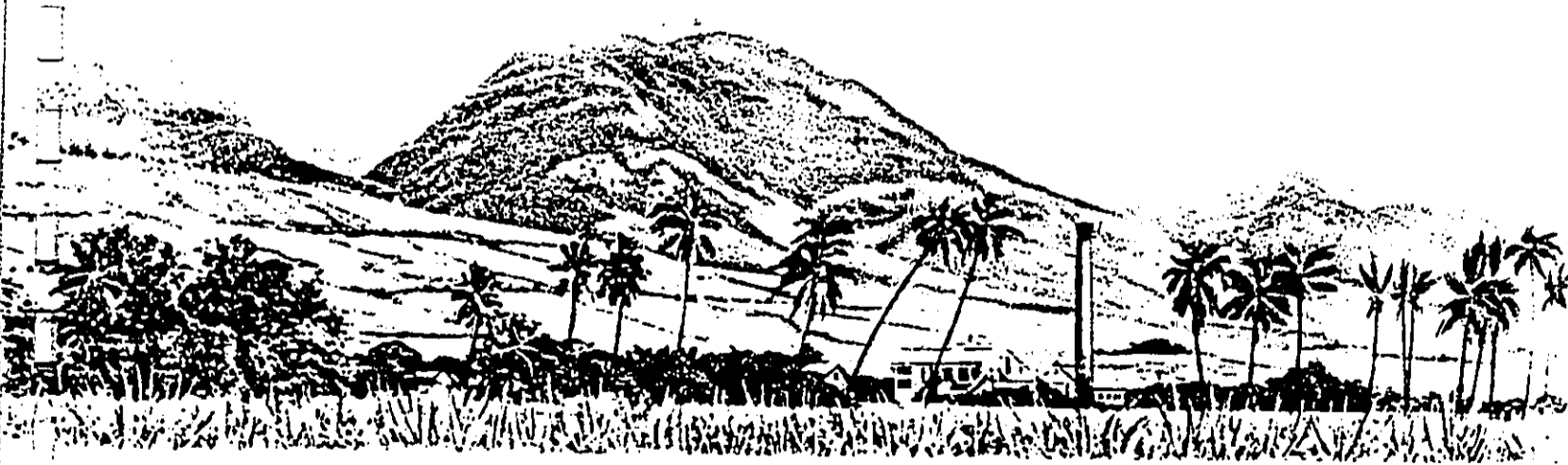
Dear Dr. Miura:

Thank you for your letter of December 18th and the
description of the above project. Pioneer Mill Company, Limited
has no comments to offer at this time.

Sincerely,


Wm. Garvie Hall
President and Manager

BLH:ms



A subsidiary of Amfac Inc.



February 5, 1976

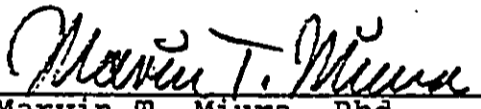
Mr. Wm. Garvie Hall
President and Manager
Pioneer Mill Company, Limited
P. O. Box 727
Lahaina, Maui 96761

SUBJECT: CONSTRUCTION OF A BULKHEAD AND OTHER
IMPROVEMENTS AT KAHULUI HARBOR
JOB NO. H.C. 3046

Dear Mr. Hall:

Thank you for your review of the above project. A copy
of the project's EIS will be available shortly for further
public review.

Very truly yours,


Marvin T. Miura, Phd.
President

MTM:cg

ENVIRONMENT IMPACT STUDY CORP.

—SUITE 401 AMERICAN SAVINGS & LOAN BLDG./FINANCIAL PLAZA OF THE PACIFIC/915 FORT STREET MALL/HONOLULU, HAWAII 96813 / TELEPHONE (808) 521-2567



DEPARTMENT OF PLANNING
AND ECONOMIC DEVELOPMENT

Kamamalu Building, 250 South King St., Honolulu, Hawaii • Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804

GEORGE R. ARIYOSHI
Governor

HIDETO KONO
Director

FRANK SKRIVANEK
Deputy Director

January 7, 1976

Ref. No. 0036

Dr. Marvin T. Miura, President
Environment Impact Study Corporation
915 Fort Street Mall, Suite 401
Honolulu, Hawaii 96813

Dear Dr. Miura:

Subject: Environmental Impact Statement Preparation Notice
For the Construction of a Bulkhead and Other
Improvements at Kahului Harbor, Maui

Thank you for your letter of December 18, 1975, requesting our
comments regarding the subject EIS Preparation Notice.

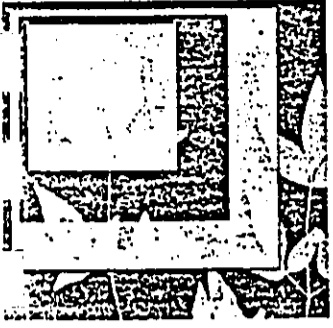
We would like to suggest that your EIS discuss measures to
mitigate the proposed project's adverse impacts on traffic flow and parking
in the harbor area.

The effects of harbor dredging on marine life should also be
addressed. It should include an assessment of the subject area's present
use as a fishing site by local residents.

We appreciate this opportunity to review the preparation notice.

Sincerely,

Frank Skrivaneck
for HIDETO KONO



February 5, 1976

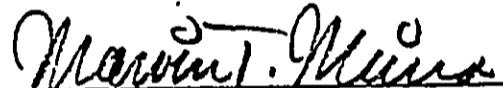
Mr. Hideto Kono
Director
Department of Planning and Economic Development
State of Hawaii
250 South King Street
Honolulu, HI 96813

SUBJECT: CONSTRUCTION OF A BULKHEAD AND OTHER
IMPROVEMENTS AT KAHULUI HARBOR
JOB NO. H.C. 3046

Dear Mr. Kono:

Thank you for your review of the subject project.
Your comments are appreciated and will be incorporated
into the EIS. Upon completion, a copy of the EIS will
be mailed to you for your further review.

Very truly yours,


Marvin T. Miura, Phd.
President

MTM:cg

ENVIRONMENT IMPACT STUDY CORP.

401 AMERICAN SAVINGS & LOAN BLDG. / FINANCIAL PLAZA OF THE PACIFIC / 915 FORT STREET MALL / HONOLULU, HAWAII 96813 / TELEPHONE (808) 521-2587



DEPARTMENT OF THE ARMY
HEADQUARTERS UNITED STATES ARMY SUPPORT COMMAND, HAWAII
APO SAN FRANCISCO 96558

AFZV-FE-EE

07 JAN 1976

Dr. Marvin T. Miura
Environment Impact Study Corp.
Suite 401, American Savings & Loan Bldg
Financial Plaza of the Pacific
915 Fort Street Mall
Honolulu, Hawaii 96813

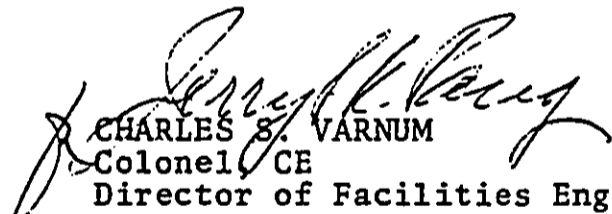
Dear Dr. Miura:

Reference is made to the Environmental Impact Statement
Preparation Notice for the Construction of a Bulkhead and
Other Improvements at Kahului Harbor, Maui.

We have reviewed the EIS preparation notice and have no
comments to offer.

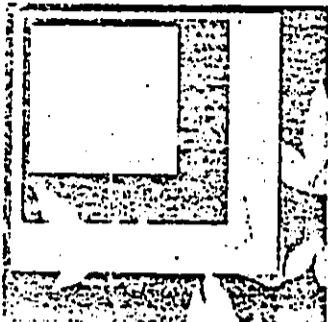
Thank you for the opportunity to review this document.

Sincerely yours,


CHARLES S. VARNUM
Colonel, CE
Director of Facilities Engineering

CF:
OEQC





February 9, 1976

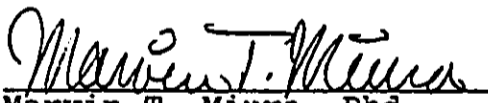
Colonel Charles S. Varnum
Director of Facilities Engineering
Headquarters, United States
Army Support Commans, Hawaii
APO San Francisco 96558

SUBJECT: CONSTRUCTION OF A BULKHEAD AND OTHER
IMPROVEMENTS AT KAHULUI HARBOR
JOB NO. H. C. 3046

Dear Colonel Varnum:

Thank you for your review of the subject project. Your comments are appreciated and will be incorporated into the EIS. Upon completion, a copy of the EIS will be mailed to you for further review. Please note that the proposed pier will be an anchored sheetpile bulkhead.

Very truly yours,


Marvin T. Miura, Phd.
President

MTM:cg

ENVIRONMENT IMPACT STUDY CORP.

SUITE 401 AMERICAN SAVINGS & LOAN BLDG / FINANCIAL PLAZA OF THE PACIFIC / 915 FORT STREET MALL / HONOLULU, HAWAII 96813 / TELEPHONE (808) 521-2567

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII



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

CHRISTOPHER COBB, CHAIRMAN
BOARD OF LAND & NATURAL RESOURCES

EDGAR A. HAMASU
DEPUTY TO THE CHAIRMAN

DIVISIONS:
CONVEYANCES
FISH AND GAME
FORESTRY
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

January 8, 1976

Dr. Marvin T. Miura, Ph.D.
President
Environment Impact Study Corporation
915 Fort Street Mall, Suite 401
Honolulu, Hawaii 96813

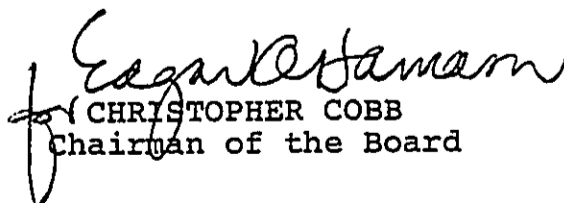
Dear Dr. Miura:

We have reviewed the EIS preparation notice for a marginal wharf at Kahului Harbor.

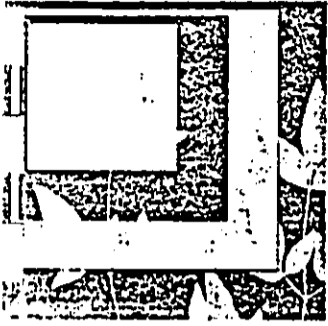
The following information appears to be missing:

- 1) The approximate width of the proposed wharf.
- 2) A description of the bottom and of the substrate on which wharf supports will rest.
- 3) Description of dredging action contemplated and its effect on fishing (moi, makiawa, and akule) in the harbor basin.
- 4) The effect of construction traffic on access to the area and the safety of fishermen.
- 5) Description of the combined effect of this project and the shore protection and beach restoration work by the U. S. Army Corps of Engineers on the other side of the harbor.

Sincerely,


CHRISTOPHER COBB
Chairman of the Board

cc: Fish & Game



February 5, 1976

Mr. Christopher Cobb, Director
Department of Land and Natural Resources
State of Hawaii
P. O. Box 621
Honolulu, HI 96813

SUBJECT: CONSTRUCTION OF A BULKHEAD AND OTHER
IMPROVEMENTS AT KAHULUI HARBOR
JOB NO. H.C. 3046

Dear Mr. Cobb;

Thank you for your review of the subject project.
your comments will be incorporated into the EIS which
will be mailed to you shortly for your further review.

Very truly yours,


Marvin T. Miura, Phd.
President

MTM:cg

ENVIRONMENT IMPACT STUDY CORP.

SUITE 401 AMERICAN SAVINGS & LOAN BLDG./FINANCIAL PLAZA OF THE PACIFIC/915 FORT STREET MALL/HONOLULU, HAWAII 96813 / TELEPHONE (808) 521-2567



DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
BLDG. 230, FT. SHAFTER
APO SAN FRANCISCO 96358

PODED-PV

14 January 1976

Dr. Marvin T. Miura, President
Environment Impact Study Corp.
Suite 401, American Savings & Loan Bldg.
915 Fort Street Mall
Honolulu, Hawaii 96813

Dear Dr. Miura:

Your request for comments on the Environmental Assessment/Determination for the Construction of a Bulkhead and Other Improvements at Kahului Harbor, Maui was received on 22 December 1975. The following comments are offered for consideration in preparation of the impact statement:

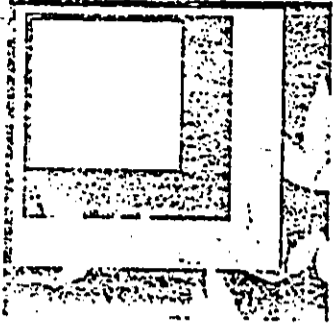
- a. The need and purpose of the action should be described as well as the alternative methods of achieving the objectives of facilitating the handling of containerized cargo and the fueling and servicing of tuna boats.
- b. The proposed work will require a Department of the Army permit under Section 10 of the River and Harbor Act of 1899. If concrete bulkhead design is selected for the wharf, permit provisions of Section 404 of the Federal Water Pollution Control Act would also be applicable.
- c. The nature and quantity of the material to be dredged should be described in the statement.

Thank you for the opportunity to participate in the consultation phase. We would appreciate a copy of the EIS when it is available.

Sincerely,


for KISUK CHEUNG
Chief, Engineering Division





February 9, 1976

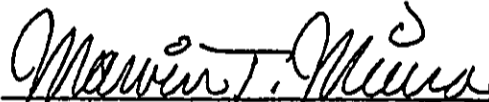
Mr. Kisuk Cheung
Chief, Engineering Division
U. S. Army Engineer District, Honolulu
Bldg. 230, Ft. Shafter
APO San Francisco 96558

SUBJECT: CONSTRUCTION OF A BULKHEAD AND OTHER
IMPROVEMENTS AT KAHULUI HARBOR
JOB NO. H. C. 3046

Dear Mr. Cheung:

Thank you for your review of the subject project. Your comments are appreciated and will be incorporated into the EIS. Upon completion, a copy of the EIS will be mailed to you for further review. Please note that the proposed pier will be an anchored sheetpile bulkhead.

Very truly yours,


Marvin T. Miura, Phd.
President

MTM:cg

ENVIRONMENT IMPACT STUDY CORP.

SUITE 401 AMERICAN SAVINGS & LOAN BLDG / FINANCIAL PLAZA OF THE PACIFIC / 915 FORT STREET MALL / HONOLULU, HAWAII 96813 / TELEPHONE (808) 521-2567

GEORGE R. ARIYOSHI
GOVERNOR



JOHN FARIAS, JR.
CHAIRMAN, BOARD OF AGRICULTURE

YUKIO KITAGAWA
DEPUTY TO THE CHAIRMAN

STATE OF HAWAII
DEPARTMENT OF AGRICULTURE
1428 SO. KING STREET
HONOLULU, HAWAII 96814

January 14, 1976

Marvin T. Miura, Ph.D., Pres.
Environment Impact Study Corp.
915 Fort Street Mall, Suite 401
Honolulu, HI 96813

Dear *Marvin*

Subject: Environmental Impact Statement Preparation
Notice For the Construction of a Bulkhead
and Other Improvements at Kahului Harbor,
Maui - Job No. H.C. 3046

Thank you for notifying this department on the proposed EIS.
Disposal of dredge spoil would be the only area of interest.

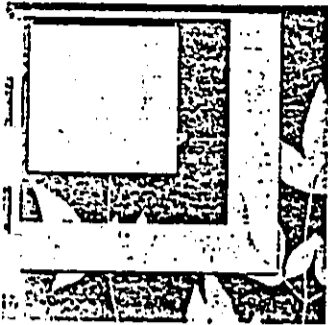
Please keep us informed if the dredge spoil consists primarily
of coral.

Many thanks,

A handwritten signature in cursive script, appearing to read "John", is written over the typed name.

John Farias, Jr.
Chairman, Board of Agriculture

JF:ad:d



February 5, 1976

Mr. John Farias, Jr.
Director
Department of Agriculture
State of Hawaii
1428 South King Street
Honolulu, HI 96814

SUBJECT: CONSTRUCTION OF A BULKHEAD AND OTHER
IMPROVEMENTS AT KAHULUI HARBOR
JOB NO. H.C. 3046

Dear Mr. Farias:

Thank you for your review of the subject project. Your comments are appreciated and will be incorporated into the EIS. Upon completion, a copy of the EIS will be mailed to you for your further review.

Very truly yours,


Marvin T. Miura, Phd.
President

MTM:cg

ENVIRONMENT IMPACT STUDY CORP.

SUITE 401 AMERICAN SAVINGS & LOAN BLDG. / FINANCIAL PLAZA OF THE PACIFIC / 915 FORT STREET MALL / HONOLULU, HAWAII 96813 / TELEPHONE (808) 521-2587

KAISER
CEMENT & GYPSUM
CORPORATION

P.O. BOX 2072 • NANAKULI, OAHU, HAWAII 96792 • TELEPHONE 808/668-1511

January 14, 1976

M. T. Miura, President
Environmental Impact Study Corporation
915 Fort Street Mall
Honolulu, Hawaii 96813

Subject: Impact Statement Re: Improvement At
Kahului Harbor, Maui. Job No. HC 3046

Dear Dr. Miura:

We are most interested and concerned about the impact the proposed wharf construction and the utilization of the adjacent area for the loading and unloading and presumably storage of containerized cargo in the adjacent areas.

We leased from A & B, Inc. approximately 22,000 square feet immediately South-Southeast of the above site in 1961 and erected a cement distribution facility. The site area was reduced in 1970 by approximately 6,800 square feet to permit construction of a State roadway between Piers 1 and 2.

Cement trucks are loaded at the facility and must be able to drive thru the plant utilizing this roadway that borders our North property line. Operating hours are Monday thru Friday with an occasional Saturday delivery.

We supply this facility via barge from Honolulu at a rate of two to three voyages per month. The barge carries approximately 1,100 tons of cement, is 200' long and is berthed at Pier 2 where we have a pipeline to transfer the cement to our silos. The transfer time takes approximately twelve (12) hours and depending on tug availability may occur at any time of the day or week.

On the basis of the information available we are unable to determine whether the project will affect us beneficially or adversely and will be most interested in more details regarding the proposed development, ship berthing, storage, parking areas, traffic patterns, and volume of traffic anticipated.

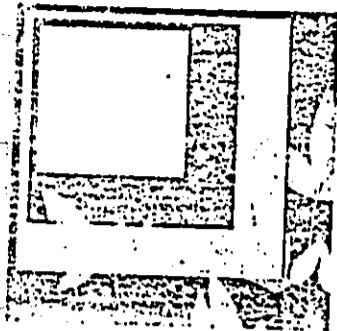
Please contact me at the above address if you have any questions and as further plans are developed.

Very truly yours,


J. Gifford

Manager, Distribution Facilities - Hawaii

cc: E. L. Erwin
J. I. Walker
Guy Chu, Dept. of Transportation
Harbors Division



February 9, 1976

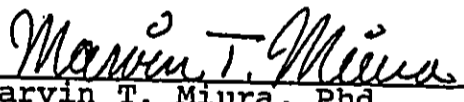
Mr. James Gifford
Manager, Distribution Facilities
Kaiser Cement & Gypsum Corporation
P. O. Box 2072
Nankuli, HI 96792

SUBJECT: CONSTRUCTION OF A BULKHEAD AND OTHER
IMPROVEMENTS AT KAHULUI HARBOR
JOB NO. H. C. 3046

Dear Mr. Gifford:

Thank you for your review of the above project.
Your comments and the information regarding the ce-
ment distribution facility operations are appreciated.
The EIS will be completed shortly and will be avail-
able for your further review.

Very truly yours,


Marvin T. Miura, Phd.
President

MTM:cg

ENVIRONMENT IMPACT STUDY CORP.

SUITE 401 AMERICAN SAVINGS & LOAN BLDG / FINANCIAL PLAZA OF THE PACIFIC / 915 FORT STREET MALL / HONOLULU, HAWAII 96813 / TELEPHONE (808) 521-2567

HAWAIIAN COMMERCIAL & SUGAR COMPANY

A DIVISION OF ALEXANDER & BALDWIN, INC.

PUUNENE, MAUI, HAWAII 96784

January 26, 1975

Dr. Marvin T. Miura, President
Environment Impact Study Corp.
Suite 401 American Savings & Loan Bldg.
915 Fort Street Mall
Honolulu, Hawaii 96813

Dear Dr. Miura:

After a thorough review by myself and other A&B staff of the Environmental Assessment/Determination regarding the construction of a bulkhead and other improvements at Kahului Harbor enclosed with your letter of December 15, we have the following comments to make:

1. This project will significantly improve the Kahului Port Facility. Additional berthing for small to medium size vessels will become available and relieve scheduling conflicts that arise at Piers 1 and 2 on occasion. The dredging associated with the project will provide a larger area for maneuvering between the piers.
2. There does not appear to be any adverse long term environmental impacts on the community from an economic or social standpoint. Some short term increases in noise levels will occur during site development. However, due to the area being designated as heavy industrial, this impact should be negative insofar as the surrounding industry is concerned. The shore line in the project area consists mostly of broken concrete, abandoned pilings and the remnants of an abandoned marine railway. This is unsightly and is a potential hazard to the population who come into the area for recreational purposes.
3. The most important aspect of this project is the type of pier foundation to be constructed; pilings or solid bulkhead. A solid bulkhead will reflect the surge generated in the harbor during periods of northerly ocean swells. A pier constructed on pilings and utilizing the broken concrete, etc. as riprap, will tend to break up the surge. Cost wise

January 26, 1975

the bulkhead would undoubtedly be cheaper than pilings. Dredged material can be used to back fill a solid bulkhead or if pilings are used the dredging can be used as fill to increase the open storage area to seaward of Pier 1.

4. The current and wave action in the harbor should not create silting or sand buildup in the project area due to the solid bulkhead on the south west side of Pier 2. The area immediately south of Pier 2 and the Maui Palms Hotel beach is filling with sand and silt due to the counter clockwise currents that are generated by swells entering the breakwater and being reflected by the stone embankments on the west side of the harbor and along the shore in front of the Harbor Lights Apartments and the Maui Beach Hotel.
5. Hopefully, a permanent berth for the tug Joe Sevier would result from this project.

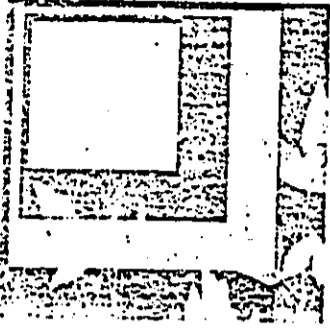
I hope this information will be helpful to you.

Sincerely,



W. S. Haines
Manager

WSH:ec
cc: RMG



February 9, 1976

Mr. W. S. Haines
Manager
Hawaiian Commercial & Sugar Company
Puuene, Maui 96784

SUBJECT: CONSTRUCTION OF A BULKHEAD AND OTHER
IMPROVEMENTS AT KAHULUI HARBOR
JOB NO. H. C. 3046

Dear Mr. Haines:

Thank you for reviewing the subject project. Your comments are greatly appreciated and will be incorporated into the EIS which will be available shortly for your further review. Please note that the proposed pier will be an anchored sheetpile bulkhead.

Very truly yours,


Marvin T. Miura, Phd.
President

MTM:cg

ENVIRONMENT IMPACT STUDY CORP.

SUITE 401 AMERICAN SAVINGS & LOAN BLDG. / FINANCIAL PLAZA OF THE PACIFIC / 915 FORT STREET MALL / HONOLULU HAWAII 96813 / TELEPHONE (808) 521-2567



Maui Land & Pineapple Company, Inc.

February 2, 1976

Dr. Marvin T. Miura
President
Environment Impact Study Corp.
Suite 401, Financial Plaza of the Pacific
915 Fort Street
Honolulu, Hawaii 96813

Dear Dr. Miura:

Subject: Environmental Impact Statement Preparation
Notice for Kahului Harbor Improvements

For your assistance in preparing the Environmental Impact Statement for these improvements, I am enclosing a copy of a memorandum written by Mr. Sam Kobayashi, our Warehouse Superintendent, to Mr. Robert J. Woods, our Cannery Manager, on the proposed project. This memorandum deals solely with the potential economic impact of this improvement and its potential adverse effect on our operations as well as on the generally increased traffic congestion in the area.

I feel that Mr. Kobayashi's assessment is generally sound and would urge that you place some emphasis on the economic impact and the cost benefit ratio of the project in preparing your impact statement.

Thank you for the opportunity to review this proposed project.

Sincerely,

Colin C. Cameron
President

CCC
sm
enclosure

JK

December 30, 1975

MEMO TO: R. J. Woods

SUBJECT: CONSTRUCTION OF A BULKHEAD AND OTHER
IMPROVEMENTS AT KAHULUI HARBOR

I can see no beneficial effects from the proposed construction of a bulkhead and other improvements at Kahului Harbor.

All of our containers are carried by Matson and discharged at Pier 1.

I can foresee several adverse impacts on Mauipine.

Number 1 will be the congestion during roll on-roll off barge and/or Japan tuna boat servicing days. Our container trucks may be forced to continue on to Kaahumanu instead of making a left at Wharf Street and use the existing connecting road between Piers 1 and 2 to reach Matson's container yard. The distance is approximately the same. However, because of the stop at the intersection of Kaahumanu and Hana Highway, our trucks will lose time using this alternate access route to the yard, as follows:

2 minutes per trip x 5,000 trips = 10,000 minutes, or 167 hours
167 hours x \$19.45 = \$3,248 annually

Other adverse impacts will be dependent on Young Brothers operation of the roll on-roll off barges. I believe that some of the on-deck cargo that can be lifted off will also be carried on the roll on-roll off barges. Lift on-lift off cargo consists of new and used pallets, miscellaneous long lengths of structural material, acid, etc. We may be forced to go to two locations to pick up and/or deliver our cargo, while we now use one location.

This project will primarily benefit the Japan tuna boat operation at Kahului Harbor. Young Brothers probably has not made any firm decision about any roll on-roll off service other than the present type of service offered with their existing equipment. They must

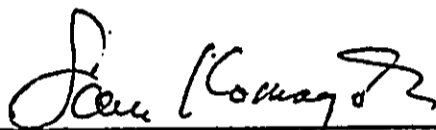
CONSTRUCTION OF A BULKHEAD AND OTHER
IMPROVEMENTS AT KAHULUI HARBOR

12/30/75
Page 2

be waiting for the State legislature to decide on an inter-island ferry system with roll on-roll off facilities.

There has even been talk of the private inter-island system being taken over by the County of Maui and the State of Hawaii. Support is also building to upgrade the inter-island transportation system to aid neighbor island farmers and ranchers.

Until a decision is made on the direction of the inter-island system, this project should be shelved and any money available should be used to improve the existing piers and container yard.



Sam Kobayashi

KK:vcf

xc: CCC

SECTION 13

COMMENTS AND RESPONSES TO THE ENVIRONMENTAL
IMPACT STATEMENT



Maui Land & Pineapple Company, Inc.

September 27, 1976

E. Alvey Wright, Director
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Admiral Wright:

Subject: Environmental Impact Statement for Bulkhead
and Other Improvements at Kahului Harbor.

Our primary concern is the potential traffic congestion in this area if this harbor improvement is constructed.

We propose that a careful study be made of current and future traffic throughout the harbor area and that any and all necessary road improvements be undertaken at the same time as the harbor improvements are made.

As one of the major users of this harbor, and in particular Pier 2, for our pineapple shipments, any additional congestion in this vicinity would not only be annoying but would be costly to us, as well as, I am sure, to others.

Consequently, we urge that additional funds be committed as necessary to improve the roadway system in order to prevent congestion within the harbor area, and that this be considered as part of the necessary cost of the project.

Thank you for the opportunity to comment on this report.

Sincerely,

Colin C. Cameron
President

cc: Office of Environmental Quality Control
550 Halekauwila St., Room 301
Honolulu 96813

P. O. Box 187
Kahului, Maui, Hawaii 96732
Telephone 877-3351

November 9, 1976

HAR-ED 1933

Maui Land & Pineapple, Inc.
P. O. Box 187
Kahului, Maui, Hawaii 96732


Attention Mr. Colin Cameron

Gentlemen:

Subject: Bulkhead and Other Improvements at
Kahului Harbor, Maui, Job H. C. 3046

Thank you for reviewing the environmental impact statement for the subject project. Your concern for traffic congestion at the project site is well taken. We have also considered the possible traffic conflicts. We have begun discussion with Alexander & Baldwin to purchase land mauka of the existing Pier 1 to 2 Access Road for use as a container yard and other maritime related activities. Although it was not discussed in the EIS, we plan to include in this project the realignment of the section of the Pier 1 to 2 Access Road between Wharf Street and our District Office to a route mauka of the cement plants. There will still be cross flow of traffic with container movement between the proposed wharf and the proposed container yard. However, the conflict would be much less than that in its present alignment. Ultimately, the Pier 1 to 2 Access Road will be realigned to a route along the mauka boundary of the parcel we plan to acquire from A&B in order to eliminate traffic conflicts. We have enclosed a sketch which indicates the proposed realignment and the future realignment.

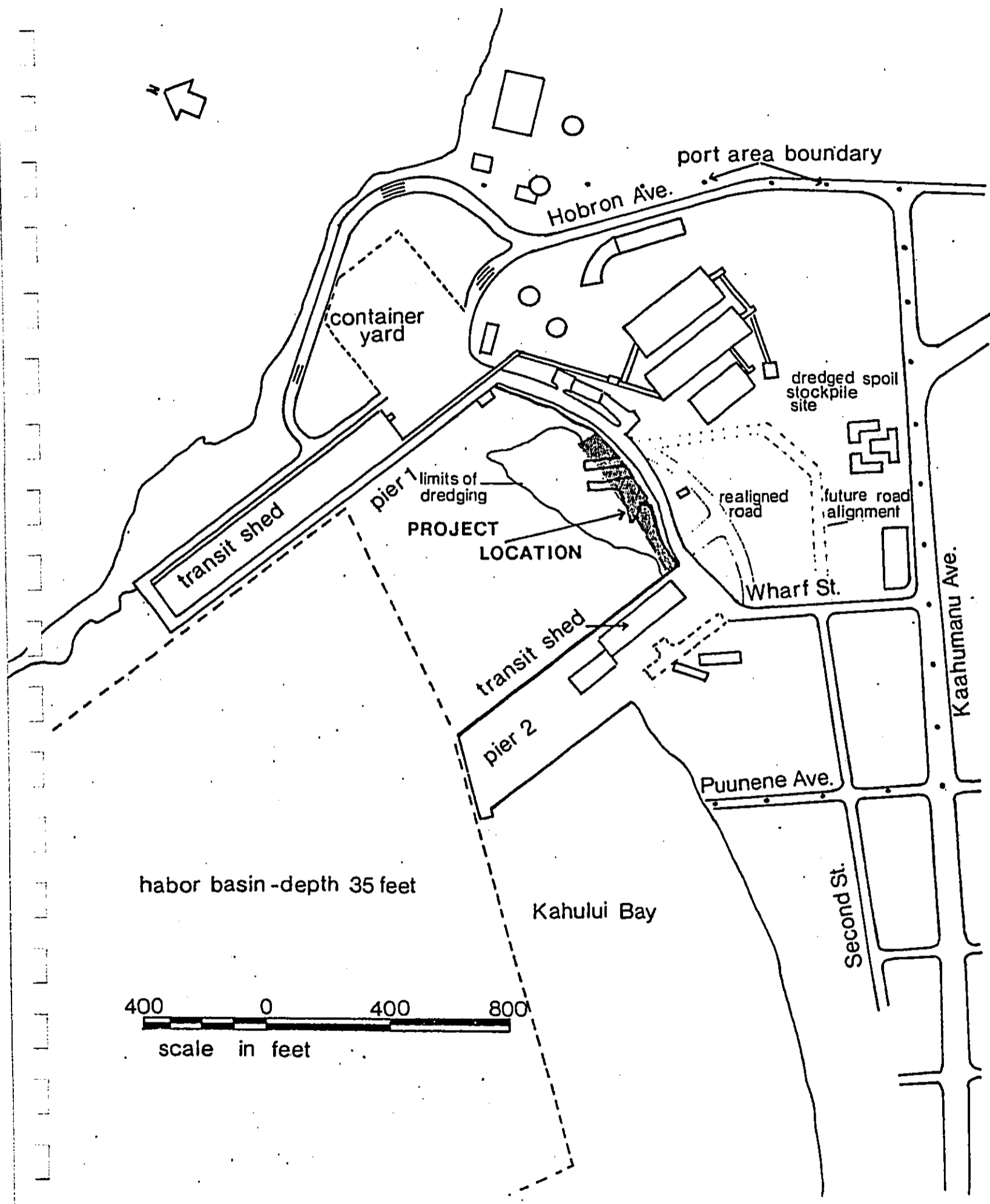
Very truly yours,


MELVIN E. LEPINE
Chief, Harbors Division

GM:yktf

Enclosure

bcc: HAR-M



port area boundary

Hobron Ave.

container yard

dredged spoil stockpile site

limits of dredging

PROJECT LOCATION

realigned road

future road alignment

Wharf St.

transit shed

transit shed

pier 2

Puunene Ave.

Kaahumanu Ave.

Second St.

harbor basin - depth 35 feet

Kahului Bay

400 0 400 800
scale in feet

University of Hawaii at Manoa

Water Resources Research Center

MEMORANDUM

September 28, 1976

MEMO TO: OEQC /
Department of Transportation

FROM: Reginald H. F. Young^{RHFY}
Asst. Director, WRRRC

SUBJECT: Review of EIS for Bulkhead and Other Improvements, Kahului
Harbor, Maui

We have reviewed the above-cited EIS and have no critical comments.
The EIS is being returned to the Environmental Quality Commission for
further use.

RHFY:jmn

Enclosure

November 9, 1976

HAR-ED 1939

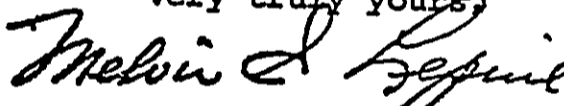
Water Resources Research Center
University of Hawaii at Manoa
Holmes 283
2540 Dole Street
Honolulu, Hawaii 96822

Gentlemen:

Subject: Bulkhead and Other Improvements at
Kahului Harbor, Maui - Job H. C. 3046

Thank you for reviewing the Draft Environmental Impact Statement for the subject project. The Final EIS will be available shortly.

Very truly yours,



MELVIN E. LEVINE
Chief, Harbors Division

GM:yktf

bcc: HAR-M

GEORGE R. ARIYOSHI
GOVERNOR



ANDREW I. T. CHANG
DIRECTOR OF SOCIAL SERVICES & HOUSING

STATE OF HAWAII
DEPARTMENT OF SOCIAL SERVICES AND HOUSING
P.O. Box 339
Honolulu, Hawaii 96809

September 28, 1976

Environmental Quality Commission
550 Halekauwila Street., Room 301
Honolulu, Hawaii 96813

Dear Sirs:

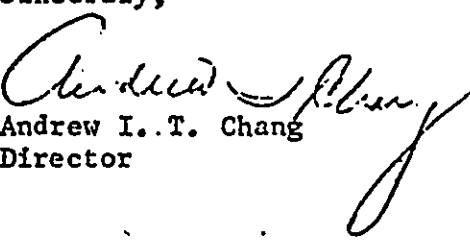
Re: Bulkhead and Other Improvements, Kahului Harbor,
Maui

The attached EIS does not affect any of the DSSH program areas.

Thank you for the opportunity to comment on this proposal.

We are returning the EIS for your usage.

Sincerely,


Andrew I. T. Chang
Director

Attachment

cc: Office of Environmental Quality Control
E. Alvey Wright, Director, Dept. of Transportation

November 9, 1976

HAR-ED 1937

Department of Social Services
and Housing
State of Hawaii
P. O. Box 339
Honolulu, Hawaii 96809

Gentlemen:

Subject: Bulkhead and Other Improvements at
Kahului Harbor, Maui - Job H. C. 3046

Thank you for reviewing the Draft Environmental Impact
Statement for the subject project. The Final EIS will be
available shortly.

Very truly yours,



MELVIN E. LEPINE
Chief, Harbors Division

GM:yktf

bcc: HAR-M

GEORGE R. ANIYOSHI
GOVERNOR



JOHN FARIAS, JR.
CHAIRMAN, BOARD OF AGRICULTURE

YUKIO KITAGAWA
DEPUTY TO THE CHAIRMAN

STATE OF HAWAII
DEPARTMENT OF AGRICULTURE
1428 SO. KING STREET
HONOLULU, HAWAII 96814

October 28, 1976

MEMORANDUM

To: Office of Environmental Quality Control
Subject: Bulkhead and Other Improvements, Kahului
Harbor, Maui - Job No. H.C. 3046

The Department of Agriculture has reviewed the subject Environmental Impact Statement (EIS) and foresees no adverse agricultural impact. Subject EIS is herewith returned per your request.

Thank you for the opportunity to comment.

A handwritten signature in cursive script, reading "John Farias, Jr.", is written in dark ink.

JOHN FARIAS, JR.
Chairman, Board of Agriculture

Enc.

November 9, 1976

HAR-ED 1938

Department of Agriculture
State of Hawaii
1428 South King Street
Honolulu, Hawaii 96814

Gentlemen:

Subject: Bulkhead and Other Improvements at
Kahului Harbor, Maui - Job H. C. 3046

Thank you for reviewing the Draft Environmental Impact Statement for the subject project. The Final EIS will be available shortly.

Very truly yours,



MELVIN E. LEPINE
Chief, Harbors Division

GM:yktf

bcc: HAR-M



DEPARTMENT OF THE ARMY
HEADQUARTERS UNITED STATES ARMY SUPPORT COMMAND, HAWAII
APO SAN FRANCISCO 96558
DIRECTORATE OF FACILITIES ENGINEERING

AFZV-FE-EE

29 SEP 1976

Environmental Quality Commission
Office of Environmental Quality Control
State of Hawaii
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

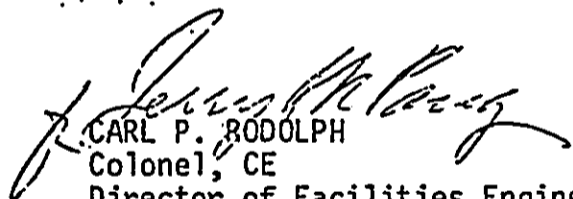
Gentlemen:

Reference is made to the Environmental Impact Statement dated June 12, 1976 for Construction of a Bulkhead and other Improvements at Kahului Harbor, Kahului, Maui.

The document has been reviewed and we have no comments to offer.

Thank you for the opportunity to review the document.

Sincerely yours,


CARL P. RODOLPH
Colonel, CE
Director of Facilities Engineering

CF:
E. Alvey Wright
Director
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813



November 9, 1976

HAR-ED 1940

Colonel Carl P. Rodolph
Director of Facilities Engineering
Headquarters, U. S. Army Support
Command, Hawaii
APO San Francisco 96558

Dear Colonel Rodolph:

Subject: Bulkhead and Other Improvements at
Kahului Harbor, Maui - Job H. C. 3046

Thank you for reviewing the Draft Environmental Impact
Statement for the subject project. The Final EIS will be
available shortly.

Very truly yours,



MELVIN E. LEPINE
Chief, Harbors Division

GM:yktf

bcc: HAR-M

GEORGE R. ARIYOSHI
GOVERNOR



VALENTINE A. SIEFERMANN
MAJOR GENERAL
ADJUTANT GENERAL

STATE OF HAWAII
DEPARTMENT OF DEFENSE
OFFICE OF THE ADJUTANT GENERAL
FORT RUGER, HONOLULU, HAWAII 96816

HIENG

29 SEP 1976

Dr. Albert Tom, Chairman
Environmental Quality Commission
550 Halekauwila Street
Honolulu, Hawaii 96813

Dear Dr. Tom:

Bulkhead and Other Improvements
Kahului Harbor, Maui

Thank you for sending us a copy of the Environmental Impact Statement for the proposed "Bulkhead and Other Improvements, Kahului Harbor." We have received the publication and have no comments to offer.

We are returning the Environmental Impact Statement for the proposed project per your request.

Yours truly,

Frederic W. Kleveland
for WAYNE R. TOMOYASU CPT, CE, HARNG
Captain, CE, HARNG
Contr & Engr Officer

Enclosure

November 9, 1976

HAR-ED 1936

State of Hawaii
Department of Defense
Office of the Adjutant General
Fort Ruger
Honolulu, Hawaii 96816

Attention Captain Wayne Tomoyasu

Gentlemen:

Subject: Bulkhead and Other Improvements at
Kahului Harbor, Maui - Job H. C. 3046

Thank you for reviewing the Draft Environmental Impact Statement for the subject project. The Final EIS will be available shortly.

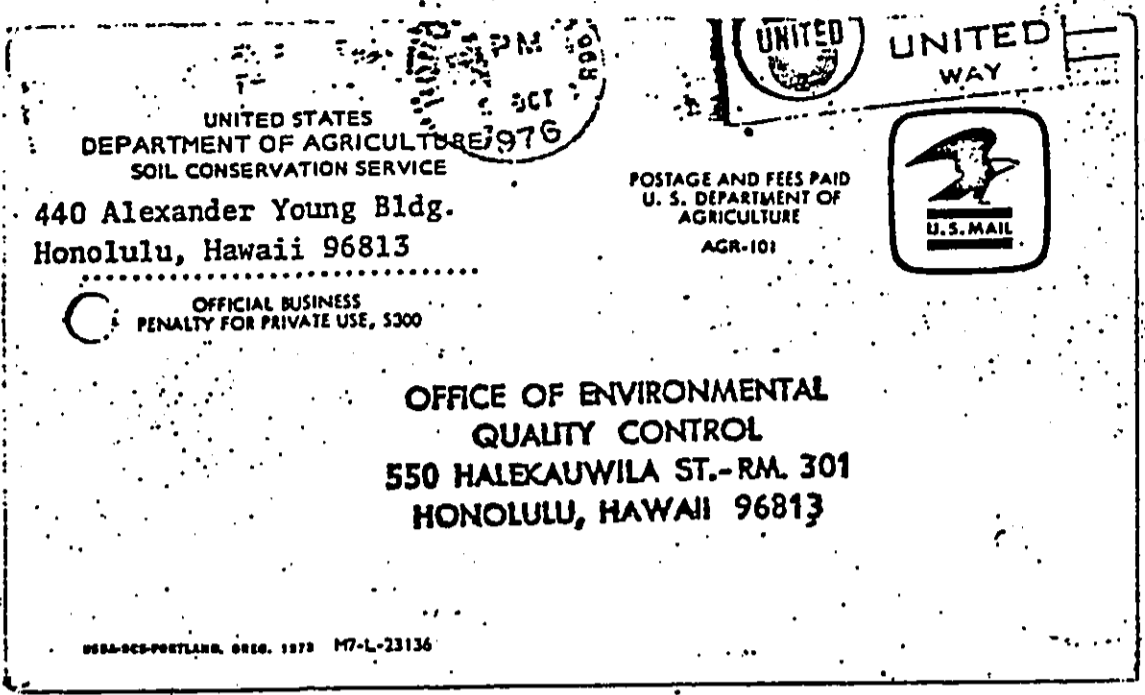
Very truly yours,



MELVIN E. LEPINE
Chief, Harbors Division

GM:yktf

bcc: HAR-M



UNITED STATES
DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
440 Alexander Young Bldg.
Honolulu, Hawaii 96813

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, \$300

OFFICE OF ENVIRONMENTAL
QUALITY CONTROL
550 HALEKAUWILA ST.-RM. 301
HONOLULU, HAWAII 96813

USDA-PCS-PORTLAND, OREG. 1972 M7-L-23136

TO: Richard E. Marland, Interim Director,
Office of Environmental Quality Control

RE: Bulkhead and Other Improvements, Kahului Harbor, HI

NO COMMENTS

EIS returned: project does not pertain to SCS activities and/or responsibilities.

EIS received: undergoing review.

Francis C. H. Lum
Francis C. H. Lum
State Conservationist

10/5/76
Date

ELMER F. CRAVALHO
MAYOR



ERIC SOTO
COORDINATOR

COUNTY OF MAUI
DEPARTMENT OF ECONOMIC DEVELOPMENT
WAILUKU, MAUI, HAWAII 96793
TELEPHONE 244-7710

October 13, 1976

Environmental Quality Commission
550 Halekauwila St., Rm. 301
Honolulu, Hawaii 96813

Gentlemen:

Re: Bulkhead and Other Improvements,
Kahului Harbor, Maui

This is to acknowledge receipt of the Environmental Impact Statement on the Bulkhead and Other Improvements, Kahului Harbor, Job h.c. 3046.

This office has reviewed the EIS and is in agreement with the economic assessment. The estimated cargo, both incoming and outgoing from Maui, will obviously be greater due to increase in population and the diversification of our economic base. This project, if it meets future demands, is important to the County for the efficient flow of goods for Maui.

Very truly yours,

A handwritten signature in cursive script, appearing to read "Eric Soto".

ERIC SOTO
Economic Development
Coordinator

October 20, 1976

dir 4875
HAR-ED 1724

County of Maui
Department of Economic
Development
Wailuku, Maui 96793

Attention: Mr. Eric Soto

Gentlemen:

Subject: Bulkhead and Other Improvements at
Kahului Harbor, Maui, Job H. C. 3046

Thank you for your review and comments on the subject
project. Your support of the project is certainly appreciated.

Very truly yours,

for Guy Chu
MELVIN E. LEPINE
Chief, Harbors Division

GM:yktf

bcc: DIR
HAR-M

96

J
HAR-ED

712
1976



DEPARTMENT OF THE ARMY
 PACIFIC OCEAN DIVISION, CORPS OF ENGINEERS
 BLDG. 230, FT. SHAFTER
 APO SAN FRANCISCO 96550

4903

14 October 1976

PODED-PV

Mr. E. Alvey Wright
 Director
 Department of Transportation
 State of Hawaii
 869 Punchbowl Street
 Honolulu, Hawaii 96813

DIRECTOR'S OFFICE
 OCT 18 8 08 AM '76
 OFFICE OF
 TRANSPORTATION

Dear Mr. Wright:

We have reviewed the Environmental Impact Statement for Bulkhead and Other Improvements, Kahului Harbor, Maui and offer the following comment for your consideration.

a. It is not clear from the discussion on Pages 5-6 and 5-7 whether dredged material will be disposed of on land or at sea. It should be noted that any ocean dumping must be done in compliance with the US Environmental Protection Agency's Proposed Revision of Regulations and Criteria for Ocean Dumping which was printed in the Federal Register dated 28 June 1976. Specific information about the disposal material will be required as well as a Department of the Army permit, pursuant to Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (P.L. 92-532).

b. As noted in letter of 14 January 1976 and recognized on Page 12-1 of the Environmental Statement the proposed work will require a Department of the Army permit under Section 10 of the River and Harbor Act of 1899, and Section 404 of the Federal Water Pollution Control Act (P.L. 92-500).

Thank you for the opportunity to review this statement.

Sincerely yours,

Kisuk Cheung
 KISUK CHEUNG
 Chief, Engineering Division



October 26, 1976

DIR 4903
HAR-ED 1747

Department of the Army
Pacific Ocean Division
Corps of Engineers
Building 239, Ft. Shafter
APO San Francisco 96552

Attention Mr. Kisuk Cheung

Gentlemen:

Subject: Bulkhead and Other Improvements at
Kahului Harbor, Maui, Job H. C. 3046

Thank you for your review and comments on the Environmental Impact Statement on the subject project.

In response to your comments, the dredged material will be disposed on land. We expect to use about 17,000 cubic yards of the material to fill the area behind the bulkhead and to stockpile the remainder of the material in an area located about 350 ft. behind the proposed bulkhead.

We will apply for a Department of the Army permit after the scope of work under this project is fully determined.

Very truly yours,

/s/ C. Swanson

fw E. ALVEY WRIGHT
Director

GM:yktf

cc: OEQC

bcc: HAR-11

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII



CHRISTOPHER COBB, CHAIRMAN
BOARD OF LAND & NATURAL RESOURCES

EDGAR A. HAMASU
DEPUTY TO THE CHAIRMAN

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

DIVISIONS:
CONVEYANCES
FISH AND GAME
FORESTRY
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

October 15, 1976

Office of Environmental Quality Control
550 Halekauwila Street, Rm. 301
Honolulu, Hawaii 96813

Dear Sir:

SUBJECT: EIS: Bulkhead & Other Improvements, Kahului Harbor,
Maui Island

Thank you for the opportunity to comment on the final EIS for the subject undertaking.

The proposed undertaking will have no effect upon any known historic or archaeological site on or likely to be eligible for inclusion to the Hawaii and/or National Register(s) of Historic Places. Therefore, this office has no reservations for the project to proceed. In the event that any unanticipated sites or remains are encountered, please inform the applicant to contact this office immediately.

Sincerely yours,

A handwritten signature in cursive script that reads "Jane L. Silverman".

Jane L. Silverman
Historic Preservation Officer
State of Hawaii

November 9, 1976

HAR-ED 1932

Ms. Jane L. Silverman
Historic Preservation Officer
Department of Land and Natural Resources
P. O. Box 621
Honolulu, Hawaii 96809

Dear Ms. Silverman:

Subject: Bulkhead and Other Improvements at
Kahului Harbor, Maui, Job H. C. 3046

Thank you for reviewing the Draft Environmental Impact Statement for the subject project. If any historic or archaeological sites or remains are encountered during the construction of this project your office will be immediately notified.

Very truly yours,



MELVIN E. LEVINE
Chief, Harbors Division

GM:yktf

bcc: HAR-M



DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD

Address reply to:
COMMANDER (mep)
Fourteenth Coast Guard District
677 Ala Moana
Honolulu, Hawaii 96813

16452
18 OCT 1976
DEPARTMENT OF TRANSPORTATION
COMMUNICATIONS SECTION

E. Alvey Wright
Director
Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Admiral Wright:

Staff review of the "Environmental Impact Statement for Bulkhead and Other Improvements at Kahului Harbor, Kahului, Maui" has been completed, and the Coast Guard has no objections to the project being implemented as stated therein.

Details on dredging operations and any temporary interruptions of harbor services should be provided to our Aids to Navigation Branch (phone 546-7130) approximately three weeks in advance so that such information can be published in the Local Notice to Mariners. It is requested that information on the final harbor depths be provided following the dredging operations so charts can be amended accordingly. No Coast Guard navigational aids will be affected by the project.

It is also requested that more information be provided on the ocean dumping of the dredged material should this spoil disposal alternative be further considered. The Coast Guard is charged with the responsibility of surveillance of ocean dumping activity under the Marine Protection Research and Sanctuaries Act.

The opportunity to review and comment on the EIS is appreciated.

Sincerely,

J. W. CAFFREY
Captain, U. S. Coast Guard
Chief of Staff
Fourteenth Coast Guard District

Copy to:
COMDT(G-WEP-7)
CEQ Washington, DC
OEQC Hawaii

October 27, 1976

Dir 4723
HAR-ED 1771

Commander
Fourteenth Coast Guard District
677 Ala Moana Boulevard
Honolulu, Hawaii 96813

Attention: Captain J. V. Caffrey

Gentlemen:

Subject: Bulkhead and Other Improvements at
Kahului Harbor, Maui, Job H. C. 3046

Thank you for reviewing the environmental impact statement on the subject project.

Information on the dredging operation and a copy of the final soundings will be furnished to your office by our Construction Section as soon as they are available.

The dredged material will be disposed of on land. We plan to use about 19,000 cubic yards of material to fill the area behind the bulkhead and the remainder will be stockpiled in an area located approximately 350 ft. beyond the proposed bulkhead.

Very truly yours,

E. Alvey Wright
E. ALVEY WRIGHT
Director

CR:yktf

cc: HAR-EC
HAR-M
CEOC



University of Hawaii at Manoa

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

Office of the Director

October 18, 1976

DIRECTOR'S OFFICE
OCT 21 8 03 AM '76
DEPT. OF
TRANSPORTATION

E. Alvey Wright, Director
Dept. of Transportation
869 Punchbowl Street
Honolulu, HI 96813

Dear Admiral Wright:

The Environmental Center does not plan to review the draft Environmental Impact Statement for the Bulkhead and Other Improvements, Kahului Harbor, Maui.

Very truly yours,

Doak C. Cox, Director

cc: OEQC

DIRECTOR'S OFFICE

OCT 25 8 11 AM '76

DEPT. OF
TRANSPORTATION

October 21, 1976

Dr. Richard Marland, Director
Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Dear Dr. Marland:

Re: Environmental Impact Statement Bulkhead and Other
Improvements, Kahului Harbor, Maui

The subject EIS has been reviewed and the following comments
are offered:

1. The existing roadway connecting Piers 1 and 2 may become
inadequate to handle the increased traffic flow. The proposed
project fronts a major portion of this roadway and we believe
that traffic congestion and hazardous conditions will increase
due to the project. The proposing agency should seriously consider
roadway alternatives to alleviate traffic problems.

2. It is assumed that additional off-street parking, loading
and unloading facilities would be necessary to service the proposed
project. The proposing agency should explain how the said needs
will be satisfied.

3. The disposal of the dredged material should take place at
a site recommended by the Environmental Protection Agency if not
used as backfill for the wharf. Spoil disposal at a County landfill
site will adversely affect landfill operations.

Thank you for the opportunity to comment on the subject EIS.
Enclosed is a copy of the EIS which we are returning.

Yours very truly,

TOSH ISHIKAWA, PLANNING DIRECTOR

cc E. Alvey Wright

RALPH MASUDA, ENVIRONMENTAL STAFF
SPECIALIST

November 4, 1976

HAR-ED 1907

Department of Planning
County of Maui
200 S. High Street
Wailuku, Maui, Hawaii 96793

Attention Mr. Toshio Ishikawa

Gentlemen:

Subject: Bulkhead and Other Improvements at
Kahului Harbor, Maui, Job H.C. 3046

Thank you for reviewing the environmental impact statement for the subject project. The following information is provided in response to your comments:

1. We have begun discussion with Alexander & Baldwin to purchase land mauka of the existing road between Piers 1 and 2 for use as a container yard and other maritime related activities. Although it was not discussed in the EIS, we plan to include in this project the realignment of a section of the roadway between Piers 1 and 2 to a route mauka of the cement plants. There will still be cross flow of traffic with container movement between the proposed wharf and the proposed container yard. However, the conflict would be much less than that which would result if the road is left in its present alignment. The proposed realignment is indicated in the preliminary plan of the subject project we sent you on September 29, 1976. Ultimately the road between Piers 1 and 2 will be re-aligned along the mauka boundary of the parcel we plan to acquire from A&B in order to eliminate traffic conflicts.
2. The area between the proposed bulkhead and the existing road between Piers 1 and 2 will be used for loading/unloading and for off-street parking. The area behind the first 200 ft. of bulkhead nearest Pier 2 will be used for loading/unloading the roll-on roll-off barges. The area behind the remaining 300 ft. of bulkhead will be used for

Department of Planning
Page 2
November 4, 1976

HAR-ND 1967

servicing the fishing boats and for off-street parking.
Off-street parking for Young Brothers is presently available
at Pier 2.

3. The dredged material will be disposed of on land. Some of this material will be used to fill the area behind the bulkhead. The remaining material will be stockpiled in an area approximately 350 ft. behind the proposed bulkhead. We plan to use part of this material at our Pier 1 container yard. The Department of Agriculture has also expressed interest in the material if it consists primarily of coral.

Your comments are appreciated and will be incorporated into the Final EIS.

Very truly yours,

MELVIN E. LEPINE
Chief, Harbors Division

CM: yktf

bcc: HAR-N



DEPARTMENT OF PLANNING
AND ECONOMIC DEVELOPMENT

Kamamalu Building, 250 South King St., Honolulu, Hawaii • Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804

GEORGE R. ARIYOSHI
Governor

HIDETO KONO
Director

FRANK SKRIVANEK
Deputy Director

October 22, 1976

Ref. No. 2214

MEMORANDUM

TO: Dr. Richard E. Marland, Director
Office of Environmental Quality Control

FROM: *for* Hideto Kono, Director *Frank Skrivaneck*

SUBJECT: Environmental Impact Statement, Bulkhead and Other Improvements,
Kahului Harbor, Maui

Thank you for providing us the opportunity to review the subject environmental impact statement.

Generally, the statement appears to give adequate consideration to the probable environmental impacts associated with the proposed harbor improvements. We are satisfied that the concerns expressed by this office during the initial consultation period have been appropriately addressed.

November 9, 1976

HAR-ED 1934


Department of Planning and
Economic Development
P. O. Box 2359
Honolulu, Hawaii 96804

Gentlemen:

Subject: Bulkhead and Other Improvements at
Kahului Harbor, Maui, Job H. C. 3046

Thank you for reviewing the Draft Environmental Impact
Statement for the subject project. Your comments are appreciated
and will be incorporated into the Final EIS.

Very truly yours,



MELVIN E. LEPRIE
Chief, Harbors Division

GM:yktf

bcc: HAR-M

4766

GEORGE R. ARIYOSHI
GOVERNOR



STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
OFFICE OF THE GOVERNOR
550 HALEKAUWILA ST.
ROOM 301
HONOLULU, HAWAII 96813
October 26, 1976

DIRECTOR RICHARD E. MARLAND, PH.D.
DIRECTOR
TELEPHONE NO. 548-6915
OCT 28 12 48 PM '76
OFFICE OF TRANSPORTATION

MEMORANDUM

TO: E. Alvey Wright, Director
Department of Transportation

FROM: Richard E. Marland, Director
Office of Environmental Quality Control

SUBJECT: Environmental Impact Statement for the Proposed
Bulkhead and Other Improvements at Kahului, Maui,
Job H.C. 3046

This Office has reviewed the subject EIS and offers the following comments:

- 1) A map of the region, which includes the harbor site, should be included in the text.
- 2) The area to be dredged should be shown on the project map. What method will be used for the dredging operation? An indication should be given of the location of the potential landfill site, where the dredge spoil might be dewatered.
- 3) It appears that the road between Piers 1 & 2 will be closed during the construction of this project, which is estimated at one year in duration. What are the short-term impacts of having to re-route the traffic onto Kaahumanu Ave.? Will traffic on this road be disrupted? What are the economic impacts on those firms that use the intra-pier road? How will these impacts be mitigated?
- 4) A long-term impact of the project is the potential increase of traffic congestion on the intra-pier road and surrounding area. Have plans been drawn up to mitigate this potential problem? Will this road need to be widened?

5) Turbidity curtains are mentioned as a potential mitigation measure during the dredging operations. Will these curtains be used during this operation? Will the placement of these curtains affect the operational use of the existing piers?

6) A discussion of the effects of alternative bulkhead configurations on the usability of the present piers due to wave reflectance is recommended for inclusion in the text.

7) The necessary approvals should be listed along with the status of each as required by the EIS Regulations, Section 1:42(o).

8) The potential for traffic congestion in the vicinity of the project appears to be an unresolved issue. If this is so, a discussion of this topic appears to be warranted. See section 1:42 (n) of the EIS Regulations on this matter.

The EIS Regulations allow the accepting authority or his authorized representative to consider responses received after the fourteen day response period. This Office will exercise that option and will consider responses after the fourteen day period.

As of this date we have received a total of ten (10) comments as indicated on the attached list.

For brevity and fairness, this Office did not attempt to summarize comments made by other reviewers. Instead, we strongly recommend that careful consideration be given to each comment made by the reviewers. We also recommend that a copy of the revised EIS be provided to those persons and agencies that have provided substantive comments on the EIS.

We trust that our comments will be helpful to you in the preparation of the revised statement. Thank you for the opportunity to review this EIS.

attachment

GEORGE R. ARIYOSHI
GOVERNOR



RECEIVED
DEC 7 1976
EISC

E. ALVEY WRIGHT
DIRECTOR

DEPUTY DIRECTORS
WALLACE AOKI
RYOKICHI HIGASHIONNA
DOUGLAS S. SAKAMOTO
CHARLES O. SWANSON

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

November 22, 1976

IN REPLY REFER TO:
HAR-ED 1974

Richard E. Marland, Ph.D.
Director
Office of Environmental Quality Control
550 Halekauwila Street
Honolulu, HI 96813

Dear Dr. Marland:

Subject: Bulkhead and Other Improvements at
Kahului Harbor, Job H.C. 3046

We thank you and your staff for reviewing the environmental impact statement for the subject project. We have numbered our responses to coincide with your comments.

1. Acknowledged. A map of the region, which includes the harbor site has been included in the text.
2. The dredged material will be disposed of on land. Some of this material will be used to fill the area behind the bulkhead. The remaining material will be stockpiled in an area approximately 350 feet behind (southeast) the proposed bulkhead. The area to be dredged, and the location of the spoil disposal site are shown on Figure 3-1.

The method used for the dredging operation has not been determined. It will be up to the contractor to select a dredging method.

3. 4. and 8. These comments all pertain to traffic/roadway impacts, hence a single response is given.

As stated on page 5-9 of the EIS:

The intra-harbor road was constructed to facilitate access to both piers from the Harbors Administration Building located between Piers 1 and 2 and was never

intended as the main route between both Piers. One lane of the intra-harbor road can be kept open during construction of the proposed project. However, there may be times when traffic will have to be diverted onto Kaahumanu Avenue. This is anticipated to cause a slight inconvenience with minimal economic impacts on firms that use the intra-harbor road. Traffic flow on Kaahumanu Avenue will not be disrupted.

Plans have been drawn to mitigate potential traffic congestion in the vicinity of the new wharf. We have begun discussion with Alexander & Baldwin to purchase land mauka of the existing road between Piers 1 and 2 for use as a container yard and other maritime-related activities. Although it was not discussed in the EIS, we plan to include in this project the realignment of a section of the roadway between Piers 1 and 2 to a route mauka of the cement plants. There will still be cross flow of traffic with container movement between the proposed wharf and the proposed container yard. However, the conflict would be much less than that which would result if the road is left in its present alignment. The proposed realignment is indicated on Figure 3-1. Ultimately the road between Piers 1 and 2 will be realigned along the mauka boundary of the parcel we plan to acquire from A & B in order to eliminate traffic conflicts.

5. Turbidity curtains were not mentioned as a potential mitigation measure during the dredging operations. Rather, it was mentioned as one example for isolating the dredging site from adjacent areas (page 5-6).

The amount of turbidity created will depend on the method of dredging. Therefore, turbidity will be monitored during dredging. If silt curtains are deemed necessary, they will be installed at that time.

6. A discussion on the net effects of wave reflecting on operations at Pier 2 has been incorporated in the text.
7. List of Necessary Approvals

Richard E. Marland, Ph.D., Director
Page 3
November 22, 1976.

HAR-ED 1974

<u>AGENCY</u>	<u>PERMIT</u>	<u>STATUS</u>
Department of the Army	Section 10, River and Harbor Act of 1899 Section 404, Federal Water Pollution Control Act	-
Board of Land and Natural Resources	Conservation District Use Application	-
Planning Commission County of Maui	Shoreline Management Area Permit	1 public meeting

Very truly yours,

E. ALVEY WRIGHT
Director

Attachments

bcc: Environmental Impact Study Corp. ✓



Reference: ES

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Division of Ecological Services
821 Mililani Street
Honolulu, Hawaii 96813

November 1, 1976

NOV 3 8 05 AM '76

DEPT. OF THE INTERIOR
TRANSPORTATION

4993

Interim Director
Environmental Quality Commission
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Dear Sir:

We have reviewed the draft environmental impact statement for the Bulk-head and Other Improvements, Kahului Harbor, Maui, Hawaii and offer the following comments.

General Comments

The statement generally fails to evaluate economic and environmental values equally. For example, the statement mentions reduction in fish and crab populations are unlikely (page 5-9) but does not evaluate the loss of riprap shorelines or any other project related effects. Similarly, under Section 7.III (Alternate Design) the feasibility of a pile-girder design has been based entirely on economic grounds, in spite of its benefits to fishery resources (see specific comments). Furthermore, to consider all phases of the proposed action, development of specific erosion/turbidity control commitments are suggested. Lack of specific commitments is well depicted by the following sentence (page 5-5). "Turbidity due to runoff from grading and erosion is potentially significant, although proper engineering practice and attention to the problem of erosion control can be expected to keep turbidity increases from this source at a minimal level."

Because some of the actions described in the environmental statement may conflict with the programs and objectives of the U. S. Fish and Wildlife Service, our response should not be considered to be approval of the project or actions described in the document. Rather, it should be regarded as relating only to the adequacy of the statement as a full disclosure document. Project approval/disapproval will be provided in our review of the permit application required under the U. S. Army Corps of Engineers' regulations. Our recommendations would generally be based on the development of effective erosion/turbidity control measures and whether the final project design reflects the most reasonable effort to accommodate fishery resources. It should be consistent with U. S. Fish and Wildlife Service guidelines as described in the Federal Register of December 1, 1975 (Vol. 40, No. 231).



Specific Comments

Page 3-11, Section 3.II.M. Aquatic Biota. Sampling methodologies of the biological survey requires discussion. The statement should: (1) identify sampling method or methods for the data presented, and (2) it should indicate whether sampling was designed to account for species periodicity, built-in biases of any specific sampling method and annual migratory patterns.

Page 3-14, Section 3.II.P. Fuel Spills. Since development of fueling facilities is an incremental part of the proposed project, the statement should describe these structures and identify measures directed toward minimizing refueling spillages. As advanced technology and harbor expansion permit greater movement of cargo, concern for oil pollution is likely to increase. Thus, regardless of responsibility, present or proposed oil spill contingency plans should be described.

Page 5-5, first paragraph, Section 5.IV. Water Quality. The statement should indicate whether berms, siltation basins or other specific control measures would be required to minimize pollution from construction generated runoff.

Page 5-5, second paragraph, Section 5.IV. It is mentioned that after dredging the "... area may experience a temporary increase in fish and crab populations due to the exposed nutrients and organisms." It is further stated that "phytoplankton populations may be temporarily depressed because of reduced light penetration caused by water turbidity..." The correlation of fish and crab increases with nutrient exposure requires explanation. In addition, it should be worth noting whether the influence of exposed organisms on these increases were based on benthic samples or were documented from other studies.

Page 5-6, first paragraph, Section 5.IV. The requirement for silt curtains should be clearly specified in the final environmental impact statement.

Page 5-8, Section 5.VIII.A. Short-term Impacts. The discussion on recreational fishing should be expanded to: (1) identify the species, season and duration of these runs, and (2) discuss the priorities fishermen place on the wharf site as compared to other locations around the harbor.

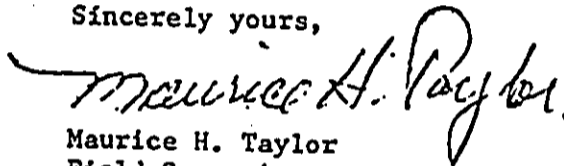
Page 5-9, Section 5.VIII.B. Long-term Impacts. A determination of fishermen access upon the completed structure should be presented in the final EIS. In recognition of adjacent water depths the rationale that fish would be attracted to the dredged depths remains unclear and requires further discussion. The EIS states that: "It is unlikely that the new wharf will reduce fish and crab populations in the port area." With rip-rap revetments providing habitat diversity, cover, as well as an attractment to marine life, its displacement by a monotonous sheetpile bulkhead

is almost certain to affect current fish and crab populations. It is suggested that the basis for the above quoted conclusions be clarified by examples.

Page 7-2, first paragraph, Section 7.III. Alternate Design. The feasibility of a pile-girder supported wharf requires balancing of economic detriments against environmental benefits. The rock revetment should partly act like an artificial reef providing cover and a diversity of habitat within an otherwise barren ocean bottom.

Page 7-2, second paragraph, Section 7.III. Although oceanographic effects of the two wharf designs are appended, a summary of the findings should be presented here to point out a potential deficiency of the proposed project design. The difficulties in accurately predicting interaction between the ocean and man-made structures should be discussed. Since feasibility of wharf designs are partly determined by economics, confidence intervals should be placed around the annual estimate of loss in operating days to accurately assess total lost time due to wave reflection.

Sincerely yours,



Maurice H. Taylor
Field Supervisor

cc: ARD, AE
NMFS, Honolulu (J. Naughton)
DOT, Honolulu
HDF&G

GEORGE R. ARIYOSHI
GOVERNOR



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HARBORS DIVISION
79 SO. HIMITZ HIGHWAY
HONOLULU, HAWAII 96813

November 22, 1976

E. ALVEY WRIGHT
DIRECTOR

DEPUTY DIRECTORS
WALLACE AOKI
RYOKICHI HIGASHIONNA
DOUGLAS S. SAKAMOTO
CHARLES O. SWANSON

IN REPLY REFER TO:

HAR-ED 1973

Mr. Maurice Taylor
Field Supervisor
U. S. Department of the Interior
Fish and Wildlife Service
Division of Ecological Services
821 Mililani Street
Honolulu, HI 96813

Dear Mr. Taylor:

Subject: Bulkhead and Other Improvements at
Kahului Harbor Job H.C. 3046

We thank you and your staff for reviewing the environmental impact statement for the subject project. We also note that your comments were prepared one week after the end of the review period. However, we offer the following responses to your comments:

GENERAL COMMENTS:

Responses to your general comments are included in responses to your specific comments.

SPECIFIC COMMENTS

Page 3-11, Section 3. II. M. Aquatic Biota

RESPONSE

A Survey of the marine biota occurring between Piers 1 and 2 in Kahului Harbor, Maui, was made during the late morning, 1000-1200 hours, on 3 January, 1976. A transect line, 100 meters long, was laid perpendicular to the shore and parallel to Pier 2 (Young Bros.). The transect line ran through the center of area proposed to be dredged. Two divers, equipped with SCUBA, then swam one on each side of the transect line. Each diver recorded by species the number

Mr. Maurice Taylor, Field Supervisor
Page 2
November 22, 1976

HAR-ED 1973

of fish or other organisms sighted within a 20-foot-wide band immediately ahead of him.

Any visual transect such as this must obviously be done in reasonably clear water and a visual range of 10 feet is considered to be the absolute minimum (Brock, 1954).

Although movement of barges did not occur during the time of the study, the turbidity of the water at depths greater than about 8 feet was such that the visual range decreased rapidly from about 10 feet to 3 feet or less. As a consequence of this reduced visibility, the dive was terminated after a survey of the shallow, inshore region (the area proposed to be dredged).

COMMENT

Page 3-14, Section 3. II. P. Fuel Spills

RESPONSE

An existing 6-inch diesel fuel line will be tapped and extended to the eastern end of the new wharf. A cutoff valve will be installed where the tap-in occurs. Cut-off valves and fuel hatches (containment boxes) will be installed at the two fuel outlets planned for the new wharf.

Present or proposed oil spill contingency plans are as follows:

- a) National Contingency Plan
- b) Regional Contingency Plan
(covers 3 Coast Guard Districts-
Northern and Southern California and Hawaii)
- c) Local Contingency Plans covering the
Hawaiian Islands

The regional and local Contingency Plans are currently being updated. The plans specify detailed procedures for responding to and cleaning up oil spills. Should a large spill occur in Kahului Harbor, the Captain of the Port of Honolulu is the Federal on scene coordinator and works with State and County officials and the oil companies in cleaning the spill. Additional detailed information about the contingency plans can be obtained from the Captain of the Port of Honolulu.

Mr. Maurice Taylor, Field Supervisor
Page 3
November 22, 1976

HAR-ED 1973

Again we would like to state that the party responsible for a spill is responsible for cleaning up. If the party cannot clean the spill or is not cleaning the spill in satisfactory manner, the Coast Guard can and will clean the spill. The party responsible for the spill is then billed for clean up costs.

COMMENT

Page 5-5, first paragraph, Section 5.IV.

RESPONSE

Berms and siltation basins will not be constructed to minimize construction related runoff at the project site.

The type of dredging operation will be determined by the contractor. Spoil will be stockpiled at a site 350 feet behind (southeast) the new pier. The contractor will ensure that water draining from the stockpile site is conveyed back into the harbor near the construction site and does not spill over onto adjacent land areas.

COMMENT

Page 5-5, second paragraph, Section 5.IV.

RESPONSE

The sentence "phytoplankton populations may be temporarily depressed because of reduced light penetration caused by water turbidity" should read "photosynthetic organisms may be temporarily depressed. . ."

It is anticipated that an artificial feeding situation will be created by dredging, hence our statement on increases in fish and crab abundance. The influence of exposed organisms on temporary increases in fish and crab abundance was documented from other sources (e.g. Harbor Maintenance Dredging, U. S. Army Engineer District, Honolulu) and from discussions with marine biologists.

COMMENT

Page 5-6, first paragraph, Section 5.IV

RESPONSE

The contractor will determine if silt curtains are to be used.

COMMENT

Page 5-8, Section 5. VIII.A. Short-Term Impacts

RESPONSE

As stated in the EIS, the project site is frequently populated with anglers during seasonal "fish runs". It is common to have akule and halalu (Trachurops crumenophthalmus), mullet (Mugil cephalus), makiawa (Etrumeus micropus), and occasionally kawa kawa (Gymnosarda alletterata) "running" during the summer and fall months. The duration of specific fish runs generally lasts about 4 to 6 weeks although "stragglers" can be found throughout the year.

The priorities fishermen place on the wharf site as compared to other locations around the harbor depends in part on what kind of fishing the angler enjoys. For example, one fisherman may enjoy surf-casting off the breakwaters; another may enjoy near shore fishing with a hand pole.

Another factor may be where the fish are biting. If fish are biting off Pier 2 or off the west breakwater, fishermen would tend to fish in those locations rather than places where fish are not "biting".

COMMENT

Page 5-9, Section 5.VIII.B. Long-Term Impacts
Page 7-2, first paragraph, Section 7 III Alternate Design
Page 7-2, second paragraph, Section 7. III

RESPONSE

These three comments are interrelated, hence a single response is given.

The State Department of Transportation, Harbors Division, has decided not to construct a sheet pile concrete bulkhead in entirety. This change was brought about by engineering, oceanographic, and environmental concerns expressed during the EIS review period and at a public meeting held on October 21, 1976.

Mr. Maurice Taylor, Field Supervisor
Page 5
November 22, 1976

HAR-ED 1973

A description of the proposed pier design is included in the revised EIS.

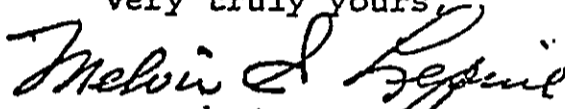
It is anticipated that the new configuration, as you point out in your comments, will partially act as an artificial reef. Also, the rip-rap revetment will provide habit and cover for marine life when the project is completed.

Since fishing is currently permitted at the project site, it is anticipated that fishermen will be allowed access upon the completed structure.

We concur that it is difficult to accurately predict interaction between the ocean and man-made structures.

Based on theoretical considerations and available data, the estimated annual loss in operating days due to wave reflection will vary between ± 20 of the estimate.

Very truly yours,



MELVIN E. LEPINE
Chief, Harbors Division

GM:yktf

cc: OEQC

bcc: HAR-M
Environmental Impact Study Corp.

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII



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

November 16, 1976

RECEIVED
NOV 21 12 39 PM '76
TRANSMISSION

GEORGE A. L. YUEN
DIRECTOR OF HEALTH
Audrey W. Mertz, M.D., M.P.H.
Deputy Director of Health
Henry N. Thompson, M.A.
Deputy Director of Health
James S. Kumagai, Ph.D., P.E.
Deputy Director of Health

In reply, please refer to:
File: EPHS- SS

MEMORANDUM

To: Dr. Richard E. Marland, Director
Office of Environmental Quality Control

From: Deputy Director for Environmental Health

Subject: Environmental Impact Statement (EIS) for Bulkhead and Other
Improvements, Kahului Harbor, Job H.C. 3046

Thank you for allowing us to review and comment on the subject EIS. Please be informed that we have some concerns in regard to the subject EIS. These concerns should be considered before the proposed expansion and dredging of Kahului Harbor commences.

Air Quality

The analysis of air quality does not address the known contribution of Maui Electric Company to the SO₂ and particulate levels in the area. The analysis is in error when it attributes the problem to distillate fuel oil. The use of distillate fuel during a finite period of time a few years ago appeared to improve air quality as compared to the residual fuel in use prior to and after that specific time period. No data is available to confirm this assumption, but the lower sulfur and ash levels in the distillate oil would indicate lower emissions and subsequent lower SO₂ and particulate levels in the ambient air.

The analysis is inadequate in that it does not make use of known data on SO₂ levels in the harbor area and the fact that standards are violated frequently during times of certain meteorological conditions. An evaluation of the downwash of SO₂ and particulates on wharf activities should be made.

The variance granted to Maui Electric Company to burn residual fuel oil was based in part on the limited use of the area in question. Expansion and/or improvement of the harbor facilities may require another evaluation of the situation.

For your information, EPA will be implementing an intensive SO₂ monitoring of the Kahului Generating Plant in the latter half of 1977.

November 16, 1976

Water Quality

There will need to be a permit application for dredging from the Corps of Engineers, either under Section 10 of the Rivers and Harbors Act, or Section 404, Water Pollution Control Act. In either case, the project will need a certification from our Department that water quality will not be impaired.

In order to make this certification, we will need additional information, including the following:

1. The environmental impact statement (EIS) describes a "few" species of marine life which presently inhabits the proposed harbor site. In order for a more meaningful evaluation regarding the effects that this project will have upon the marine biology, a study should be made to determine how the project will actually affect these individual marine organisms. This study should reflect estimated populations as well as seasonal migratory habits (if any) for each particular species. In addition, attention should be given in these areas to the immediate effects which will occur as a result of the dredging and filling, as well as the long-term effects.
2. The EIS mentions that a series of settling ponds may be utilized to control the harmful effects of dewatering dredge spoil at a landfill site. We realize that this is only one alternative for handling the dredge spoil. However, since there is a distinct possibility that this alternative may be adopted, we suggest that a more detailed plan should be provided. Primarily, our concern is directed to the criteria which will be used to design this dewatering process. Secondly, we are concerned about the location of this settling basin. Before advocating any system such as this, we need to have adequate information to make a reasonable determination regarding potential adverse environmental effects which may accompany the use of such a treatment system.

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.


JAMES S. KUMAGAI, Ph.D.

cc: Mr. E. Alvey Wright, DOT ✓
DHO, Maui

RECEIVED

JAN 11 1976

EISC

STATE OF HAWAII
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

December 23, 1976

HAR-ED 2740

James S. Kumagai, Ph.D., P.E.
Deputy Director
Department of Health
State of Hawaii
P. O. Box 3378
Honolulu, Hawaii 96801

Dear Dr. Kumagai:

Subject: Bulkhead and Other Improvements at
Kahului Harbor, Job H. C. 3046

We thank you and your staff for reviewing the EIS for the subject project. We offer the following responses to your comments:

Air Quality

As pointed out by your comments, the EIS should have attributed air quality problems in the harbor area to residual fuel oil rather than distillate fuel oil.

Maui Electric Co. used high sulfur fuel at their Kahului facility until December, 1972, when they converted to low sulfur fuel. From December, 1972 to April, 1974, they used low sulfur fuel; and from April, 1974 (to the present), they went back to using high sulfur fuel.

Based on monthly data recorded at the Kahului air monitoring station, sulfur dioxide, (SO₂) emissions from the MECO plant did not exceed State ambient air quality standards during the period January, 1973 to April, 1974, when low sulfur fuel oil was used. During the same period particulate levels were exceeded 32 times (Hawaii Air Quality Data, Department of Health, August, 1976).

From May, 1974 to September, 1976, particulate levels exceeded State air quality standards nine times (four times during 1974, five times during 1975, and at no time during 1976).

During the same period SO₂ emissions exceeded State standards thirteen times (six times during 1974, four times during 1975, and three times during 1976) and ranged from less than 5 to 179 ug/cm₃.

Of greater importance than the aggregated data discussed above, is data recorded within the past at the Harbor Master's Office which is located downwind of the MECO plant. As shown in Table 1-1, SO₂ emissions averaged over a 24-hour period exceeded State air quality standards by a magnitude of 5-10 times the standard.

TABLE 1-1

SO₂ EMISSIONS RECORDED AT HARBOR MASTER'S OFFICE

Date	7/15/74*	7/16/74	7/17/74	7/18/74	7/19/74**
Concentration (ug/cm ³)	945	603.5	424	787	470
Range of Values (ug/cm ³)	208.9- 1,615.7	58.7- 1,609.6	4.6- 1,251.3	2.2 1,911.9-	200.4- 1,300.6

* 12-hour average

**24-hour standard: 80 ug/cm³

More recent data from March 1975 to June 1975 (attached), indicates SO₂ levels recorded at the Harbor Masters Office have not improved.

How the downwash of SO₂ and particulates affect future wharf activities is difficult to ascertain at this time. Persons working in the harbor area have complained about external body irritations and the pungent odor caused by SO₂ and particulates. Should downwash of SO₂ occur during construction, construction workers as well as other persons employed in the harbor will be affected. Whether construction activity is affected depends on the contractor, that is, he can decide to stop work until downwash conditions cease.

The effects of SO₂ downwash on future wharf activities depends in part on operational procedures that will be

determined by maritime operators. Procedures such as future modes of operation, including changes in the number of weekly port calls, the use of larger vessels, vessel turn-around times, and the number of additional cargo handling personnel required to service the facility will influence both the number of persons exposed to SO₂ and the duration of exposure. Until such time that these procedures are developed, it is difficult to accurately evaluate the effects of SO₂ and particulates on future wharf activities. Potential hazards stemming from SO₂ and particulate levels will persist in the harbor area unless the pollutants can be controlled at the source.

Water Quality

1. The State Department of Transportation Harbors Division, has modified the design of the bulkhead. This change was brought about by engineering, oceanographic, and environmental concerns expressed during the EIS review period and at a public meeting held on October 21, 1976.

The new wharf will be a combination anchored sheet pile bulkhead and pile-girder structure. A 150-foot long sheet pile bulkhead will be constructed perpendicular to Pier 2 at the site of an existing embedded bulkhead. Sheet piles, capped with concrete to one foot below the low tide mark, will form the outboard face of the wharf and will be anchored with tie-backs.

The remaining 350 feet of the wharf will be a pile girder structure similar to that shown in the attached diagram. The slope under this structure will be protected by a rock revetment. Approximately 12,500 cubic yards of fill is required to fill in the area between the outboard face of the sheetpile structure and the shoreline and for the rock revetment.

As stated in the EIS, the project site is frequently populated with anglers during seasonal "fish runs". It is common to have akule and halalu (Trachurops crumenophthalmus), mullet (Muqil cephalus), nakiawa (Etrumeus micropus), and occasionally kawa kawa (Gymnosarda alletterata). "running"

during the summer and fall months. The duration of specific fish runs generally lasts about 4 to 6 weeks although "stragglers" can be found throughout the year.

We have checked with the Division of Fish and Game (Department of Land and Natural Resources) and marine biologists on the availability of fish population data for Kahului Harbor. To their knowledge, such data does not exist for the project area.

Dredging will destroy some benthic habitats and organisms. The damage will be localized and confined to the dredged area. The agitated bottom material will expose bottom dwelling organisms thus contributing micro-nutrients to the marine environment. Fish and crab density, abundance, and diversity in the immediate dredging area will probably decrease due to dredging activities. However, an increase in nutrients, organic material, and organisms stirred up by dredging operations and carried to surrounding areas may create an artificial feeding situation and temporarily increase fish and crab densities in these areas. After dredging operations have ceased the dredged area may experience a temporary increase in fish and crab populations due to the exposed nutrients and organisms.

Construction also entails the loss of some rocky intertidal habitats along the shoreline of the project site. However, upon completion of the project, the wharf will partially act as an artificial reef. The rip-rap revetment under the pile-girder structure will provide habitat and cover, and benthic communities should re-populate its surface.

2. Dredged material will be disposed of on land. Some of this material will be used to fill the area behind the outboard face of the bulkhead. The remaining material will be stockpiled in an area approximately 350 feet behind (southeast) the proposed bulkhead. The need for berms and siltation basins will be determined by the type of dredging method the contractor selects. Therefore, berms and siltation basins will not be specified. Rather, the contract specification will specify that runoff from the spoil stockpile be free of silt and be channeled back into the harbor or into holding ponds.

James S. Kumagai, Ph.D., P.E.
Page 5
December 23, 1976

HAR-ED 2740

Design criteria for the dewatering process will be formulated as additional agency concerns (Corps of Engineers, and State Department of Health) are specified during the permit application period.

Very truly yours,



E. ALVEY WRIGHT
Director

GM:wh

Attachments

bcc: OEQC
Environment Impact
Study Corp. ✓
HAR-M

MAR 19 1975

DIRGE R. ARIYOSHI
GOVERNOR OF HAWAII



GEORGE A. L. YUEN
DIRECTOR OF HEALTH
AUDREY W. MERTZ, M.D.
DEPUTY DIRECTOR OF HEALTH

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

March 18, 1975

To: Chief, Pollution Investigation & Enforcement Section
(Through Chief, Laboratories Branch)
From: Supervisor, Air Pollution Laboratory
Subject: Result of SO₂ Analyses at Kahului, Maui, March 12-13, 1975

On March 13, 1975, 40 samples were submitted to the Air Pollution Laboratory for analysis of sulfur dioxide. These samples were analyzed by the Federal reference method for the determination of SO₂ in the atmosphere. (Federal Register; Volume 36; No. 84; Friday, April 30, 1971; Appendix A) The results are listed below in $\mu\text{g SO}_2/\text{m}^3$:

Date & Time	Harbormaster	Hale Mahaolu
3/12/75 1200-1300 Hrs.	1,318	44
1300-1400	1,085	46
1400-1500	1,206	24
1500-1600	1,184	0
1600-1700	1,051	0
1700-1800	564	44
1800-1900	1,031	0
1900-2000	1,230	0
2000-2100	1,063	--*
2100-2200	522	34
2200-2300	461	0
2300-2400	532	0
3/13/75 0000-0100	241	0
0100-0200	161	0
0200-0300	315	0
0300-0400	530	0
0400-0500	564	0
0500-0600	550	0
0600-0700	532	0
0700-0800	261	0

Jean L. Taba
Analyst

W. J. M. Chiu
Analyst

JLT:mf
* Sample Spilled in Transit

Jean L. Taba
Supervisor

FORWARDED:
Albert L. Oda
ALBERT L. ODA
Chief, Laboratories Branch

MAR 24 1975

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII



GEORGE A. J. YUNN
DIRECTOR OF HEALTH
AUDREY W. MERTZ, M.D.
DEPUTY DIRECTOR OF HEALTH

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

March 21, 1975

To: Chief, Pollution Investigation & Enforcement Section
(Through Chief, Laboratories Branch)

From: Supervisor, Air Pollution Laboratory

Subject: Result of SO₂ Analyses at Kahului, Maui, March 15-16 and
18-19, 1975

Results of analysis of samples submitted to this laboratory
on March 17 and March 19 are listed below in $\mu\text{g SO}_2/\text{m}^3$:

Time of Sampling	Date Sampled 3/15-16/75 Date Analyzed 3/18/75		Date Sampled 3/18-19/75 Date Analyzed 3/20/75	
	Harbor Master	Hale Mahaolu	Harbor Master	Hale Mahaolu
0800-0900	1,543	0	539	0
0900-1000	1,076	0	683	35
1000-1100	978	0	1,174	0
1100-1200	1,043	0	1,557	0
1200-1300	783	0	1,313	36
1300-1400	935	0	904	50
1400-1500	1,123	0	707	0
1500-1600	987	0	1,185	0
1600-1700	769	0	1,720	0
1700-1800	942	0	1,766	0
1800-1900	1,205	0	1,560	81
1900-2000	1,182	0	1,732	33
2000-2100	1,292	0	1,030	0
2100-2200	1,140	0	651	0
2200-2300	393	0	904	0
2300-2400	198	0	602	0
0000-0100	142	0	635	0
0100-0200	130	0	397	0
0200-0300	0	67	507	0
0300-0400	212	46	507	0
0400-0500	0	0	353	0
0500-0600	79	0	574	0
0600-0700	257	0	451	0
0700-0800	447	0	1,004	0

Joana L. Taba
Analyst

Joana L. Taba
Supervisor

FORWARDED:
Albert I. O'Neil
ALBERT I. O'NEIL

APR 2 1975

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII



GEORGE A.I. YUEN
DIRECTOR OF HEALTH
AUDREY W. MERTZ, M.D.
DEPUTY DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. BOX 3370
HONOLULU, HAWAII 96801

April 2, 1975

To: Chief, Pollution Investigation & Enforcement Section
(Through Chief, Laboratories Branch)
From: Supervisor, Air Pollution Laboratory
Subject: Results of SO₂ Sampling at Kahului, Maui, March 21-22, and
25-26, 1975

Results of analysis of samples submitted to this laboratory
on March 24 and 27 are listed below in $\mu\text{g SO}_2/\text{m}^3$:
(*See Attached Chain of Custody)

Time of Sampling	Date Sampled 3/21-22/75 Date Analyzed 3/25/75		Date Sampled 3/25-26/75 Date Analyzed 3/27 and 3/31	
	Harbor Master*	Kahului Shopping Center	Harbor Master	Kahului Shopping Center
0800-0900	330	98	0	0
0900-1000	0	0	0	0
1000-1100	251	0	0	0
1100-1200	456	0	0	0
1200-1300	351	0	0	0
1300-1400	0	0	0	56
1400-1500	0	0	0	47
1500-1600	0	0	0	0
1600-1700	0	0	0	0
1700-1800	0	0	0	0
1800-1900	0	0	0	0
1900-2000	0	0	0	0
2000-2100	0	0	0	0
2100-2200	0	0	170	0
2200-2300	0	0	425	0
2300-2400	0	0	314	0
0000-0100	0	0	0	0
0100-0200	0	0	0	0
0200-0300	0	0	137	0
0300-0400	0	0	0	0
0400-0500	58	0	0	0
0500-0600	0	0	0	0
0600-0700	0	0	0	0
0700-0800	0	0	0	0

Joanna L. Taber
Analyst
Richard W. M. Chung
Analyst
JT:mf

Joanna L. Taber
Supervisor
FORWARDED
Richard W. M. Chung

SITES: PARKMASTER - NM
 NAHULI SHOPPING CENTER - KSC

SMC ENT... ON... / 18 / m

DATE SAMPLED: 3/28-29/75
 SITE: HM

DATE ANALYSIS: 4/1/75

TIME	4/1-2/75		4/4-5/75		4/9-10/75		4/12-13/75	
	HM	KSC	HM	KSC	HM	KSC	HM	KSC
07:00	0	0	838	0	398	0	0	0
09:00	0	0	291	0	578	0	0	0
10:00	88	0	617	0	391	0	0	0
11:00	160	0	423	0	276	0	0	0
12:00	219	0	399	0	260	0	0	0
13:00	288	0	509	0	980	0	0	0
14:00	360	0	932	0	1,273	0	0	0
15:00	237	0	566	0	1,178	0	0	0
16:00	100	0	437	0	1,556	0	0	0
17:00	0	0	697	0	1,061	0	0	0
18:00	47	0	1,258	0	242	0	0	0
19:00	0	0	648	0	0	0	0	0
20:00	219	0	1,667	0	0	0	0	0
21:00	381	0	1,289	0	0	0	0	0
22:00	976	0	1,322	0	0	0	0	0
23:00	325	0	1,047	0	0	0	0	0
24:00	372	0	890	0	0	0	0	82
01:00	532	0	451	0	0	0	0	90
02:00	614	0	472	0	0	0	0	0
03:00	625	0	106	0	0	0	0	0
04:00	681	0	268	0	0	0	0	0
05:00	521	0	150	0	0	0	0	0
06:00	902	0	413	0	0	0	0	0
07:00	667	0	702	0	0	0	0	0
08:00	644	0		0	0	0	0	0

DATE	4/15-16/75		4/18-19/75		4/22-23/75		4/26-27/75		4/30-5/1/75		5/3-4/75		5/7-8/75		5/10-11/75	
	HM	KSC	HM	KSC	HM	KSC	HM	KSC	HM	KSC	HM	KSC	HM	KSC	HM	KSC
0700	468	0	350	182	0	211	0	0	290	94	0	0	2,021	0	0	0
0800	281	0	228	0	432	0	0	192	0	0	0	0	4,124	0	0	0
0900	0	0	394	0	137	0	562	0	146	0	0	0	4,844	0	149	0
1000	233	0	636	0	77	0	0	0	163	0	0	0	4,220	0	146	0
1100	277	0	804	0	55	0	65	0	278	0	0	0	3,115	0	173	110
1200	228	0	862	0	91	0	62	0	571	58	0	0	1,553	0	106	258
1300	258	0	1,104	0	185	0	130	0	520	91	0	0	2,655	0	0	0
1400	550	0	470	0	262	0	310	0	281	264	0	0	3,711	0	0	223
1500	0	0	682	0	252	0	365	0	0	307	0	0	4,061	0	0	723
1600	0	0	456	0	65	0	322	0	235	67	0	0	2,510	0	0	1,219
1700	0	0	792	0	331	0	0	0	300	0	0	0	2,377	0	0	115
1800	80	0	564	0	274	0	406	0	0	0	0	0	178	0	0	775
1900	368	0	684	0	204	0	0	0	727	0	0	0	1,474	139	0	434
2000	0	0	502	0	146	0	0	0	487	0	0	0	545	120	0	257
2100	0	0	278	0	348	0	0	0	370	0	0	0	588	94	0	0
2200	0	0	338	0	127	0	0	0	377	0	0	0	1,374	0	0	0
2300	0	0	258	0	0	0	0	0	324	0	0	0	1,025	0	0	0
0100	70	0	326	0	96	0	0	0	209	0	0	0	1,863	0	0	0
0200	0	0	374	0	84	0	0	0	0	0	0	0	1,841	0	0	0
0300	0	0	254	0	26	0	0	0	271	0	0	0	1,445	0	0	0
0400	55	0	250	0	202	60	0	0	127	0	0	0	1,210	0	0	0
0500	214	0	120	0	91	0	0	0	0	0	0	0	328	0	0	0
0600	0	0	425	0	79	0	0	0	0	0	0	0	807	0	0	0
0700	264	0	473	0	48	84	0	0	0	0	0	0	553	0	0	0

↑ THE STARTING TIME FOR THESE SAMPLES WAS 25 MINUTES AFTER THE HOUR.
 ↓ THE STARTING TIME FOR THESE SAMPLES WAS 45 MINUTES AFTER THE HOUR.

SITES : HMI - HITHULUWUWA IELLS
 KSC - KAHULU SHOPPING CENTER

RESULTS REPORTED IN $\mu\text{g SO}_2/\text{m}^3$

DATE OF SAMPLING: 5/15-16/75 5/15-16/75 5/19-20/75

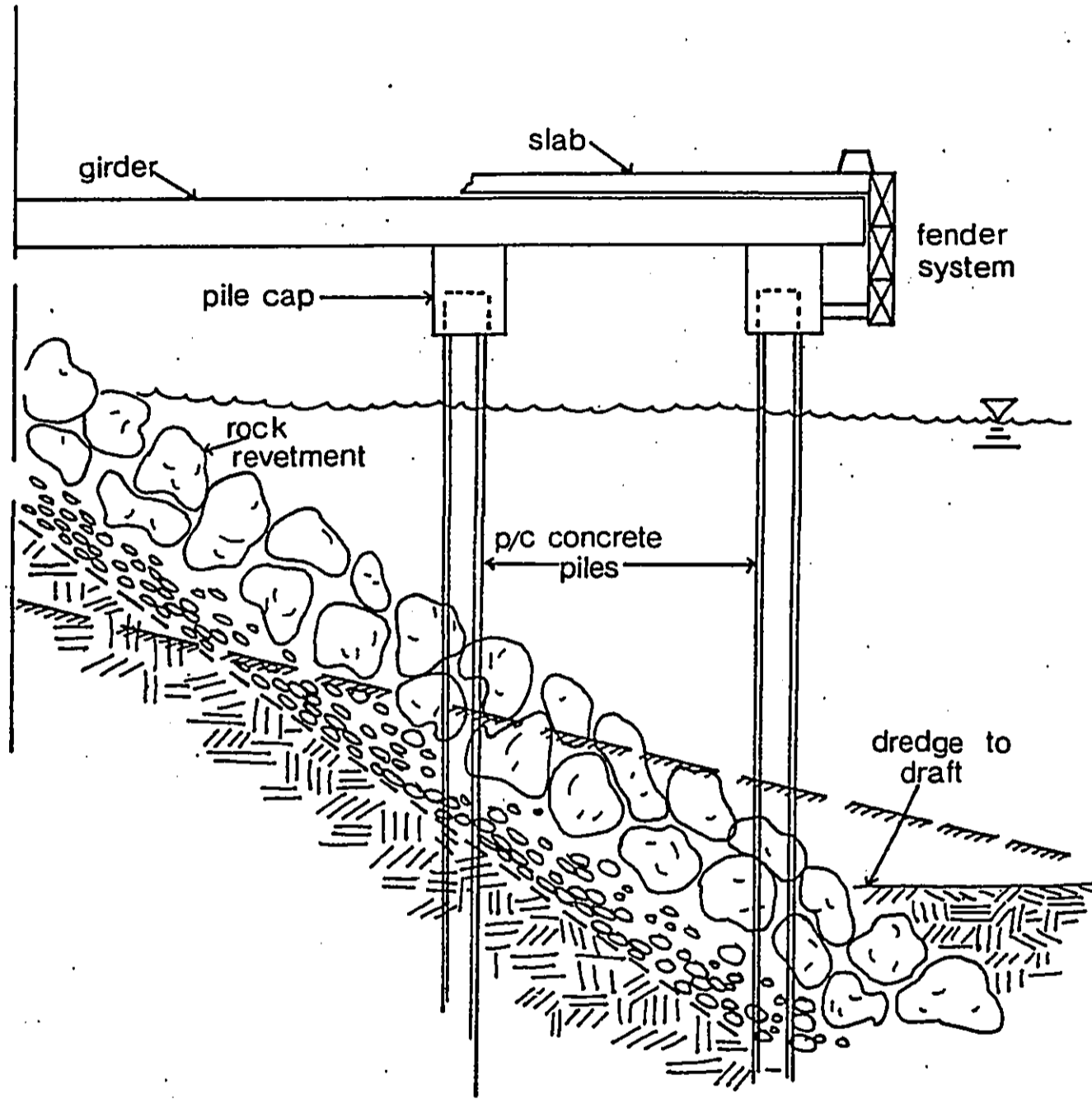
SITE:	HM	KSC	HM	KSC
0800-				
0900	118	0	1,051	163
0900-				
1000	274	0	156	154
1000-				
1100	962	0	60	130
1100-				
1200	825	0	180	127
1200-				
1300	916	0	902	0
1300-				
1400	1,324	0	1,339	0
1400-				
1500	1,476	0	1,332	0
1500-				
1600	1,520	0	725	0
1600-				
1700	1,070	0	1,135	175
1700-				
1800	656	0	1,313	0
1800-				
1900	952	0	910	0
1900-				
2000	1,001	0	662	0
2000-				
2100	0	0	427	0
2100-				
2200	98	0	353	0
2200-				
2300	122	0	588	0
2300-				
2400	0	0	276	10
2400-				
0100	0	0	377	0
0100-				
0200	0	0	204	0
0200-				
0300	0	0	202	0
0300-				
0400	0	0	185	0
0400-				
0500	0	0	422	10
0500-				
0600	0	0	319	0
0600-				
0700	0	0	487	22
0700-				
0800	0	0	876	0
DATE ANALYZED	5/19/75		5/22/75	

SITES: HM - HARBORMASTER'S OFFICE
 KSC - KAHULUI SHOPPING CENTER.

DATE OF SAMPLING: 5/23-24/75 5/28-29/75

RESULTS REPORTED IN $\frac{\text{Mg}}{\text{m}^3}$
 5/31 to 6/1/75

SITE:	HM	KSC	HM	KSC	HM	KSC
0500-						
0900	0	0	269	0	163	0
0900-						
1000	0	0	281	0	0	0
1000-						
1100	0	0	362	0	0	125
1100-						
1200	0	0	122	0	0	115
1200-						
1300	0	0	494	0	0	103
1300-						
1400	0	0	250	91	0	34
1400-						
1500	0	0	0	0	0	0
1500-						
1600	0	0	0	0	0	0
1600-						
1700	0	0	0	0	0	0
1700-						
1800	0	0	0	0	931	0
1800-						
1900	0	0	0	0	605	0
1900-						
2000	0	0	0	0	0	0
2000-						
2100	0	0	0	0	0	0
2100-						
2200	0	0	0	0	881	0
2200-						
2300	0	0	0	0	526	0
2300-						
2400	0	0	0	0	264	0
0000						
0100	0	0	0	0	79	0
0100-						
0200	0	0	0	0	456	0
0200-						
0300	0	0	0	0	113	0
0300-						
0400	0	0	0	0	53	0
0400-						
0500	0	0	0	0	0	0
0500-						
0600	0	0	0	0	36	0
0600-						
0700	0	0	0	0	72	0
0700-						
0800	0	0	0	0	262	0
DATE ANALYZED	5/28/75	5/28/75	5/30/75		6/4/75	



APPENDIX

OCEANOGRAPHIC ANALYSIS

WAVES. Kahului Harbor, located on the northern coastline of Maui, faces in the direction of predominant wave generation. Of particular interest to this project are four wave types: deep water waves which reach the coastline; wind waves generated within the harbor basin by prevailing winds; tsunamis; and seiche.

The deepwater waves reaching Kahului Harbor are restricted to the arc between the transects of N32°W and N75°E (as shown in Figure 1). Waves approaching from other directions will not significantly affect the harbor. The general frequency of waves observed one-third of a mile seaward of the Harbor is shown in Table 1. It should be noted that waves in excess of twelve feet occur more than 1½% of the time.

Table 1. WAVE CLIMATOLOGY FOR KAHULUI HARBOR
(Source: Ref. #1)

Distribution of Wave Height in Percent as a Function of
Wave Period

Observation Period: July 1966 to January 1968
Number of Observation: 1,230

WAVE PERIOD Seconds	Wave Height (Feet)					Total
	0 - 3	3 - 6	6 - 9	9 - 12	12+	
0 - 6.9	2.8	0	0	0	0	2.8
7.0 - 9.9	24.8	11.6	1.2	0	0	37.6
10.0 - 12.9	11.6	25.8	9.0	2.0	0.4	48.8
13.0 - 15.9	1.1	4.3	2.9	0.9	0.9	10.1
16.0 - 18.9	0	0.7	0.3	0	0.2	1.2
19.0+	0	0	0	0	0	0
TOTAL	40.3	42.4	13.4	2.9	1.5	100.5

Notes:

1. Record obtained with a pressure wave gauge located at Kahului Harbor.
2. Departure from 100 percent results from accumulation of round-off error and is not considered to be significant enough to justify further adjustment.

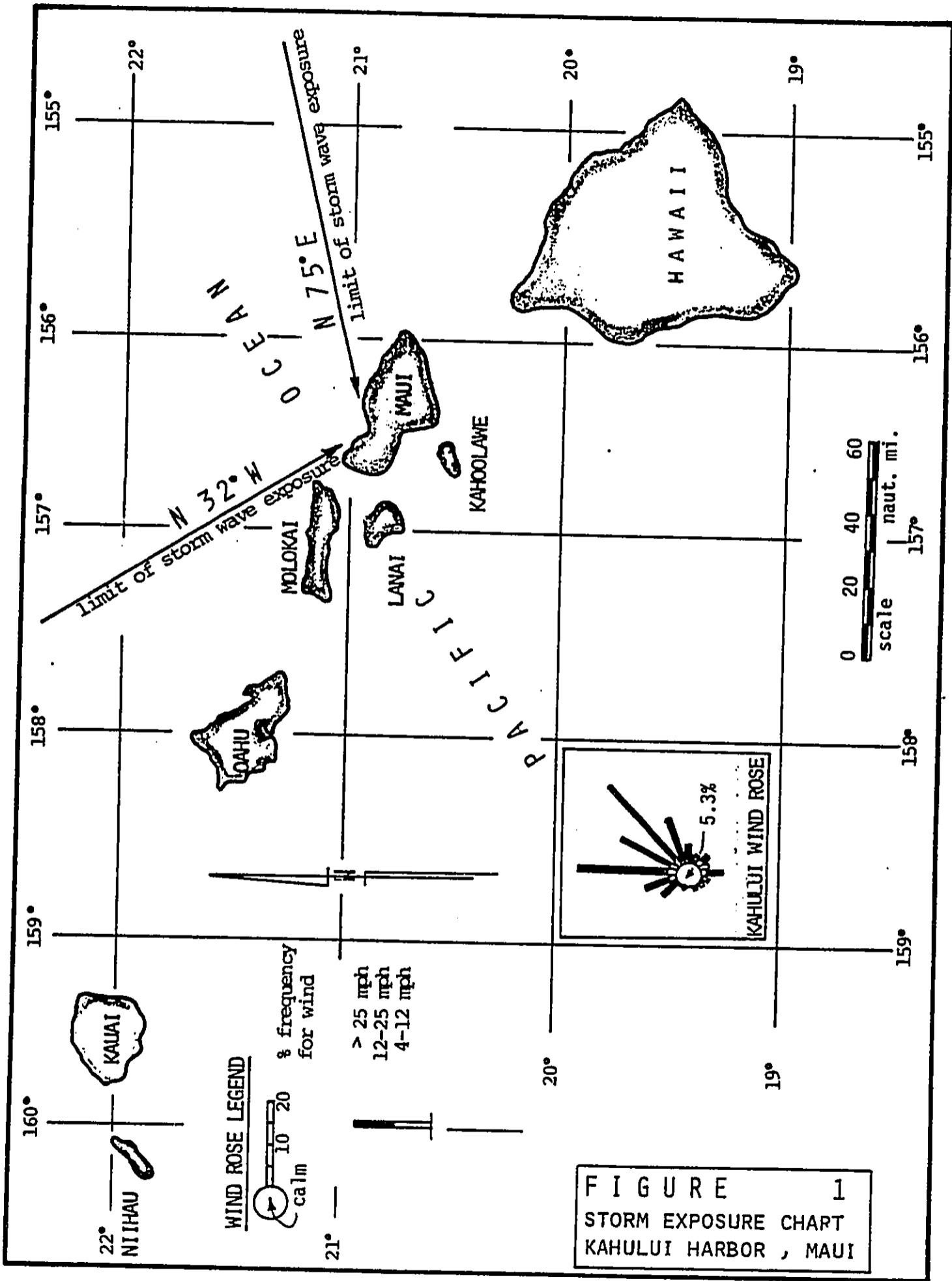
MAXIMUM WAVE DESIGN. For the determination of the maximum wave which could be expected at the project site, a study of the historical records of storm generated waves was required. A list of observed deepwater heights for various storms is given in Table 2. Wave heights of 26 - 28 feet and with periods of 15 - 18 seconds have been observed.

Table 2. STORMS AFFECTING KAHULUI HARBOR
(Source: Ref. #1)

Date	Deepwater Wave Height (Feet)	Periods (Seconds)	Direction
3 Jan 1947	23	19	N
5 - 6 March 1954	26	18	NE
27-28 Nov 1956	9	15	N
22 November 1958	14.0	17	NE
18-21 Dec 1960	12.1	14.2	N
29 Jan - 3 Feb 1965	27.0	17	N - 10°E
6-7 Oct 1966 *	14	12	-
27 Aug - 1 Sep 1967 *	19	15	N
12-14 Dec 1967 *	18	15	N
4 - 6 Dec 1968	28	15 - 16	N
29 Nov - 1 Dec 1969 **	20	-	N
22-24 Nov 1970	18	19	NNE

NOTE: Wave height based on hindcast unless otherwise noted.
* Wave height and period recorded by gauge.
** Observed wave height.

As these waves approach the coastline at Kahului Harbor, the bathymetry



of the bottom causes refraction of the wave energy. Depending on the approach direction and wave period, the wave height can either be amplified or diminished. The ratio of the refracted wave height, H , to the deepwater wave height, H_0 , can be determined analytically, and is expressed as a refraction coefficient, K_r . A tabulation of computed refraction coefficients for various wave directions and periods is given in Table 3. These coefficients agree with observed conditions and were also verified in model studies performed for the Harbor Breakwater Repair Study (Reference #6).

Table 3. DEEPWATER WAVE REFRACTION COEFFICIENTS K_r KAHULUI HARBOR
(Source: Ref. #2)

<u>Wave Direction</u>	<u>Period</u> (Seconds)	<u>K_r</u>
N	19	1.69
NW	19	0.23
NE	18	1.41
NE	17	1.45
N	14	0.64
NE	11	0.77

After entering the Harbor through the gap at the breakwater, a wave laterally dissipates its energy by expanding the width of the wave crest. A diffraction analysis is required to determine the wave heights which will reach structures located along the harbor shoreline. Diffraction diagrams have been prepared for the Harbor (Reference #2 and 3) for several different wave conditions. After examining these diagrams, it was determined that the maximum waves at the project site would be caused by a storm wave approaching the Harbor at $N22\frac{1}{2}^{\circ}W$ (NNW). An approach further westward results in shoreline refraction rapidly attenuating the wave energy reaching the breakwater. Waves which originate more towards the east result in larger waves at the

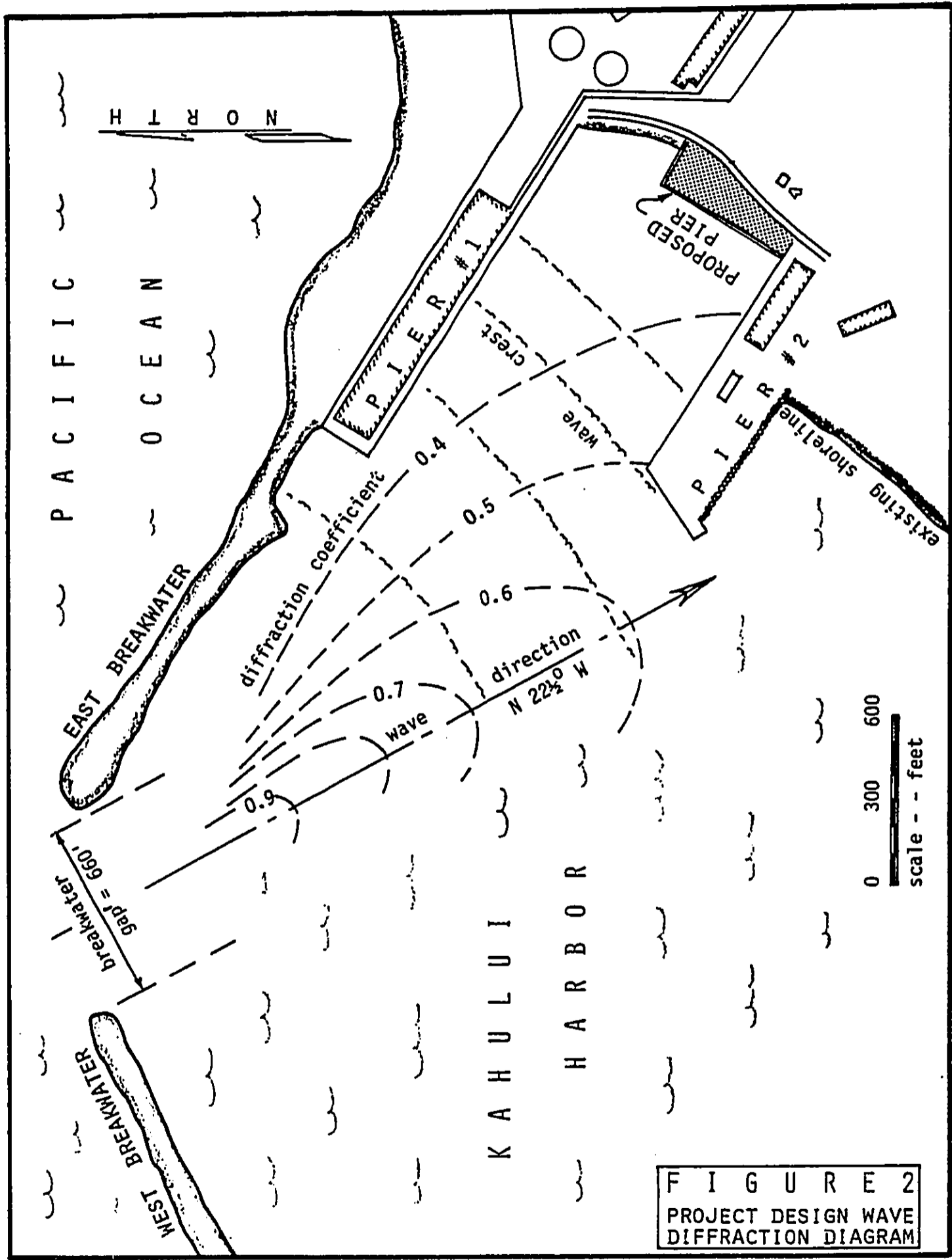


FIGURE 2
PROJECT DESIGN WAVE
DIFFRACTION DIAGRAM

breakwater; however, diffraction effects within the Harbor greatly limit the wave heights at the proposed project site. Therefore, for this analysis, a 28 foot deepwater wave height with a 17 second period was assumed from the NNW. The refraction coefficient, extrapolated from Table #2, was set at 0.80 (= K_r). Therefore, at the entrance to the breakwater, a wave of (0.80 x 28' =) 24½ feet was assumed. A diffraction diagram was prepared for this wave entering the Harbor and diffracting laterally to the beginning of the rectangular basin at the head of Pier 2. Further diffraction past this point was not considered since lateral spreading of the energy will be restrained by the existing pier structures at either side of the channel. The deepwater wave length, L_0 , of the design wave with a 17 second period, T, is computed as:

$$L_0 = 5.12T^2 = 1,480 \text{ Feet}$$

TIDE DATA. For the analysis of wave parameters, the water elevation during the storm wave must be estimated. The observed tidal levels for Kahului Harbor are listed in Table 4.

Table 4. KAHULUI HARBOR TIDE DATA
(Source: Ref. #1)

<u>Tide Description</u>	<u>Feet</u>
Highest Tide Observed (12 Nov 1958 & 20 June 1959)	3.6
Mean Higher High Water	2.30
Mean High Water	1.90
Mean Tide Level	1.15
Mean Low Water	0.40
Mean Lower Low Water	0.00
Lowest Tide Observed (19 - 20 June 1955)	-1.2

For design purposes, an assumed water level of Mean Higher High Water (+2.30

Feet MLLW) will be used. An additional 0.7 feet will be added to allow for storm surge. The water depth at the breakwater gap is approximately 48 feet MLLW and an assumed stillwater depth, d, of 51 feet was used (48 MLLW + 3.0). The wave length of the approaching wave at the gap can be calculated (using Appendix D, Reference #3) as:

$$\frac{d}{L_0} = \frac{51}{148} = 0.03446 \quad \text{then} \quad \frac{d}{L_{51}} = 0.07689 \quad \text{and} \quad L_{51} = 663'$$

At an angle of approach of N22½°W, the breakwater gap is approximately equal to the wave length. From this, a diffraction coefficient of 0.4 was determined at the midpoint of the project basin (See Figure 2). Therefore, a 24½ foot wave would be reduced to (0.4 x 24½ =) 9.8 feet at the head of the pier. Refraction of the wave from this point to the proposed pier results in less than a 5° angle of refraction and little significant change in height.

WIND WAVES. Within the Harbor basin, a 3400 foot fetch is available for the formation of waves due to winds. The maximum waves which could be generated within the Harbor under a condition constant winds are shown in Table 5.

<u>Wind, MPH</u>	<u>Wave Height, Ft.</u>	<u>Wave Period, Sec.</u>
25	1.0	6.5
50	2.1	7.5
75	3.3	8.1
100	5.0	8.6

In general, waves caused by wind within the Harbor are small and not of particular importance. The maximum wave heights possible would only occur during severe, long duration winds. Under these conditions, the wind induced

damages would be much more significant than any damage caused by the induced waves.

WAVE CLIMATE. Of additional interest for this study is an analysis of the spectral frequency of wave heights which can be expected at the project site. The method for determining the expected wave frequency ("wave climate") is identical to the procedure followed for the calculation of the maximum design wave. The frequency of occurrence for each deepwater wave category consists of a direction, period, and significant wave height. Each category of deepwater wave is first refracted to the shoreline at the breakwater and then diffracted through the breakwater gap to the proposed pier location. For this analysis, nine directional quadrants (A = NW; NNW; N; etc.), twenty wave periods (T = 0-1 seconds, 1-2 seconds, etc.), and thirteen wave heights (H = 0-1 feet, 1-2 feet, etc.) were examined. Each wave category had a finite frequency of occurrence, defined as $F_{A,T,H}$.

To determine the individual values for $F_{A,T,H}$, the deepwater wave climatology at Kahului Harbor, as compiled in Reference 8, was used as a data base. This data is reproduced as Table 6 of this report. To extend Table 6 for the frequency determination of wave categories not observed, a log-normal density function was assumed with the following form:

$$P(K) = \frac{1}{\sqrt{2\pi\beta}} x^{-1} e^{\{-(\ln x/\alpha)^2/2\beta\}} \quad x, \beta > 0$$

To solve for the parameters α and β , a least-squares regression analysis was performed on the available data. Since the data is multi-functional, the log-normal function can be extended for direction, (A), height, (H), and period,

TABLE 6. WAVE CLIMATOLOGY FOR KAHULUI HARBOR, HAWAII
 Distribution of Height (In Observations Per 1,000 Observations)
 As A Function of Period for 1,230 Observations

PERIOD (Secs)	HEIGHT (FT)													Total	Acc. Total	
	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-13			13+
.0- 1.9	1														1	1
2.0- 2.4																1
2.5- 2.9																1
3.0- 3.4																1
3.5- 3.9																1
4.0- 4.9																1
5.0- 5.9																1
6.0- 6.9	1	15	11													27
7.0- 7.9	3	37	55	3	1											99
8.0- 8.9		22	72	24	7	3	1									136
9.0- 9.9		23	36	37	21	16	4	3	1							141
10.0-10.9		7	54	30	30	19	15	5	2	2						166
11.0-11.9		2	27	51	35	26	20	9	3	1	1					177
12.0-12.9		2	24	32	19	16	23	8	5	2	2	1				145
13.0-13.9		3	8	13	9	7	7	8	2	2	2	1				64
14.0-14.9				3	2	2	4	1	1	1						17
15.0-15.9				3	2	2	2	4	1	2						20
16.0-16.9				1	1	1	1	1	1	1		2				7
17.0-17.9				2												3
18.0-18.9					1											2
19.0-19.9																
20.0+																
Total	5	111	287	199	128	97	81	38	15	14	11	4	3	12		1,000
Acc. Total	5	116	403	602	730	827	908	946	961	975	986	990	993	1,005	1,005	1,005

Record obtained with a pressure wave gage located at Kahului, Harbor, Hawaii.
 Analysis obtained by inspection of a paper tape record. Analysis type 13.
 Heights are expected to be within 1 foot of the indicated value 92 percent of the time.
 Periods are believed to be correct within 3 seconds 92 percent of the time.
 The indicated height should be increased by about 10 percent.
 The periods of surface waves would be slightly less than the indicated value.
 A zero in the period column indicates missing data.
 Departure from 1,000 results from accumulation of roundoff error and is not considered to be of enough significance to justify further adjustment.

(T), and a joint-probability density function developed. Therefore, the individual wave category frequency, P_c , is developed as:

$$P_c = \int_a^b P(T)dT \cdot \int_c^d P(H)dH \cdot \int_e^f P(A)dA$$

To determine the directional frequency for wave occurrence, the tabulation as presented in Reference 2 was used and is presented in modified form as Table 7 of this report.

Table 7. FREQUENCY DISTRIBUTION OF WAVE APPROACH TO KAHULUI HARBOR

Direction	NW	NNW	N	NNE	NE	ENE	E
South Azimuth	135°	167½°	180°	202½°	225°	247½°	270°
Frequency	21.6%	8.2	7.8	5.3	2.5	25.8	59.8

The total of the frequencies for the wave directions shown in Table 7 is greater than 100% due to the concurrent arrival of waves from two separate directions. A simplifying assumption made for this analysis is that the observed categories for wave period and height shown in Table 6 are evenly distributed in the direction frequencies of Table 7. This procedure should not introduce an unacceptable level of deviation from the actual conditions. In application, a particular category of wave (for example, 2-3 foot waves at 7.0 - 7.9 seconds with an occurrence frequency of 55/1000) is assumed to be distributed so that 21.6% of these waves approach from the northwest ($0.216 \times 55/1000 = 11.88/1000$). Therefore, approximately twelve waves per 1000

observed are 2 - 3 feet high, 7 - 8 seconds in period, and approach from the northwest. Examination of the net changes in direction due to refraction which occurs as the deepwater waves advance to the harbor entrance indicate this is not a significant factor in the net wave climate at the project site and will be ignored in this analysis.

The refraction coefficients which effect the wave height as the wave moves from deepwater to shallow water at the harbor entrance is treated the same way. The values shown in Table 3 were extended in a log-normal bi-function distribution and applied to the individual wave categories to determine increase or decrease in wave height as the wave travels toward shore.

The final factor which effects the wave reaching the project site is the diffraction within the harbor basin after the waves pass through the breakwater gap. The diffraction coefficient, K_d , is a function of: the ratio of the wave length at the breakwater to the breakwater opening = L/X and; the angle of approach relative to the project site = A (See Figure 3).

The breakwater gap is aligned roughly east-west and is 725 feet wide. If the waves approach at an azimuth, A , then the effective gap width is:

$$X = \sin (A - 90^\circ) \times 725'$$

The wave length of the approaching wave, L_x , can be computed from the relationship:

$$L_0 = 5.12T^2$$
$$L_x = L_0 \tanh \frac{2\pi d}{L_x}$$

The ratio $q = L_x/X$ is then computed.

The relationship between T, A, and K_d is shown in Table 8.

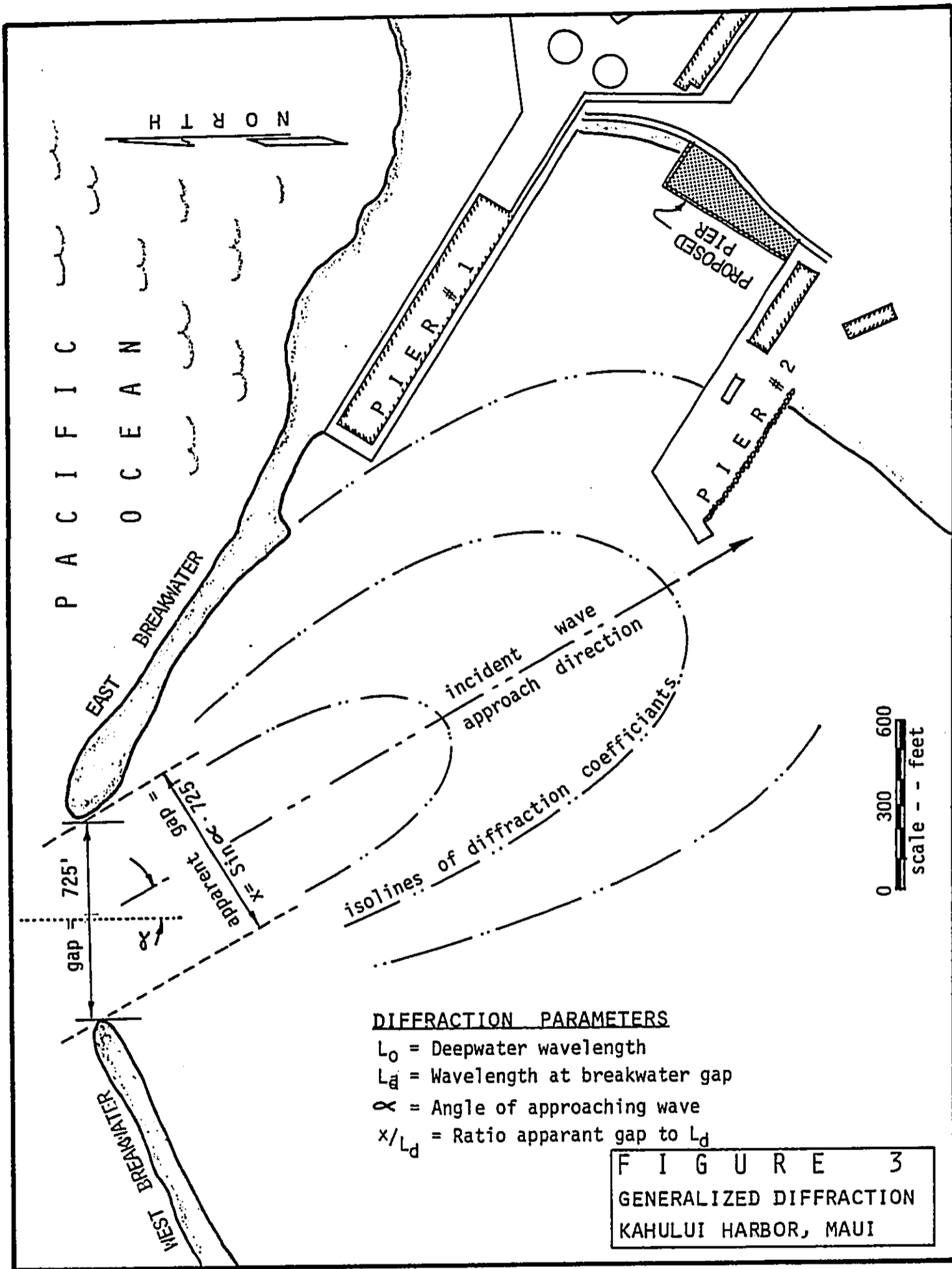
Table 8. DIFFRACTION COEFFICIENTS, K_d

		Approach Direction						
		NW	NNW	N	NNE	NE	ENE	E
5		0.90	0.15	0.08	0.04	0.02	0.01	0
10		0.58	0.25	0.15	0.06	0.05	0.04	0.02
15		0.47	0.39	0.17	0.17	0.14	0.08	0.04
20		0.42	0.46	0.21	0.18	0.15	0.11	0.05

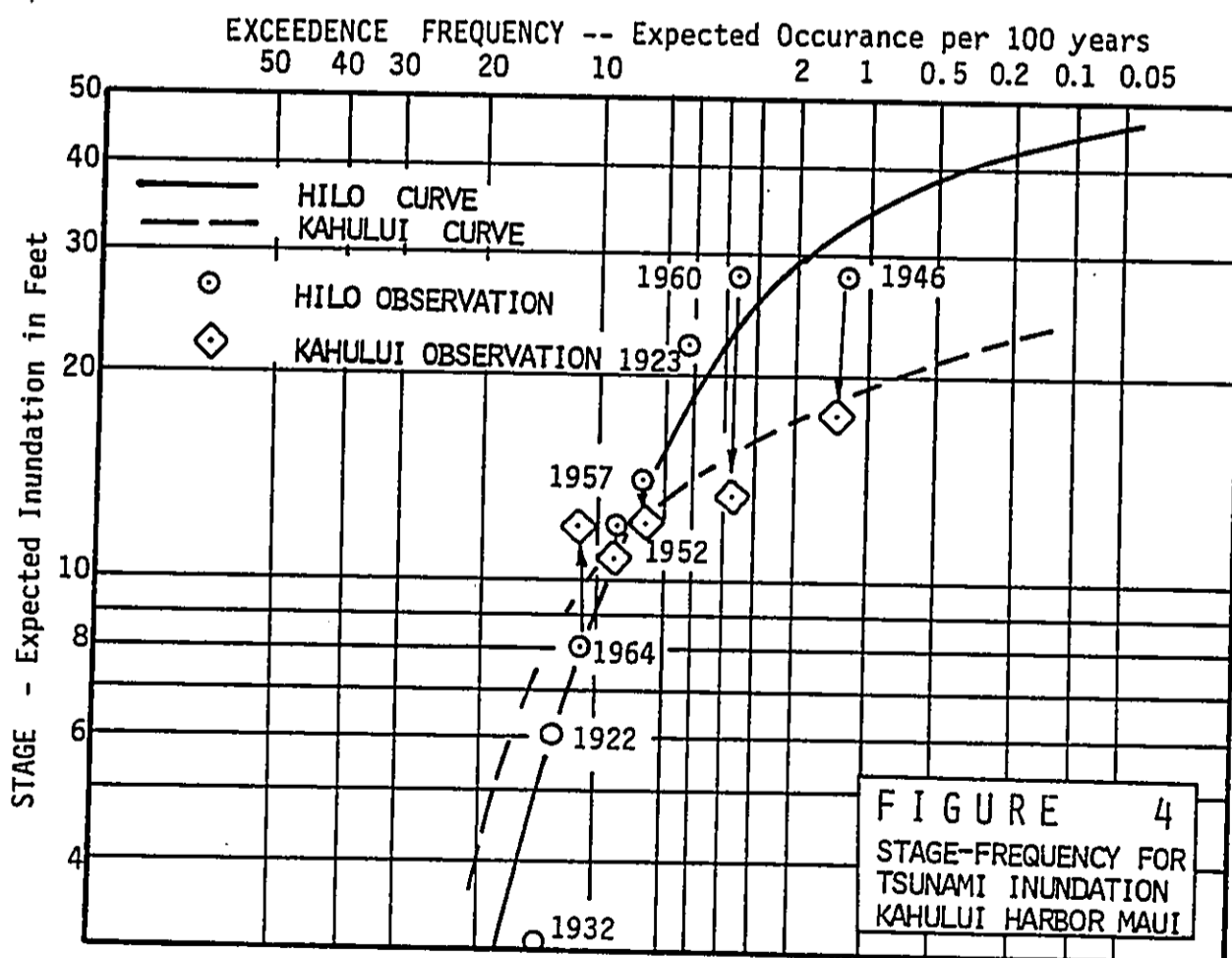
A spectral frequency was then developed for the wave climate at the project site. The wave crests, due to diffraction, are nearly parallel to the proposed pier regardless of the offshore approach angle of the deepwater waves. The required analysis for the spectral wave density was performed by digital computer to simplify the computational procedure. The resulting wave climate is presented in Table 9.

Table 9. PROJECTED WAVE CLIMATE AT PROPOSED PIER SITE

		Significant Height, Feet								
		0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	9-10
Period, Secs.	0- 4	1.33	0.51	0.30	0.04	0.01	-	-	-	-
	4- 8	345.3	3.93	1.20	0.27	0.03	0.01	-	-	-
	8-12	762.8	66.6	4.45	0.66	0.15	0.06	0.01	-	-
	12-16	102.7	21.3	6.52	1.12	0.32	0.09	0.03	0.01	-
	16-20	4.17	0.92	0.24	0.07	0.02	0.01	-	-	-
	Total	1216.3	93.2	12.7	2.15	0.53	0.18	0.04	0.02	0.01
Days/yr	335	25.7	3.50	0.58	0.15	0.05	0.011	0.007	0.004	
Recurrence	0.003	0.04	0.30	1.71	6.85	19.6	91.3	137.0	274	



TSUNAMI. The largest tsunami recorded in Kahului Harbor reached a height of 21.9 feet (1 April 1946) as measured at the breakwater. The March 1964 wave reached a water level of 12.1 feet, causing over \$50,000 damage to the Kahului Shopping Area. One method of predicting tsunami inundation is to construct a "Stage-Frequency" curve for the project area. As detailed in Reference 7, the method utilizes available historical information to modify the frequency curve developed for Hilo. The governing assumption is that the shape of the curve at Hilo will be similar to that at the project site. The inundation levels observed at the project site are plotted along the same exceedence frequency line for the tsunami level observed at Hilo. A new frequency curve, representing the project site, is then proportionately fitted through the new points. This stage frequency curve developed for Kahului Harbor is shown in Figure 4.



For the new curve, the values used were: 1946 = 17.5'; 1952 = 12.0'; 1957 = 9.5'; 1960 = 13.5'; 1964 = 12.1'. The developed curve indicates an expected inundation of seventeen feet every fifty years and nineteen feet once every 100 years. It should be noted that the tsunami inundation for Kahului Harbor would be a long period wave (15 - 20 minutes) and the physical phenomenon observed would be of a gradual rise in water level. A "bore" or rapidly moving vertical wave front should not occur at this site. The important tsunami design criteria to be considered at this site are buoyancy (which can lift structures off the pier) and water damage.

SEICHE. To determine the natural periods of a closed harbor basin, the following relationship can be used:

$$T_m = \frac{2b}{m\sqrt{gd}}$$

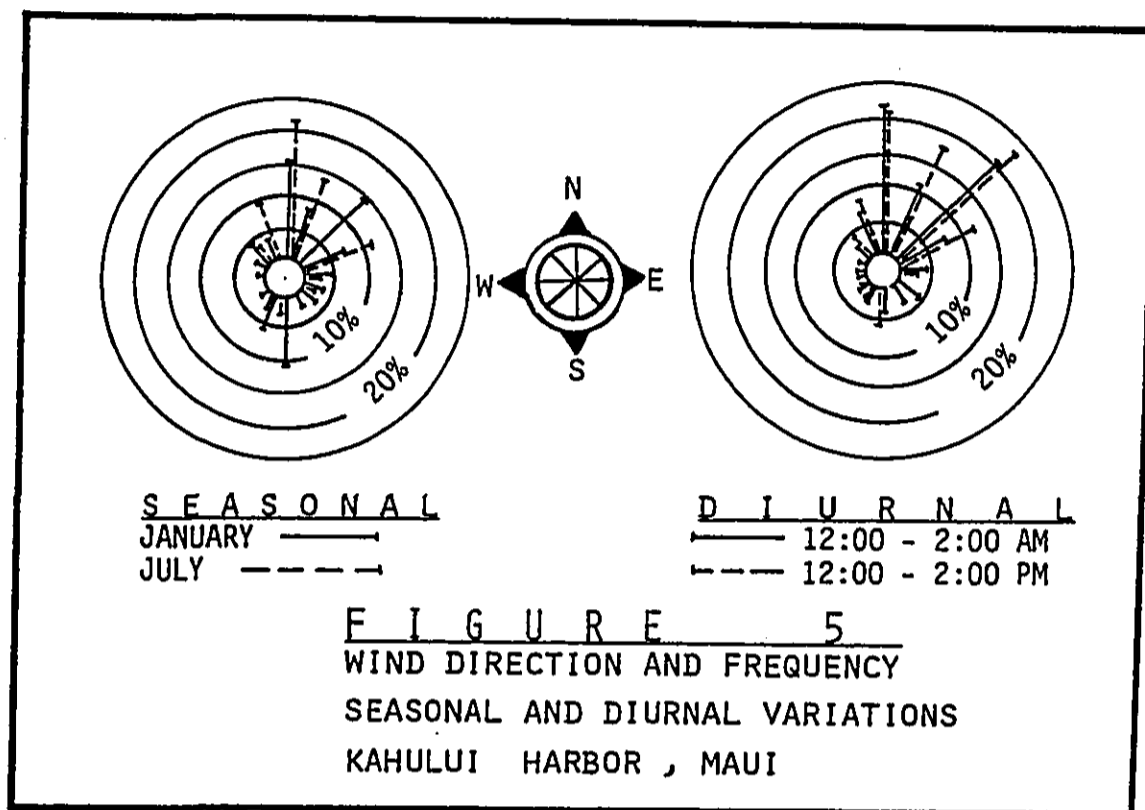
where

T = Response period, secs.
b = Harbor width, ft.
m = Mode number
g = 32.2 ft/sec²
d = Harbor depth, ft.

Using a width of 3400 feet and an average depth of 35 feet, the primary natural frequency of Kahului Harbor is 3.3 minutes. Within the small basin between Pier 1 and Pier 2, the open pile structure will not reflect wave energy. Additionally, the head of the basin will act as a good energy absorber, also limiting reflected waves. Therefore, a seiche problem probably does not occur at the existing pier location.

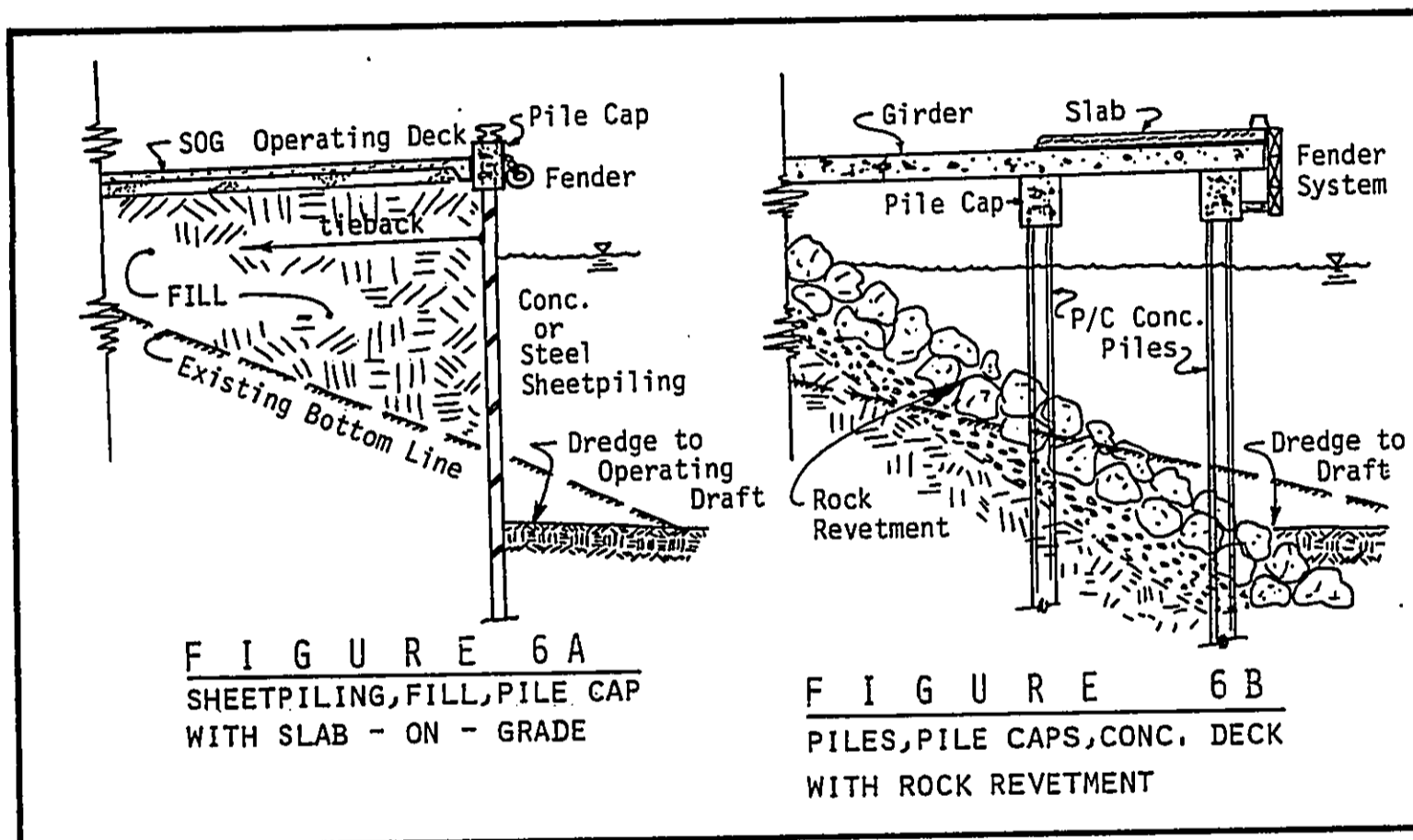
WIND DATA. The seasonal and diurnal variations in wind direction are shown in Figure 5. The relationship between direction and magnitude is indicated in

the wind rose shown in the left of Figure 1.



CURRENTS. The currents observed (Reference #2) within Kahului Harbor were caused by tidal fluctuations or offshore rip currents due to wave run-up. The tidal currents were erratic at the center shoreline of the Harbor where eddies and rip currents were common. However, observations along the north-east shoreline (at Pier 1) were very consistent, with a clockwise flow indicated for both ebb and flood tide conditions. Velocities were usually less than 0.1 knots. In the vicinity of the proposed pier, very weak currents should be expected, generally moving clockwise along shore to the west.

IMPACT OF PROPOSED CONSTRUCTION. There are two basic configurations being considered for the proposed pier. The first is a sheet piling bulkhead, backfilled with an on-grade working surface. The second is a pile-girder framing system with a supported deck area. These alternatives are shown schematically in Figures 6A and 6B.



At this site, the sheet pile bulkhead would be the least cost solution. However, this type of structure causes a significant reflection of incident wave energy. Analyzing the natural frequency of the basin area between Piers

1 and 2, a primary natural frequency of approximately 2.4 minutes is computed. Therefore, the construction of a highly reflective surface at the head of the pier should not induce a resonance problem. At this project site, all significant waves arrive nearly parallel to the face of the pier and will accordingly reflect directly. Based on preliminary design data, the new pier will occupy one-half of the head of the project basin. Since a reflected wave will only have one-half the crest width of the incident wave, the significant heights induced by summation of the incident and reflected waves will decrease from the new pier face. After construction of a sheetpile system a maximum wave build-up of 1.8 times the arriving wave height should be expected adjacent to the new pier. At the head of Pier 2, the reflected wave would be diffracted to less than one-fourth the arrival height. Therefore, a wave train with a significant height of five feet could theoretically induce a nine foot wave adjacent to a new sheetpile pier structure, and a height of six feet at the head of the project basin. In general, Pier 1 will not be affected by reflected wave energy from the new pier.

The net effects of this wave reflection on operations at Pier 2 and at the new pier is dependent on the characteristics of the ships moored at the piers. Based on the wave climate developed for the harbor (see Table 9), the effects of the increased wave height were calculated and are tabulated in Table 10.

Table 10. TOTAL SIGNIFICANT WAVE HEIGHT DUE TO SUMMATION OF INCIDENT AND REFLECTED WAVES
In days of occurrence/year

CONDITION	Maximum Hieght, Feet				
	0 - 1	≤2	≤3	≤4	≤5
Existing at New Pier Site *	335.0	360.7	364.2	364.78	364.96
Expected After Sheet-Piling Pier Constructed	251.25	354.28	363.33	364.64	364.90
Existing @ Midpoint of Pier 2 *	335.0	360.7	364.2	364.78	364.96
@ End Pier 2 Expected After New Pier Construction	293.1	357.49	363.76	364.71	364.91

*Construction of absorbing pile-revetment pier structure will not significantly change existing conditions.

In general, for the normal operations expected at the new pier, mooring should be limited to conditions when significant waves are two feet or less. As shown in Table 10, normal operations could be conducted at the new Pier approximately 361 days per year if no intensification of waves due to reflection were to occur. Constructing a reflective sheet-pile structure would reduce this to 354 days, or a loss of 6 operating days per year. The effects on Pier 2 can be estimated by assuming a maximum tolerable wave height of three feet. The loss in operational days at Pier 2 would be ½ day (from 364.2 days/year to 363.8 days/year).

The preliminary construction cost for a sheetpile pier configuration is \$960,000.00. A pile-girder system would cost \$1,280,000.00 to construct. Based on an effective 40 year project life, zero salvage value and an 6% annual percentage rate for capitalization, the equivalent annual costs to amortize the pier would be \$63,800.00 and \$85,070.00 or an equivalent annual difference of \$21,270.00. The loss in operating days would be 6 days at the new pier and ½ day at Pier 2. The daily mooring fees would average \$100 - \$150/day. An additional lost time cost to boat operator's standing by to dock during high wave conditions can be estimated at \$750/day. Total lost cost from wave intensification due to reflection is then \$1000/day or a maximum \$5000/year. Compared to an annual first cost differential of \$21,270.00 the sheetpile system is the logical economical choice.

The new pier construction will have negligible effect on currents within the harbor. The net current will continue to be a weak clockwise circulation, regardless of the new pier configuration. There will be little impact on the adjacent harbor shoreline, and no measurable erosion will be induced. Except for reflected wave energy as previously discussed, no changes in the oceanographic characteristics of Kahului Harbor will occur due to this proposed pier. In general, the area being affected by reflected wave energy will be limited to the basin between Piers 1 and 2.

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