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Revised
ENVIRONMENTAL IMPACT STATEMENT for

KAILUA-KONA SEWERAGE SYSTEM, PHASE IV (NORTHERN ZONE)

Kailua-Kona, Hawaii

JULY 1981

PREPARED FOR:

Department of Public Works
County of Hawaii

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DEPARTMENT OF PUBLIC WORKS
COUNTY OF HAWAII

REVISED

ENVIRONMENTAL IMPACT STATEMENT

FOR THE

KAILUA-KONA SEWERAGE SYSTEM
PHASE IV (NORTHERN ZONE)

This Environmental Document is Submitted
Pursuant to Chapter 343, HRS

PROPOSING AGENCY:

Department of Public Works
County of Hawaii
25 Aupuni Street
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ACCEPTING AUTHORITY:

Governor, State of Hawaii

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July 20, 1981
Date

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JULY 1981

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SECTION 1
SUMMARY

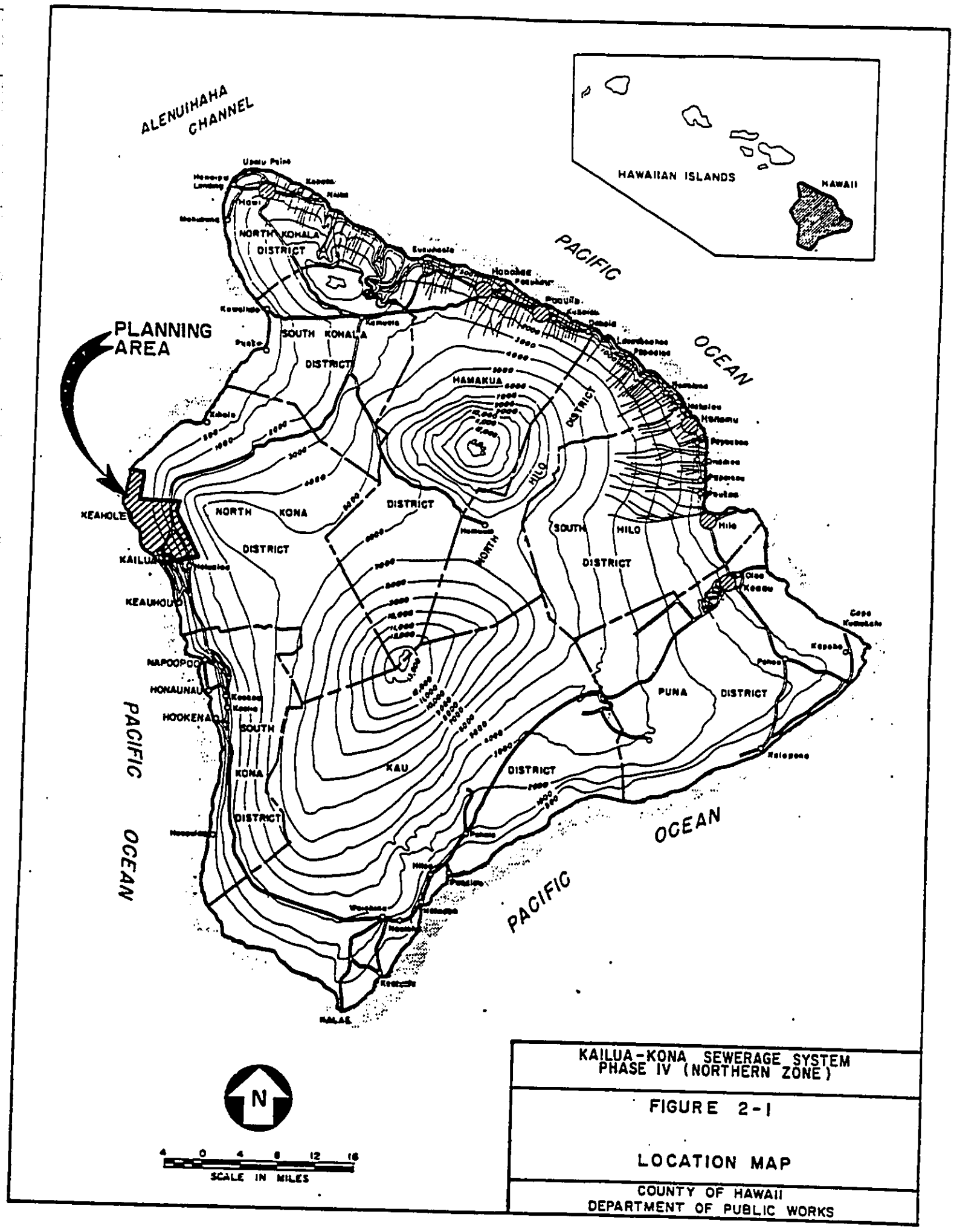
The North Kona District is experiencing a rapid growth in population. The 1980 census indicated a resident population of 13,898 which is a 187.7 percent increase over 1970. This major tourist destination is the fastest growing community in the State of Hawaii. The Kailua-Kona Sewerage System, Phase IV (Northern Zone) is required to ensure adequate wastewater facilities for both the Northern and Southern Zones of the District during the period 1985 to 2005.

The project includes an expanded collection system, a new treatment plant at Kealakehe near Honokohau Harbor and disposal via a new deep ocean outfall. The existing sewage treatment plant in Kailua-Kona will be abandoned. There have been many complaints on its present location within a built-up industrial area. Also, it is not capable of expansion to meet the anticipated flows foreseen during the design period.

The existing collection system will be expanded to accept the new sewage flows from the Southern Zone which will be sewered in the same time frame as the Northern Zone. A new 12-inch interceptor line will also be constructed on Palani Road to collect flows from the urbanizing Kealakehe subarea. A new 18-inch interceptor will also be constructed through Kailua-Kona to carry all of the collected sewage from the Northern and Southern Zones to a new sewage pumping station located near the old Kona Airport. The sewage will be pumped via a new 20-inch force main to the new treatment plant site on State lands at Kealakehe. The treatment plant will use the aerated lagoon process to reduce the sewage pollutants to prescribed standards for ocean discharge. The 30-inch ocean outfall will follow a natural terrain corridor to the shoreline where it will continue offshore to a very deep diffuser. The outfall diffuser will be placed to ensure that pollutants will not enter the nearshore Class AA waters and that all other State water quality standards are met. A design feature of the outfall will be the capability to divert treated effluent to land reclamation uses as those oppurtunities develop.

The beneficial impacts include the development of a cost-effective modern wastewater system adequate for the future needs of both the Northern and Southern Zones of the North Kona District. The many existing sewage cesspools and injection wells in this coastal sector are presently discharging to the groundwater. Their effluents are then moving to the shoreline and into the nearshore Class AA waters in violation of State water quality standards. The project will provide the means for collecting, treating and disposing of this wastewater in accordance with current Federal, State, and County regulations.

The primary adverse impacts will be related to the short-term construction activity. The long-term adverse impacts forecast are not believed to be significant because the project conforms to and supports the County General Plan.



KAILUA-KONA SEWERAGE SYSTEM
PHASE IV (NORTHERN ZONE)

FIGURE 2-1

LOCATION MAP

COUNTY OF HAWAII
DEPARTMENT OF PUBLIC WORKS

SECTION 2
PROJECT DESCRIPTION

A. PROJECT LOCATION

The project planning area is located on the west coast of the Island of Hawaii, State of Hawaii. This area is indicated on Figure 2-1. The Island of Hawaii is the largest island in the State of Hawaii. The State of Hawaii is located near the middle of the Pacific Ocean between 154°-40' and 156°-04" west longitude and 18°-54' and 20°-17' north latitude. The state is situated about 2,500 miles west of the California Coast.

The boundary limits of the Kailua-Kona (Northern Zone) planning area are delineated in Figure 2-2. The planning area covers a 5-mile wide and 8-mile long coastal sector of the west coast of the island from Ke-ahole Point southward to Kailua Bay.

B. PURPOSE OF PROJECT

1. Project Objectives

In April 1981 the County's Department of Public Works completed the project Facility Plan, entitled "The Facility Plan for the Kailua-Kona Sewerage System, Phase IV (Northern Zone)." This Environmental Impact Statement is the parallel study to assess the environmental impacts of the project. The Facility Plan developed the recommended wastewater system, using a rigorous methodology prescribed by the Federal Environmental Protection Agency. The objectives were to:

a. Comply with the requirements of the Amendments to the Federal Water Pollution Control Act contained in the Clean Water Act of 1977 (P.L. 95-217), the National Pollutant Discharge Elimination System (NPDES), and the National Environmental Policy Act (NEPA). The Facility Plan follows the rules and regulations promulgated in the Federal Register, Volume 39, No. 29 dated February 11, 1974 and Volume 43, No. 80 dated April 25, 1978.

b. Comply with State of Hawaii, Department of Health regulations on water pollution control. These regulations include Chapter 37: Water Pollution Control, Chapter 37A: Water Quality Standards, and Chapter 38: Private Wastewater Treatment Works and Individual Wastewater Systems.

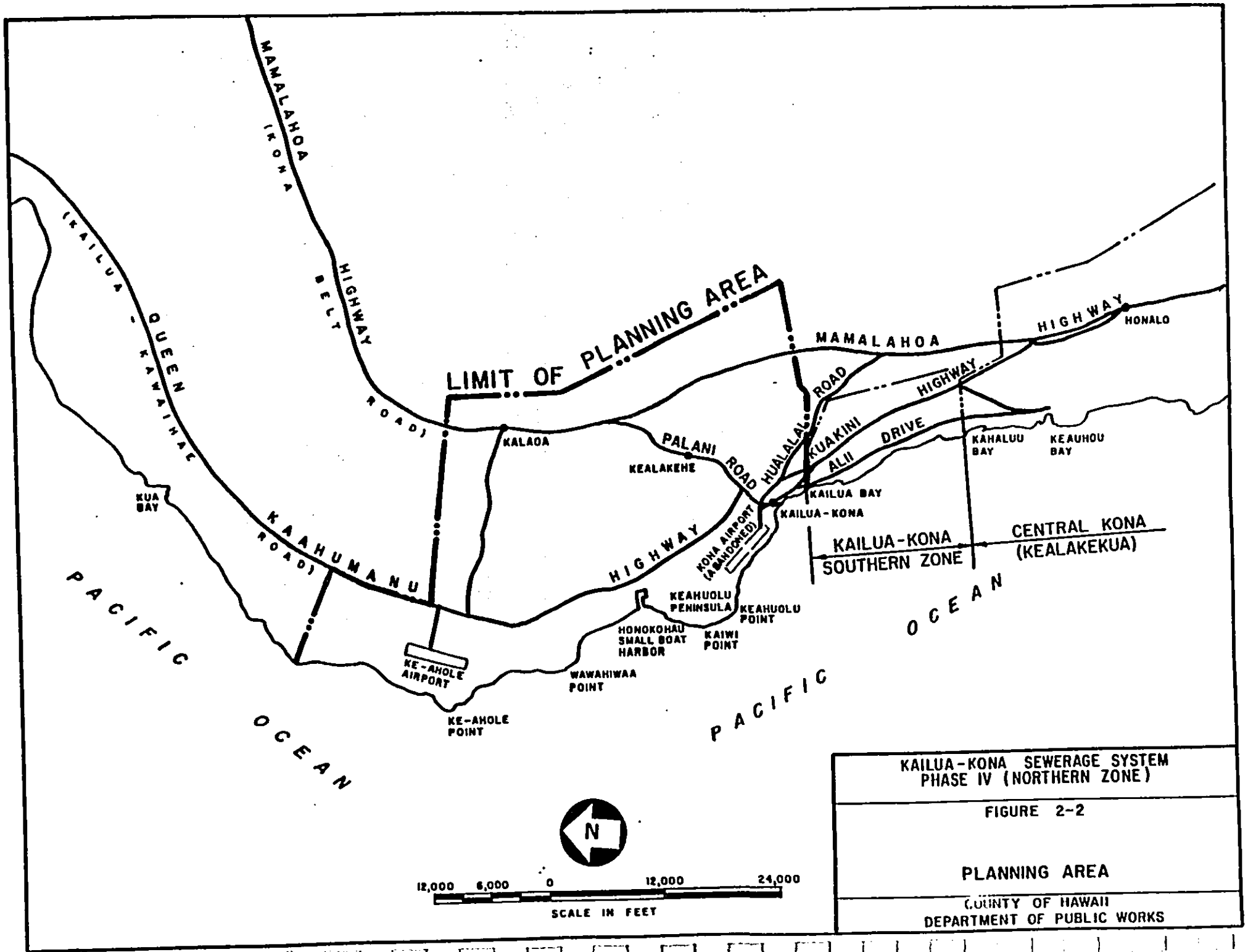
c. Define the relevant institutional, water quality, and socio-economic constraints on the facilities plan.

d. Develop alternatives and evaluate their cost-effectiveness for sewage collection, transmission, treatment, and effluent disposal, taking into account environmental impact and socio-economic factors.

2. Description of Problem

The existing Kailua-Kona Sewage Treatment Plant (STP) is rapidly approaching its design capacity of 1.0 million gallons per day (mgd). The present flow is approximately 0.6 - 0.7 mgd. This system serves only the resort hotels, commercial and industrial sources, and some high density residential developments (apartments and condominiums) in Kailua Village. The present treatment plant has remaining capacity to serve only the wastewater needs of the community for another 10 years, provided new flows from outside the village are not introduced into the system. The present system cannot accommodate the planned flows from the Southern Zone and the Kealakehe subarea.

The collection system has not been expanded to keep pace with the rapid development of the planning area. Several developments with large concentrations of wastewater flows presently are using cesspools for disposal because of the nonavailability of sewers. Injection wells are used to dispose of effluent from the Kailua-Kona STP and from a number of small package STP's in the Southern Zone. Because of the porous lava substructure, contamination of the groundwater and nearshore coastal water is a potential



KAILUA-KONA SEWERAGE SYSTEM
PHASE IV (NORTHERN ZONE)

FIGURE 2-2

PLANNING AREA

COUNTY OF HAWAII
DEPARTMENT OF PUBLIC WORKS

health hazard, especially in the low coastal areas where the groundwater moves directly into the protected nearshore Class AA waters. The proposed action is expected to eliminate the cesspool and injection well wastewater discharges to the shoreline in the densely populated coastal areas and to thereby protect the water quality in compliance with State water quality standards.

The Kailua-Kona STP site is inadequate for a centralized wastewater treatment plant to serve the long term needs of the planning area. The present location has the following shortcomings:

a. The two-acre site has no room for additional treatment units to accommodate the long term wastewater flow projections.

b. The plant occupies prime land at the center of the only commercial and industrial complex in Kona. The plant is now completely surrounded by development and is incompatible with the current land use.

c. There have been numerous complaints about odors from the surrounding property owners.

C. PROJECT BACKGROUND

1. Related Sewerage Plans for the Kona Districts

The Facility Plan for the proposed project is one of three facility plans recently prepared for the North and South Kona Districts of the Island of Hawaii. The other two facility plans are for the urbanizing areas south of this planning area and cover the Kailua-Kona Southern Zone and the Central Kona (Kealakekua) planning areas. The planning area for the Kailua-Kona Southern Zone extends from the southern boundary of the Kailua-Kona Northern Zone planning area to Kahaluu Bay, from the shoreline to Kuakini Highway. The Central Kona (Kealakekua) planning area covers a 3-mile wide sector between Kahaluu Bay and Kauhako Bay and includes the resort development at Keauhou Bay and the Kealakekua-Captain Cook Village center. These three facility plans

combined cover most of the populated areas in both Kona Districts. These facility plans were prepared according to the guidelines set forth by the Federal EPA Construction Grants Program.

a. Previous Sewerage Master Plans for the Kailua-Kona Area

Sewerage master planning for the Kailua-Kona area was initiated in the early 1960's. The initial sewerage plan was entitled "Report to the County of Hawaii Covering the Investigation, Studies, and Preliminary Plans With Recommendations for a Sewerage System Within the Kailua-Kona Area," May 1961. This report developed a plan for constructing a sewer system serving the resort hotels and the businesses within the village proper.

Following Statehood in 1959, Hawaii became a major tourist destination. The boom that followed affected all the resort centers, including Kailua-Kona. The rapid expansion in and around Kailua-Kona of the tourist industry required an adequate sewerage system to serve the area since the existing system was inadequate to handle all of the projected growth of the area.

A revised sewerage master plan was developed entitled "Supplement to the Sewerage Master Plan for the Kailua-Kona Area," November 1969, which addressed the immediate and future needs of the area. Because of the growth potential, the study area limits encompassed the area outside the Kailua-Kona Village. The study area was divided in two sections: the Northern Zone and Southern Zone. These sections encompass the areas which are now the Kailua-Kona Northern Zone and Kailua-Kona Southern Zone planning areas, respectively. This concept of zones was based on the following considerations as excerpted from the report.

"1. The southern zone is not anticipated to develop in conjunction with, nor as rapidly as the northern zone. Therefore, construction of new sewers and supporting sewage facilities should initially be concentrated in the northern zone.

2. An independent sewerage system for the southern zone would eliminate the need to presently design and oversize any initial facilities constructed in the northern zone, to accommodate flows anticipated from the southern zone in the future. This would minimize initial capital expenditures.

3. An independent sewerage system for the southern zone would provide the flexibility to provide for any changes in planning, zoning and development in this relatively undeveloped region. Further, the Keauhou area, just south of this study area, is also subject to immediate development. A treatment facility located on the south end of this study area could well include service to these lands at Keauhou.

4. Two separate treatment facilities as recommended, would reduce the required sizes of interceptor sewers and the need for large capacity pumping stations. Moreover, it would reduce the time interval to convey sewage from its farthest origin to a treatment facility, thus reducing the chances of septicity and odors."

Based on the recommendations of this report, the existing Kailua-Kona collection system and treatment plant was expanded in 1972 to accommodate the projected flows from the Kailua-Kona Village limits.

b. County Water Quality Management Plan

The "Water Quality Management Plan for the County of Hawaii" was published by the State Department of Health and the County of Hawaii in December 1980. It was prepared as a County-wide water quality planning document, as prescribed by Section 208 of the Federal Water Pollution Control Act Amendments of 1972. This project was developed as a component of the County Water Quality Management Plan.

c. Areawide Wastewater Management Plan

Subsequently, the 1972 Amendments to the Federal Water Pollution Control Act (P.L. 92-500) were promulgated. This Act appropriated an unprecedented amount of Federal funds through a grants program for the construction of wastewater treatment facilities. This Act set the basic goals for water quality and mandated that (1) the discharge of pollutants into the nation's navigable waters be eliminated by 1985, and (2) "fishable and swimmable" waters be attained wherever possible by July 1, 1983. In addition, the Act states that;

> "It is the national policy that areawide waste treatment management planning processes be developed and implemented to assure adequate control of sources of pollutants in each State."

As the first step in complying with this Act, the County of Hawaii developed a wastewater management plan for the Kailua-Kona area entitled "Areawide Wastewater Management Plan for North Kona," December 1976. The limits of the study area were identical to the limits defined in the 1969 report and followed the same North and South Zone concept. The report recommended separate sewerage systems for each zone.

The Clean Water Act (CWA) of 1977 (Public Law 92-217) which amended Public Law 92-500 was signed into law in late 1977. The CWA contained several significant changes among which were (1) the requirement that existing plans evaluate the use of innovative and wastewater reuse alternatives, (2) the facility plan must address potential recreation and open space opportunities of a proposed treatment works, (3) the facility plan must evaluate the reduction of energy requirements, (4) the eligibility of small individual systems for Federal funding and (5) a limited design period of 20 years (after construction is completed.)

Because of these new requirements, the "Areawide Wastewater Management Plan for North Kona" was reevaluated and a revised wastewater management plan was developed entitled "Supplement to the Areawide Wastewater Management Plan for North Kona." The most cost-effective system recommended was a centralized collection system for both the Northern and Southern Zones, with a centralized treatment facility located in the Northern Zone for both the Northern and Southern Zone flows, with the effluent disposed by irrigation or by ocean outfall. The areawide plan meets the intent of the CWA.

In conformance with the Areawide Plan, the Facility Plan for the proposed project developed a plan for a sewerage system for the Northern Zone, with provisions for accommodating the flows pumped into it from the collection system of the Southern Zone.

D. EXISTING WASTEWATER SYSTEMS

1. Kailua-Kona Sewerage System

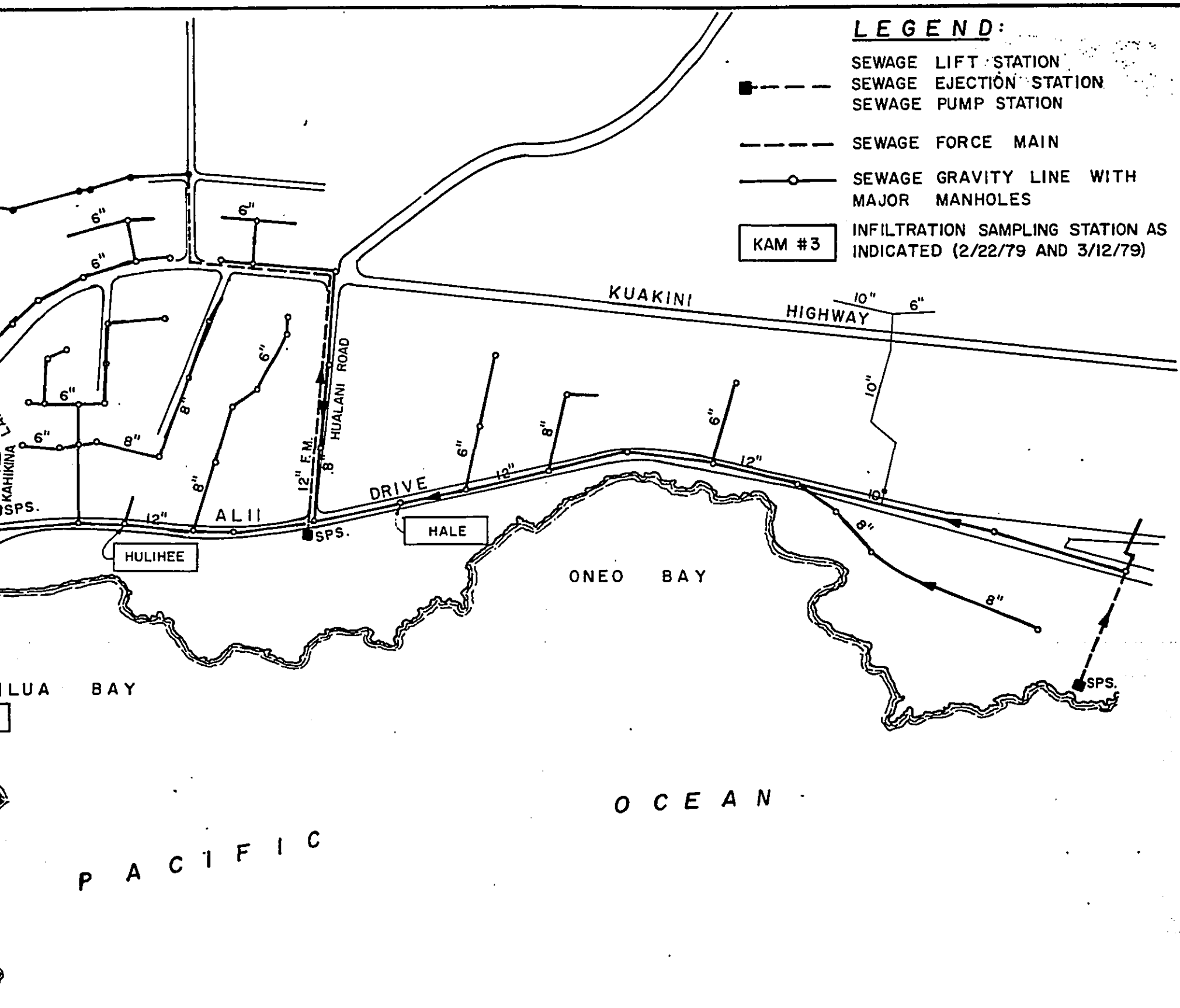
The present Kailua-Kona sewerage system was constructed in the mid 1960's to serve the hotels, apartments, townhouses, commercial and

industrial sources, and the more densely populated residential areas in Kailua-Kona. The collection system consists of gravity laterals and sewers, manholes, pumping stations and force mains. Approximately 14,000 lineal feet of piping are in serviceable condition, of which 12,500 lineal feet are gravity flow sewers ranging in stock pipe sizes of 6 to 20 inches. The remaining 1,500 lineal feet are force mains. The collection system configuration is shown in Figure 2-3.

The Kailua-Kona STP is operated and maintained by the County of Hawaii. The design capacity of this treatment plant is 1.0 million gallons per day (mgd).

The Kailua-Kona STP (Figure 2-4) utilizes the Chicago Pump Co. "Rapid Bloc" unit for secondary treatment. Salient features include a 20-inch influent pipe, a comminution channel and grit chamber, the "Rapid Bloc" aeration and settling tanks, a chlorine contact tank, an effluent polishing reservoir, aerobic digestion tanks, and sludge drying beds. Supporting facilities consist of a control building, an enclosing protective chain link fence and pertinent operational utilities. The effluent is used intermittently to irrigate a County park near the old Kona Airport. During non-irrigating periods, the effluent is stored in a holding pond with overflow from the pond disposed in an injection well. The dried sludge is utilized by local farmers as fertilizer.

There are six sewage pumping units which are identified by their location as: (1) the lift station at Hulihee Palace (2) the ejector station at the Pier, (3) the pump station at the intersection of Kuakini Highway and Palani Road, (4) the pump station near the Kona Inn, the pump station at the Kona Hilton Hotel, and the lift station off the Kuakini Highway servicing the light industrial area. The only operational problem stems from a periodic excessive accumulation of grease



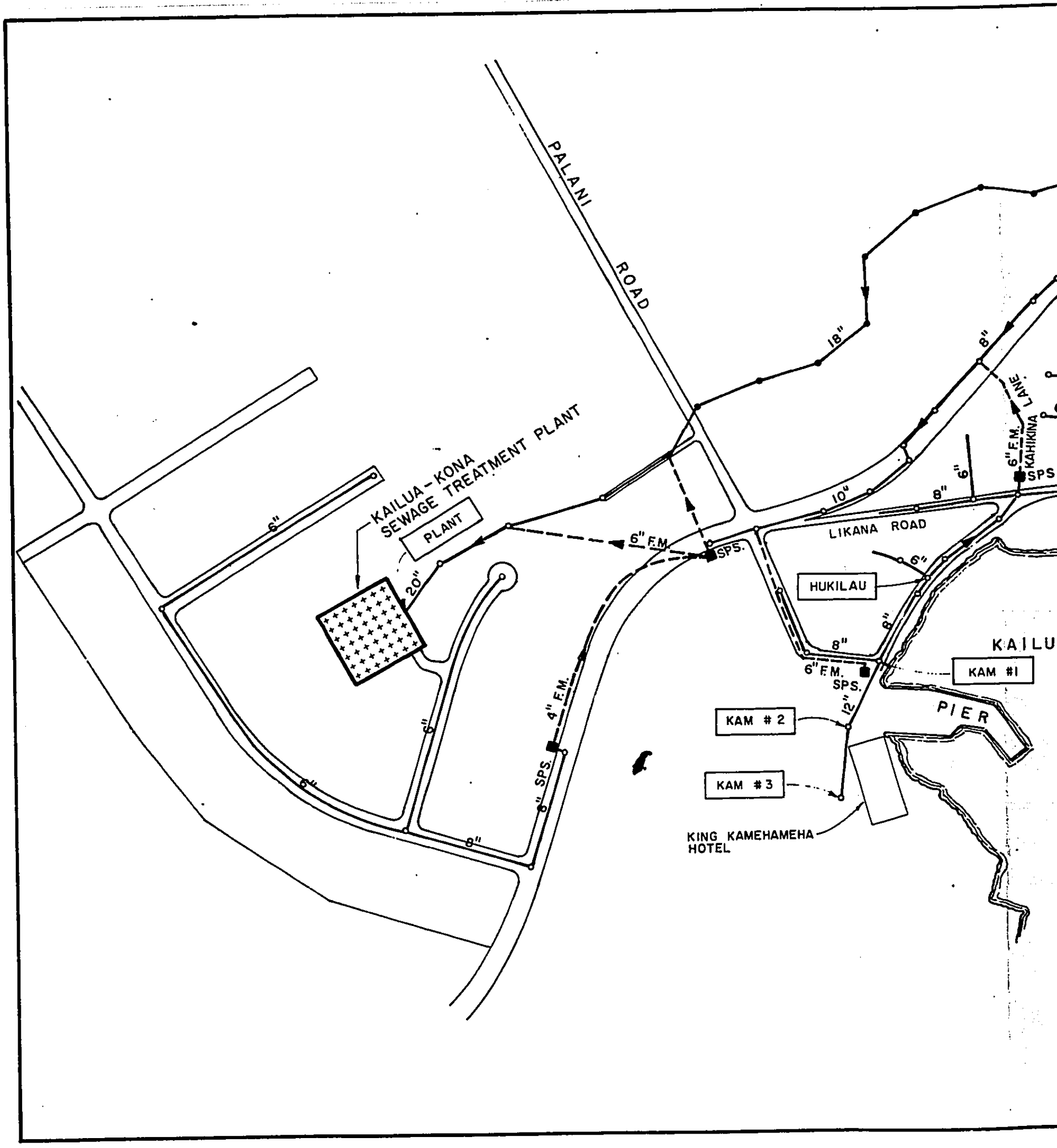
400 0 400 800
Scale in Feet

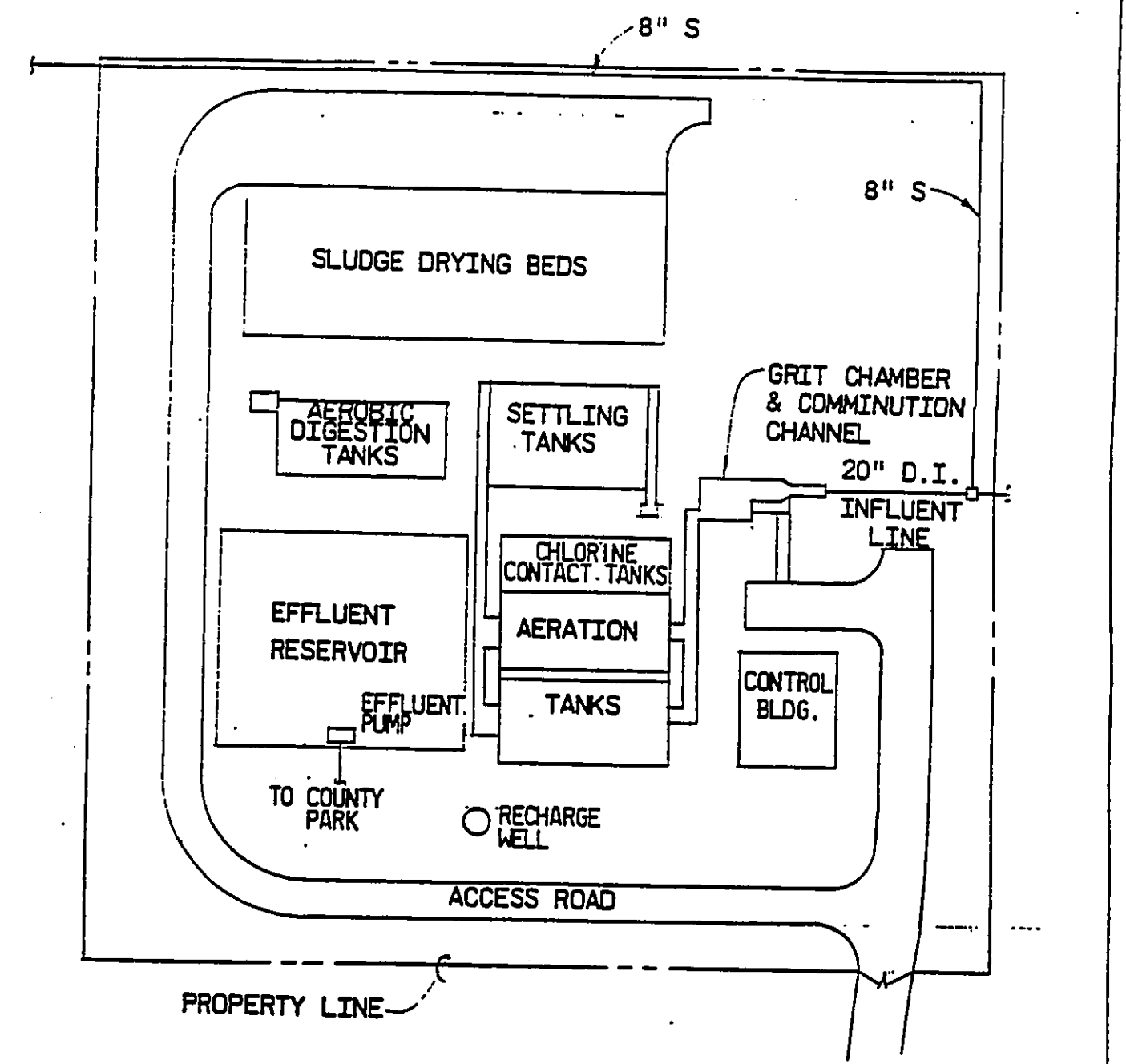
KAILUA-KONA SEWERAGE SYSTEM
PHASE IV (NORTHERN ZONE)

FIGURE 2-3

EXISTING SEWERAGE SYSTEM

COUNTY OF HAWAII
DEPARTMENT OF PUBLIC WORKS


PALANI ROAD
KAILUA-KONA SEWAGE TREATMENT PLANT
PLANT
6"
20"
6" F.M.
SPS.
4" F.M.
6" SPS.
8"
18"
10"
8"
6"
6" F.M.
KAHIKINA LANE
SPS
LIKANA ROAD
6"
HUKILAU
8"
8"
6" F.M.
SPS.
12"
KAM #1
KAM #2
KAM #3
KING KAMEHAMEHA HOTEL
PIER
KAILU



KAILUA-KONA SEWERAGE SYSTEM
PHASE IV (NORTHERN ZONE)

FIGURE 2-4

LAYOUT OF 1.0 MGD KAILUA-KONA SEWAGE TREATMENT PLANT

COUNTY OF HAWAII
DEPARTMENT OF PUBLIC WORKS

in the wet wells. This is now broken up manually when required. This grease accumulation is reportedly from the hotels' kitchens and results from poor maintenance of the kitchens' grease traps.

3. Unsewered Areas

Cesspools are the primary means of household waste disposal in the unsewered areas within the village and elsewhere in the planning area. The State of Hawaii, Department of Health (1978) estimates there are nearly 1,200 cesspools in the planning area. There has been no reported cesspool overflows in the planning area. The Department of Health reports that there have been only about 50 reported cesspool failures for the entire island, indicating a very low cesspool failure rate. This is due to the porous lava rock in the area. This porosity also permits the cesspool effluent to reach the groundwater and eventually to move into the nearshore ocean waters.

E. GENERAL DESCRIPTION OF THE ACTION'S CHARACTERISTICS

1. Subarea Evaluation

The planning area was subdivided into five subareas since each subarea has unique features which are best evaluated independently of each other. The subarea boundaries as shown in Figure 2-5 were influenced by the following considerations:

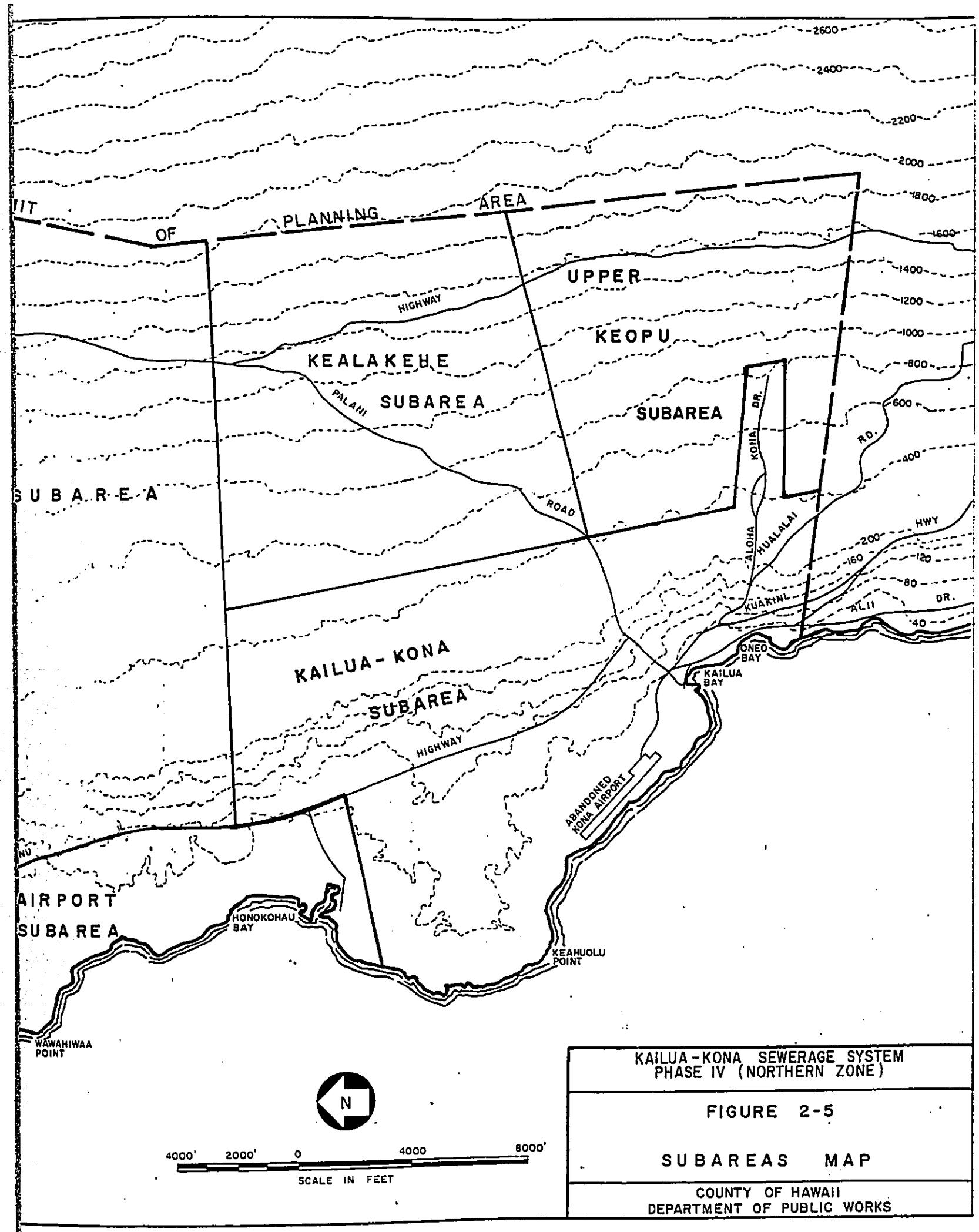
a. The land development plans of the large landowners.

b. The County of Hawaii's General Plan policy to centralize urban growth in the Kailua-Kona Village and the General Plan's land use policies.

c. The population projections and distribution in the planning area.

d. The limitations of the existing wastewater facilities serving Kailua-Kona.

The description of each subarea is discussed below.

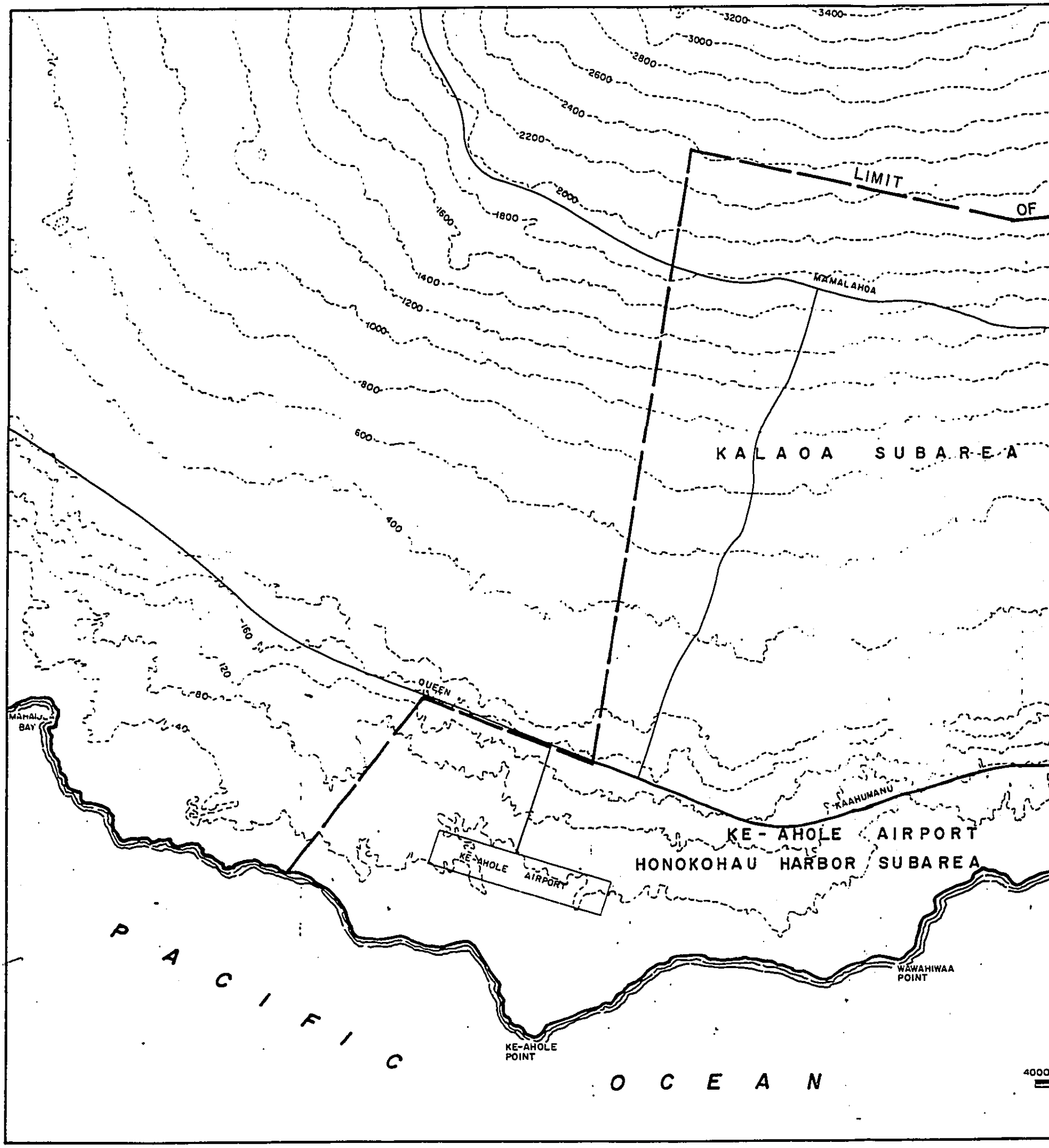


KAILUA-KONA SEWERAGE SYSTEM
PHASE IV (NORTHERN ZONE)

FIGURE 2-5

SUBAREAS MAP

COUNTY OF HAWAII
DEPARTMENT OF PUBLIC WORKS


3400
3200
3000
2800
2600
2400
2200
2000
1800
1600
1400
1200
1000
800
600
400
160
120
80
40
LIMIT
OF
MAMALAHOA
KALAOA SUBAREA
QUEEN
MAHAI'ULA BAY
KAAHUMANU
KE-AHOLE AIRPORT
KE-AHOLE AIRPORT
HONOKOHAU HARBOR SUBAREA
PACIFIC
OCEAN
WAWAHIWAA POINT
KE-AHOLE POINT
4000

a. Kailua-Kona Subarea

This subarea encompasses the major area of development within the planning area. Portions of this subarea are already sewered to accommodate the large commercial and resort developments within the Kailua Town area.

The County-operated Kailua Sewage Treatment Plant is located in this subarea.

This subarea has land presently zoned resort, industrial, commercial and single and multiple family residential uses.

b. Kealakehe Subarea

This subarea covers the central eastern half of the planning area, includes the ahupuaas of Kealakehe and Keahuolu. The land in this subarea is presently zoned for low density residential and agricultural uses. Lilioukalani Trust Estate owns the ahupuaa of Keahuolu and the State of Hawaii owns the lower portion of the ahupuaa of Kealakehe.

Residential developments are concentrated along Mamalahoa Highway and along Palani Road. The remainder of the area is used for agriculture purposes.

The State of Hawaii has several high density housing projects in this area for which dry sewers were installed in anticipation of a future sewerage system in the area. The Kealakehe Elementary School is also located in this subarea.

c. Kalaoa Subarea

This subarea includes the northern half of the planning area above the Queen Kaahumanu Highway.

Although this subarea is zoned for agricultural use, almost half of the area has developed into residential subdivisions. Most of the residential subdivisions are concentrated west

of Mamalahoa Highway. Presently, these lots are only 20-30 percent occupied. Cesspools are being used as the means for wastewater disposal.

The State has set aside about 200 acres of land in the northwest corner of this subarea for an agricultural park. These lots will range from 5-15 acres in size.

d. Upper Keopu Subarea

This subarea is located at the south end of the planning area above Kailua Town and south of Palani Road. Presently, the land uses are agriculturally oriented. Although some low density and medium density land uses are designated on the General Plan Land Use Allocation Map, urbanization is not expected within the planning period time frame. Most of the land in this subarea is privately owned.

e. Ke-ahole Airport - Honokohau Harbor Subarea

This subarea includes most of the undeveloped land between the Queen Kaahumanu Highway and the coastline north of Kailua-Kona. Most of the lands in this subarea is owned by the State of Hawaii. Located in this subarea are Ke-ahole Airport, Honokohau Harbor, and the proposed Ka-Loko Hono-ko-hau National Cultural Park.

No residential subdivisions are anticipated to develop within this subarea during the planning period. Therefore, no population forecasts were done for this subarea.

All the land in this subarea is within the Special Management Area and developments in this area must therefore comply with the rules and regulations of the Hawaii Coastal Zone Management Program.

2. Subareas to be Sewered

The conventional wastewater collection system was considered as the cost effective alternative for the Kealakehe and Kailua-Kona subareas. This determination was based on the following considerations:

a. Population densities are highest in these subareas and the quantity of raw wastewater presently being discharged by cesspools may be considered as a point source of pollution.

b. Proximity of unsewered sections of these subareas to the existing Kailua-Kona system. The collection system can be readily expanded into these unsewered areas.

c. The centralized system is much more reliable and cost effective in achieving the desired water quality than the other wastewater management alternatives.

d. The County General Plan Land Use Allocation Map indicates urban type land uses in the areas proposed to be sewered. The proposed action is compatible with these land uses.

The no immediate action (no project) alternative is recommended for the remaining subareas of Upper Keopu, Kalaoa, and Ke-ahole Airport-Honokohau Harbor. This determination to continue the present wastewater disposal practices, i.e., cesspools, was based on the low population density, land use (agricultural and conservation), low projected wastewater flows and the excessive fiscal impacts associated with the other treatment and disposal alternatives. With the no immediate action alternative, water pollution control measures for existing and new developments will continue to be enforced under the existing State Department of Health Regulations. Existing and new homes in these subareas will continue to use cesspools or other private on-site wastewater systems.

3. Features of the Proposed Action

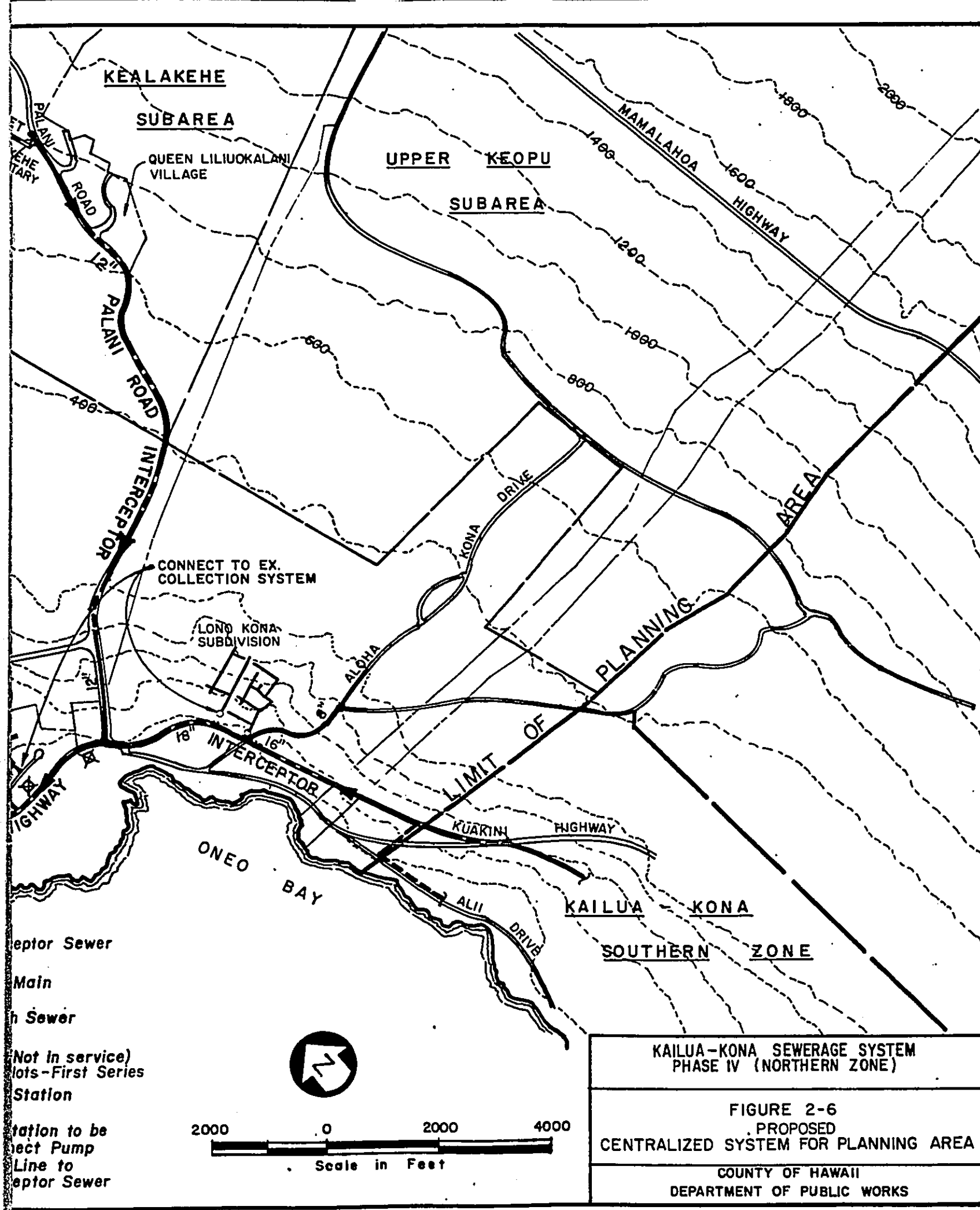
The proposed action will involve expansion of the existing Kailua-Kona collection system to sewer the recently developed urbanized areas. The expansion will also accommodate the entire Kailua-Kona Southern Zone wastewater flows. The existing Kailua-Kona STP will be abandoned and a new treatment facility will be constructed on State land adjacent to Honokohau Harbor. Effluent will be disposed by land reclamation.

The essential features of the proposed project are shown in Figure 2-6 and are described below:

a. Wastewater Collection System

The existing Kailua-Kona collection system has a capacity of 1.0 mgd. Only large wastewater flow sources such as hotels, restaurants, and shopping complexes are connected to the system. Numerous detached dwellings and business establishments within the village are not connected. All of these wastewater sources will eventually be required to connect to the system at which time the flow will reach the system's capacity. However, the urban fringes of the village have no collection system and cesspools are the primary means of disposal. The existing collection system does not have excess capacity to include all of the existing flows from the urban fringe area.

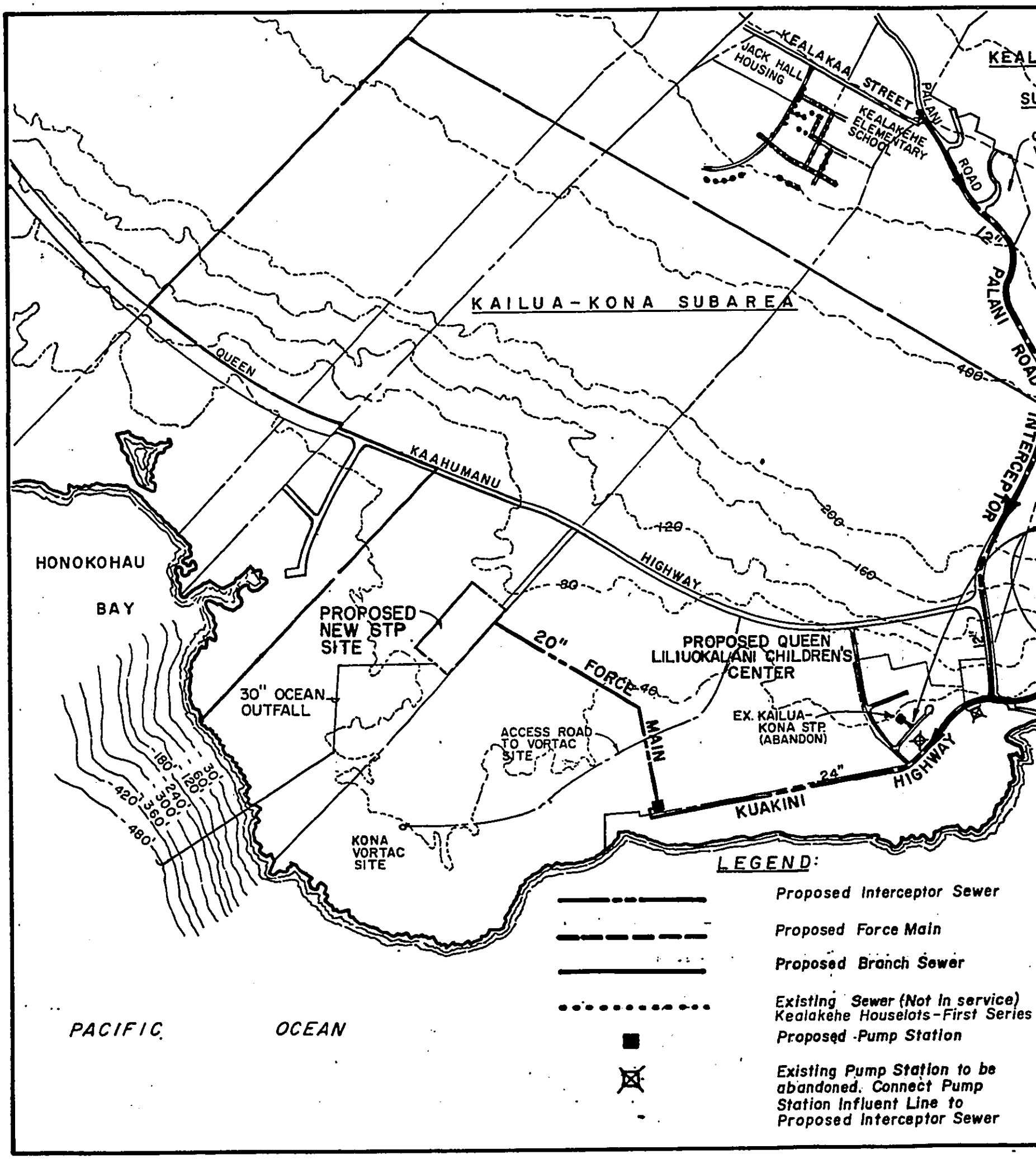
The projected wastewater flow of 1.48 mgd for the Kailua-Kona subarea for the year 2005 is greater than the capacity of the present collection system. With the introduction of the Southern Zone flows, the existing collection system will be very inadequate. Introducing the Southern Zone and the urban fringe flows to the existing collection system would require major changes in existing gravity sewer sizes and larger pump stations. Therefore, it is recommended that a separate interceptor sewer system for the Southern Zone flows and branch sewers for the unsewered tributary areas of Kailua-Kona be provided.



KAILUA-KONA SEWERAGE SYSTEM
PHASE IV (NORTHERN ZONE)

FIGURE 2-6
PROPOSED
CENTRALIZED SYSTEM FOR PLANNING AREA

COUNTY OF HAWAII
DEPARTMENT OF PUBLIC WORKS


KEALAKAA STREET
JACK HALL HOUSING
KEALAKEHE ELEMENTARY SCHOOL
PALANI ROAD
12"
PALANI ROAD INTERCEPTOR
KAILUA-KONA SUBAREA
QUEEN KAAHUMANU HIGHWAY
HONOKOHAU BAY
PROPOSED NEW STP SITE
30" OCEAN OUTFALL
20" FORCE MAIN
PROPOSED QUEEN LILIUOKALANI CHILDREN'S CENTER
EX. KAILUA-KONA STP. (ABANDON)
ACCESS ROAD TO VORTAC SITE
24"
KUAKINI HIGHWAY
KONA VORTAC SITE
PACIFIC OCEAN
LEGEND:
Proposed Interceptor Sewer
Proposed Force Main
Proposed Branch Sewer
Existing Sewer (Not in service) Kealakehe Houselots-First Series
Proposed Pump Station
Existing Pump Station to be abandoned. Connect Pump Station Influent Line to Proposed Interceptor Sewer

The collection system proposed for the subarea consists of two subsystems: the existing collection system and a new interceptor sewer along Kuakini Highway. The existing collection system will be expanded to sewer the Lono Kona Subdivision. Flows from this subdivision had been planned and provided for during the design of the system.

The new interceptor sewer will originate at the boundary between the Northern and Southern Zones where the Southern Zone flow is introduced. This interceptor sewer will sewer the remaining unsewered tributary areas of Kailua-Kona. Because of the topography, gravity flow is provided along Kuakini Highway to the old Kona Airport. A sewage pump station is required at the northern end of the abandoned runway for transmission of the wastewater to the new treatment plant site.

With the abandonment of the Kailua-Kona STP, the flows from the existing system can be diverted to the new Kuakini Highway interceptor sewer as follows:

(1) Connect the influent line of the sewage pump station at the Palani Road-Kuakini Highway intersection to the new interceptor. This pump station can be abandoned.

(2) Connect the influent line for the sewage pump station serving the industrial lots subdivision to the new interceptor sewer and abandon the pump station.

(3) Install a gravity line from the influent junction box at Kailua-Kona STP to a nearby trunk sewer.

The Kealakehe subarea flows will be carried by a new 12-inch Palani Road interceptor which will follow the existing Palani Road alignment down to a connection with the proposed Kuakini Highway interceptor.

b. Wastewater Treatment

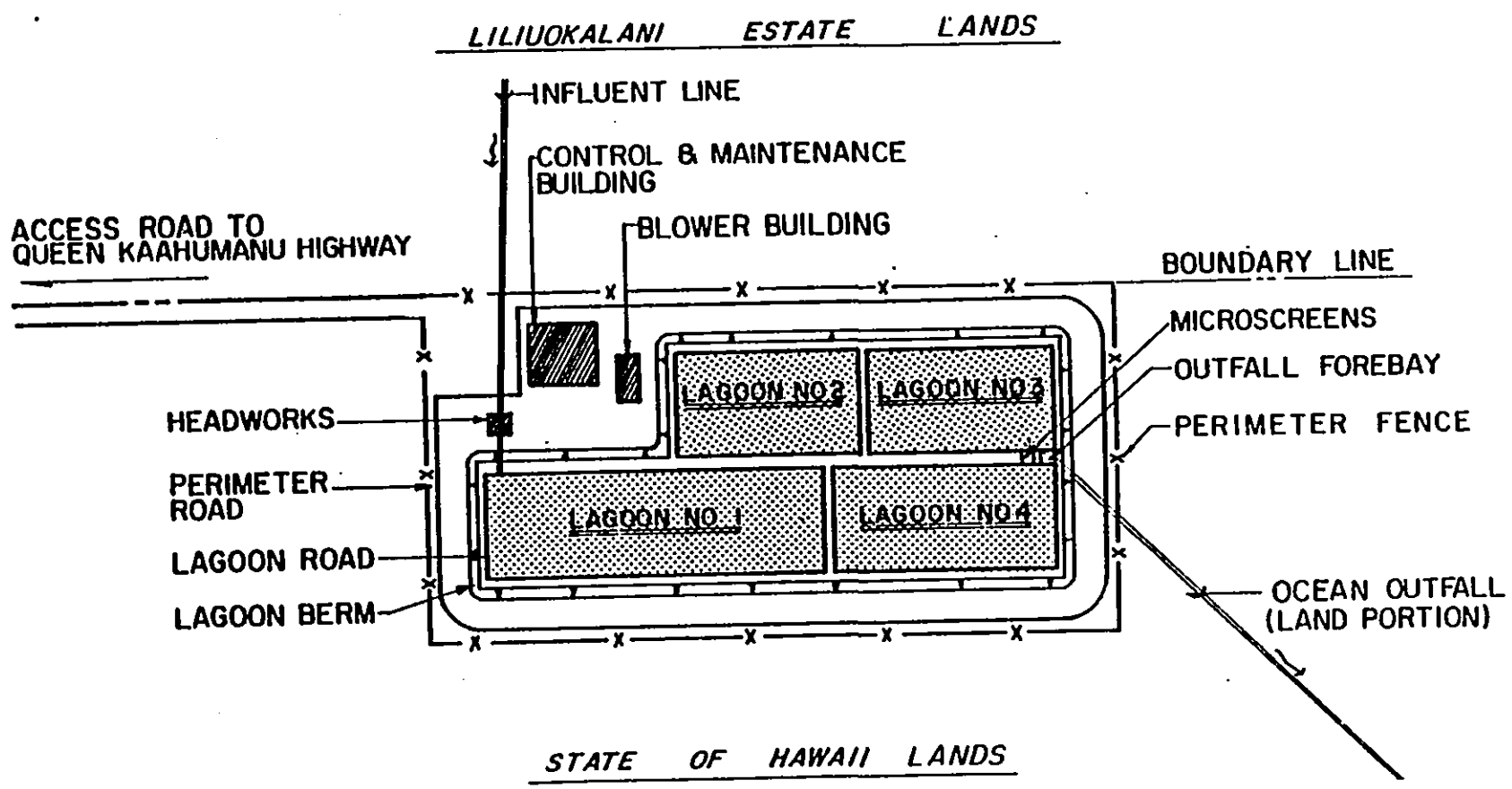
The existing Kailua-Kona Sewage Treatment Plant will be abandoned and a new treatment facility (Figure 2-7) with a design capacity of 2.8 mgd will be constructed near Honokohau Harbor. The State Department of Land and Natural Resources has already committed 25 acres of land at Kealakehe for the treatment facility and has been requested to expand the site to the required 30 acres. However, the specific location of the committed lands has not been finalized.

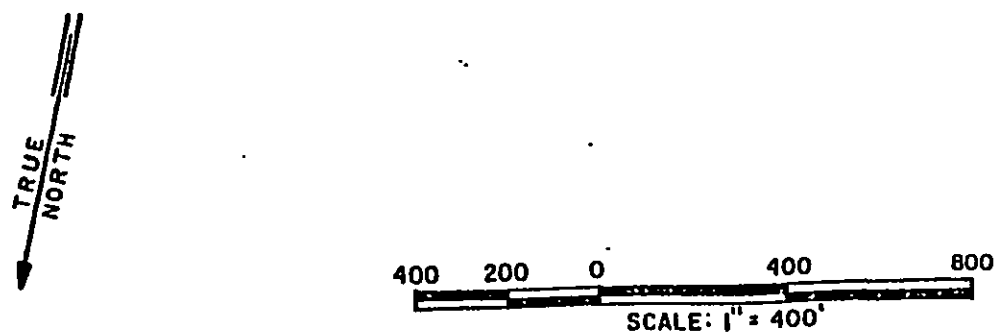
The most cost effective treatment process is aerated lagoons because of its low operation and maintenance costs. The lagoons will achieve secondary treatment using the complete mix aerobic system. Solids will settle to the bottom of the lagoon and will not require disposal.

c. Effluent Disposal

It is recognized by the Federal, State and County agencies that disposal by land reclamation is the preferred method of effluent disposal. However, there is no significant immediate application for land reclamation of the planned flow of 2.8 mgd at this time in the Kealakehe area. The planned disposal of the treated effluent by deep ocean outfall offers an immediate, simple and effective means of disposal. This outfall will be designed with a forebay at the treatment plant which will permit diversion of treated effluent to land reclamation opportunities as they develop at nearby golf courses and other recreational areas such as parks.

The ground elevations at the treatment plant will permit gravity flow in the outfall, thereby eliminating the requirement for a pumping station. The buried 30-inch pipe will be placed in the natural corridor leading from the treatment plant site and through the lava fields to the buried shoreline junction box.





KAILUA-KONA SEWERAGE SYSTEM
PHASE IV (NORTHERN ZONE)

FIGURE 2-7
PROPOSED WASTEWATER TREATMENT PLANT LAYOUT

COUNTY OF HAWAII
DEPARTMENT OF PUBLIC WORKS

The ocean portion of the 30-inch outfall will be a ductile iron pipe buried in a trench near the shore to protect it from wave attack. It will descend to an ocean depth of approximately 500 feet at a distance of approximately 2,000 feet from shore. It will terminate in a diffuser designed to attain the desired dilution and effluent plume submergence. The design of deep ocean outfalls has advanced sufficiently in recent years to ensure the desired compliance with State water quality regulations and the avoidance of the Class AA waters extending 1,000 feet offshore in this coastal sector.

Appendix A, "Effluent Disposal Alternatives" discusses the three disposal alternatives of irrigation (land reclamation), injection wells and ocean outfalls. In particular, it describes the flow of injection well effluent to the nearshore waters. This characteristic would negate the use of injection wells in any wastewater system designed to keep pollutants from the Class AA nearshore waters.

Appendix B, "Disposal by Ocean Outfall," provides additional information on the preliminary outfall investigation completed in the planning area and on outfall planning considerations.

4. Arrangements for Implementation

a. Institutional Responsibilities

The County of Hawaii is responsible for implementing the proposed project. The Department of Public Works is the agency authorized to implement each phase of the project to completion. The Department of Public Works is required to prepare the project construction plans and specifications, arrange for the necessary funding, arrange for construction, conduct project inspections, obtain all necessary permits and clearances, operate and maintain the facilities, and collect sewer user charges.

The project will be funded under the U. S. EPA Construction Grants Program. Under this program, the total costs of the project are shared jointly by the

Federal (75 percent), County (15 percent), and State (10 percent). The Department of Health is the State agency responsible for administering the Construction Grants Program. The Department of Health is responsible for determining the amount and timing of Federal assistance to each County for which treatment works is needed.

Under the program, sewer collection systems are eligible for Federal assistance but have very low priority. If Federal funding is not available, the Improvement District mechanism will be implemented whereby the affected property owners will be assessed for their share of the cost of the Improvement District Collector Sewers.

Operation and maintenance programs for these new facilities will be funded by sewer user charges. The County's Ordinance 61 established the sewer user charge program and set the monthly service charge for each category of users.

b. Implementation Steps

The construction of Federally assisted wastewater facilities is accomplished in three steps:

Step 1: Facilities Plan (and Environmental Impact Statement).
Step 2: Preparation of construction drawings and specifications.
Step 3: Construction of the facilities.

The Step 1 Facilities Plan has been completed. The schedule for implementing the last two steps of the project is shown in Table 2-1.

5. Project Costs

The total construction cost of the project includes the capital construction costs and the non-construction costs. The non-construction costs include the Step 2 cost of preparing the

TABLE 2-1

PROJECT IMPLEMENTATION SCHEDULE
BY PRIORITY

	Implementation Dates
A. Step 2 Plans and Specifications	
1a. Kuakini Highway Interceptor Sewer b. Sewage Pump Station and Force Main c. Sewage Treatment Plant d. Ocean Outfall System	Following Approval of Facility Plan (Sept 1981 - Sept 1982)
2. Palani Road Interceptor Sewer	When Funding is Available
3. Improvement District Collector Sewers	When Funding is Available
B. Step 3 - Construction	
Phase 1 - Wastewater Treatment Plant (Phase I)	Apr 1983 - Apr 1985
Phase 2a - Sewage Pump Station and Force Main	Apr 1983 - Apr 1985
Phase 2b - Kuakini Interceptor Sewer	Apr 1983 - Apr 1985
Phase 3 - Ocean Outfall System	Apr 1983 - Apr 1985
Phase 4 - Palani Road Interceptor Sewer	When Funding is Avail.
Phase 5 - Improvement District Collector Sewers	When Funding is Available
Phase 6 - Wastewater Treatment Plant (Phase II)	1995

plans and specifications of the proposed project and the additional expenses incurred as part of the Step 3 construction phase. Step 3 non-construction expenses include the cost of obtaining the necessary land and easements for the project, inspection costs, services of the Architect/Engineer, legal and administrative costs and interest costs during construction.

Under the Federal Construction Grants Program, certain costs are not eligible for Federal funding. For example, the specific costs of obtaining the land required for a sewage pump station, treatment facility, or sewer line are not eligible for Federal funding. These ineligible costs are shared by the property owner and the County.

The construction of the collector sewers is implemented through the County Improvement District (I.D.) regulations. The costs of the I.D. project are shared by the individual landowners within the I.D. and the County. The landowners are assessed at a rate of $0.08 cents per square foot for residential zoned property, $0.10 cents per square foot for commercial/industrial zoned property and $0.12 cents per square foot for hotel/apartment/resort property. The I.D. project costs are limited to the street sewer system and the sewage lift stations. The costs of backfilling cesspools and connecting the house laterals to the street sewers are borne by the individual landowners.

Under the Construction Grants Program, the construction costs of the transmission system for conveying the collected wastewater to the treatment facility is eligible for Federal funding. The eligible components are the interceptor sewers, sewage pumping stations and force mains.

The costs of operations, maintenance, and replacement of the treatment facilities are borne by the users of these facilities. The County has adopted a sewer user charge system whereby property owners are assessed costs to pay for these continuing expenses.

The total construction costs and the proportionate shares for the property owner, and County, State, and Federal governments are shown in Table 2-2. Anticipated sewer improvement district costs to property owners are detailed in Table 2-3.

TABLE 2-2

SUMMARY OF TOTAL CONSTRUCTION COSTS FOR SELECTED PLAN
AND TABULATION OF PARTICIPANTS' PROPORTIONATE SHARE
(COSTS AS OF SEPT. 1980)

	Total Construction Cost	Property Owners' Share	County of Hawaii Share	State of Hawaii Share	Federal Share
1. Backfill Cesspools, Install House Laterals	1,556,900	1,556,900	0	0	0
2. Improvement District Collector Sewers	2,940,600	411,900	2,528,700	0	0
3. Interceptor Sewers, Sewage Pump Station, Force Main	6,074,900	0	1,031,100	593,400	4,450,400
4. Wastewater Treatment Plant	7,888,200*	0	1,183,200	788,800	5,916,200
5. Effluent Disposal System	4,604,500	0	690,600	460,500	3,453,400
TOTALS	$23,065,100	$1,968,800	$5,433,600	$1,842,700	$13,820,000

*Land costs are not included (State land).

TABLE 2-3

SEWER IMPROVEMENT DISTRICT FINANCING COSTS TO PROPERTY OWNERS

	Capital Cost $/Sq.Ft.	Monthly User Charge	Hook-Up Charge	Cesspool Backfill Charge
Residential	$ 0.08	50% of Water Bill w/$5.00 Maximum	$1500-3000	$300-$500
Commercial/Industrial	$ 0.10	50% of Water Bill	$1500-3000	$300-$500
Hotel/Apt./Resort	$ 0.12	50% of W ter Bill	$1500-3000	$300-$500

EXAMPLE

5,000 Sq. Ft. Lot - Apartment

1. Initial Costs

A.	Capital Cost =	$ 600
B.	Hook-Up =	2,000
C.	Cesspool Backfill =	400
		$3,000

2. Monthly Costs

50% of Water Bill

SECTION 3
DESCRIPTION OF THE EXISTING ENVIRONMENT

The existing physical, economic and social environments in the planning area are described in this Section. These conditions were considered when analyzing the alternatives and determining the impacts of the proposed action.

A. PHYSICAL ENVIRONMENT

1. Climate

The climate in the Kona District is generally warm and semi-tropical. It is characteristic of the leeward coastal regions of the major islands in the Hawaiian Island chain. Seasonal changes are mild and fairly uniform, except for infrequent convective storms (known as "kona storms") during the winter months.

The average temperature varies between 70° and 76°F with a maximum of 89°F for the summer period May through September and a minimum of 54°F for the winter period October through April. The range of daily temperature change is 10° to 13°F.

The annual rainfall varies from 20 inches in the coastal region to 100 inches on the upper slopes of Hualalai Mountain in the North Kona District (Figure 3-1). The average annual rainfall at the abandoned Kona Airport was 24 inches for the period 1949 through 1972. More than 50 percent of the rainfall usually occurs during the 5-month period, May through September. Mountain masses intercept tradewinds and effect a minimal orographic rainfall. However, the temperature differences between land and offshore waters during warm summer days generate a moderate onshore seabreeze with resultant showers of intensity higher than that of other general leeward areas. Rainfall data are shown in Table 3-1.

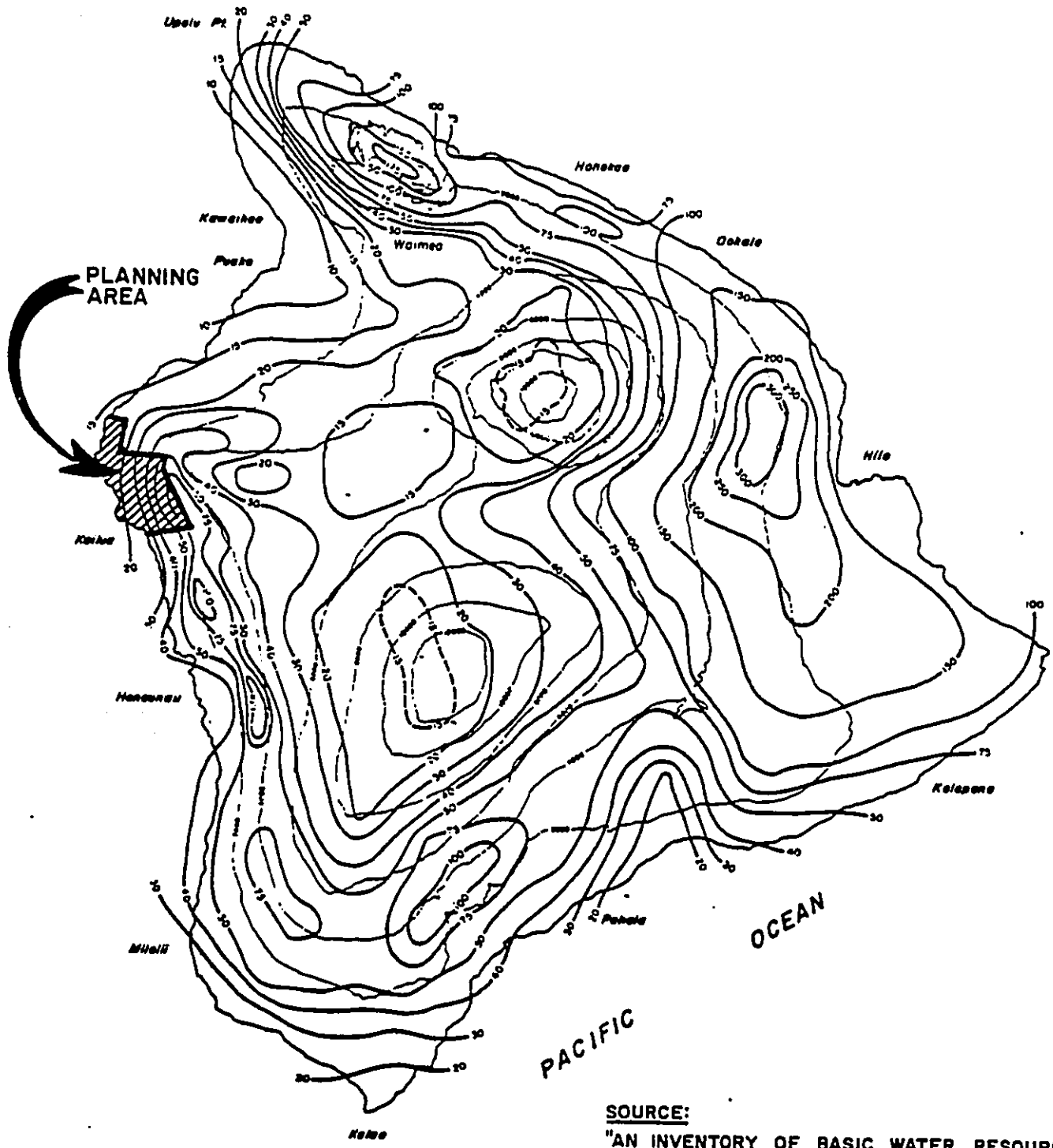
Northeasterly tradewinds with an average velocity of 15 mph generally prevail in the Hawaiian Islands. Along the Kona

TABLE 3-1

MONTHLY AND ANNUAL PRECIPITATION DATA, KONA AIRPORT (OLD)*

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1963	4.78	1.63	3.65	10.71	2.52	1.46	2.28	2.86	2.79	0.48	0.48	0.76	34.40
1964	0.54	0.95	3.92	2.15	1.20	3.51	0.77	1.59	1.32	1.20	1.18	2.63	20.96
1965	1.25	1.58	1.15	2.40	3.31	2.23	2.43	5.03	2.04	3.52	4.60	0.06	29.60
1966	0.20	2.54	0.20	0.66	2.92	0.94	2.54	1.39	1.33	4.56	5.17	1.25	23.70
1967	0.71	1.24	1.57	1.66	3.07	1.80	3.39	1.22	2.18	1.31	1.42	3.04	22.61
1968	3.87	3.19	1.70	5.50	2.54	0.85	2.04	2.06	0.86	3.21	0.14	5.91	31.87
1969	5.73	2.56	0.11	1.85	2.14	3.63	4.00	1.76	2.73	0.35	1.21	1.09	27.16
1970	1.51	0.32	0.00	0.39	2.32	3.18	3.15	3.32	3.70	0.33	2.10	0.38	20.70
1971	11.14	0.40	1.70	2.06	1.47	0.53	3.02	0.86	3.42	0.07	2.19	0.42	27.28
1972	2.71	3.11	3.14	1.43	3.61	2.08	4.82	0.84	2.67	0.43	0.09	3.89	28.82
AVERAGE	3.24	1.75	1.71	2.88	2.51	2.02	2.84	2.09	2.30	1.55	1.86	1.94	26.71
YEARS	10	10	10	10	10	10	10	10	10	10	10	10	
RECORD	2.98	1.56	1.75	2.07	2.31	2.06	2.49	2.01	1.87	1.56	1.80	1.66	24.13
YEARS	23	23	23	23	23	23	23	23	23	23	23	23	

*U.S. Weather Bureau



SOURCE:
"AN INVENTORY OF BASIC WATER RESOURCES DATA: ISLAND OF HAWAII," REPORT R35, DLNR.

N

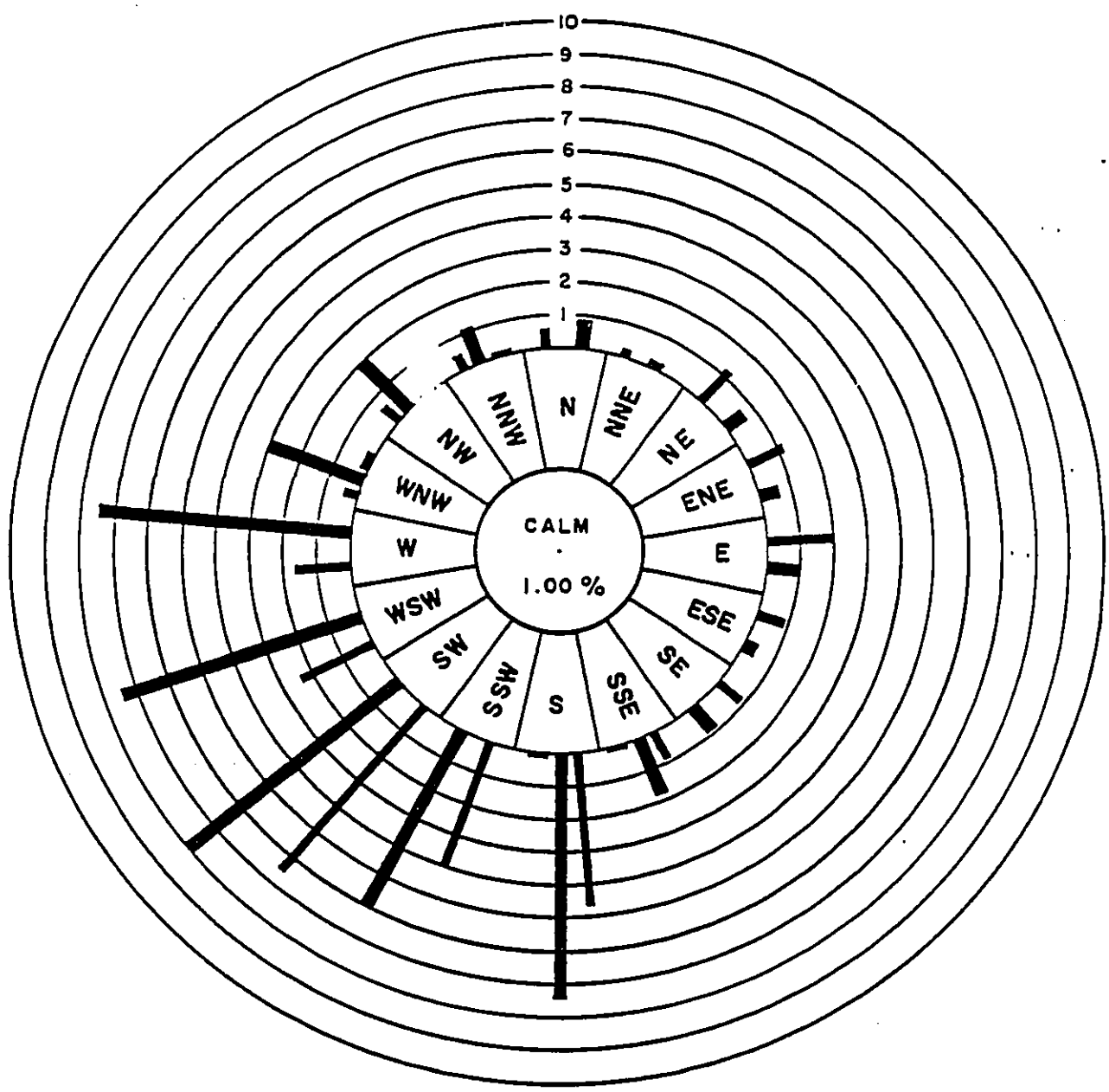
5 0 5 10 15
SCALE IN MILES

KAILUA-KONA SEWERAGE SYSTEM
PHASE IV (NORTHERN ZONE)

FIGURE 3-1
MEAN ANNUAL
DISTRIBUTION OF RAINFALL

COUNTY OF HAWAII
DEPARTMENT OF PUBLIC WORKS

NOTE: THE PERCENTAGES AND THE DIRECTIONS ARE AVERAGES DURING THE 9 YEAR PERIOD, 1957 TO 1965, INCLUSIVE.



LEGEND

3.0 - 8.0 MPH

8.0 - 18.0 MPH

18.0 - 24.0 MPH

OVER 24.0 MPH

—8%— TOTAL % OF YEAR

SOURCE: – HONOLULU U S W B

KAILUA-KONA SEWERAGE SYSTEM
PHASE IV (NORTHERN ZONE)

FIGURE 3-2
WIND ROSE AT
ABANDONED KONA AIRPORT

COUNTY OF HAWAII
DEPARTMENT OF PUBLIC WORKS

coast, however, winds are predominantly from the southwesterly quadrant due to the influence on the northeasterly trades by the adjacent land masses of Mauna Loa, Mauna Kea and Hualalai. Westerly, southerly or onshore winds occur about 38 percent of the time at an average velocity of 13 miles per hour. During kona or southerly storms which occur on an average of 2 or 3 times a year, winds are frequently gusty with velocities as high as 30 to 40 mph. Hurricanes, with wind velocities of 75 mph and higher, are infrequent but have touched or approached the island 4 times during the past 25 years. Tropical storms, however, occur on a frequency of twice yearly. Based on historical records, 9 major storms including 2 hurricanes have occurred during the 15-year period of record, 1947 through 1961. Wind data as observed by the U.S. Hydrographic office are depicted by a wind diagram shown on Figure 3-2.

2. Water Resources

Water for the Kona area is obtained from deep groundwater sources and rain caught on roofs and stored in tanks. Before the Department of Water Supply, County of Hawaii, developed the groundwater sources, rain catchment was the major source of the domestic water supply. This method is still used in areas not serviced by the County system.

The present County water system includes a network of pressure lines, pumping stations, and storage tanks. Figure 3-3 shows the existing water distribution system for the planning area. The major sources of municipal water are the wells at Kahaluu and Keei which tap the basal lens. These wells are located 4 and 13 miles, respectively, south of the planning area.

Basal groundwater in Kona generally occurs near sea level. Recharge of the fresh water lens is moderate to large in the rainy zones on the slopes of Mauna Loa. Aerial infrared images along the shore indicate that a considerable groundwater

flow occurs at sea level (Fischer, et al, 1966). Exploratory wells near shore produce water with a chloride content in excess of 1,000 ppm. (DLNR, 1970). Two hundred fifty (250) parts per million (ppm) is the standard set by the United States Public Health Service for human consumption.

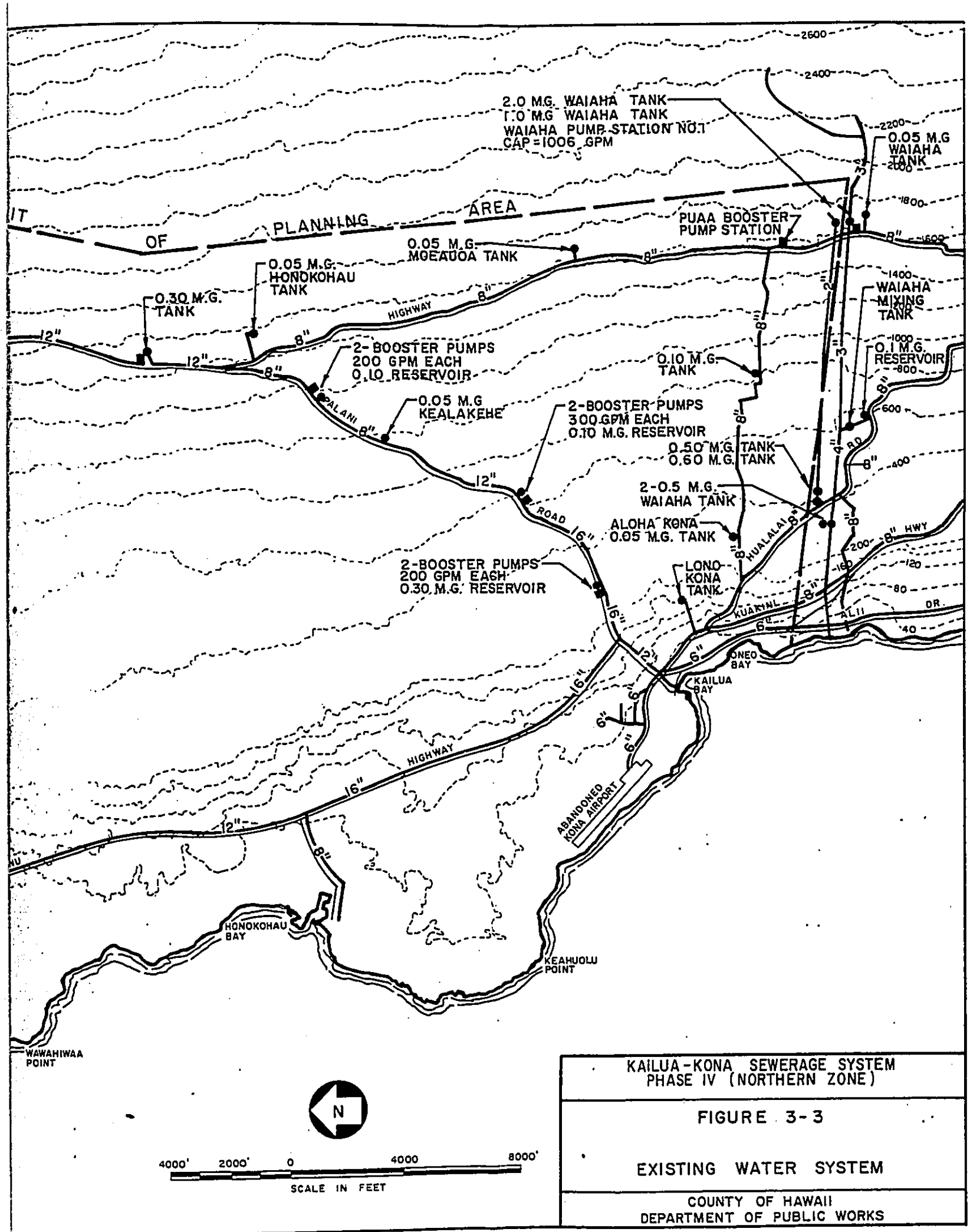
Further inshore, the chloride content decreases. The wells at Kahaluu, which are located about 1.5 miles from shore have low chloride readings of less than 20 ppm. The level of the water table at the Kahaluu wells is approximately +4.0 feet, mean sea level (msl).

3. Geology and Soils

The Hawaiian Islands are volcanic in origin. The Islands were built up on the sea floor by a continuing series of volcanic eruptions. Wave erosion and weathering later transformed the volcanic dome into a jagged range of mountains, sea cliffs, and valleys. Geologically, the Island of Hawaii is the youngest of the eight major islands in the archipelago. A simplified geologic map of the Island of Hawaii is shown in Figure 3-4.

The planning area is located in lands formed by prehistoric lava flows from Hualalai Volcano. The volcano summit stands 8,271 feet high at a location 10 miles east of the planning area. Hualalai Volcano last erupted in 1801 producing two lava flows which entered the ocean in an area north of Ke-ahole Point. Although Hualalai has been dormant since 1801, the possibility of future eruptions still exists.

Seismic activity is fairly common in the Kona area. These quakes, however, are small and do little or no damage. In 1951, however, a very large earthquake originating on the Kealakekua Fault, about 12 miles south of Kailua-Kona, caused damage in the Kailua area.

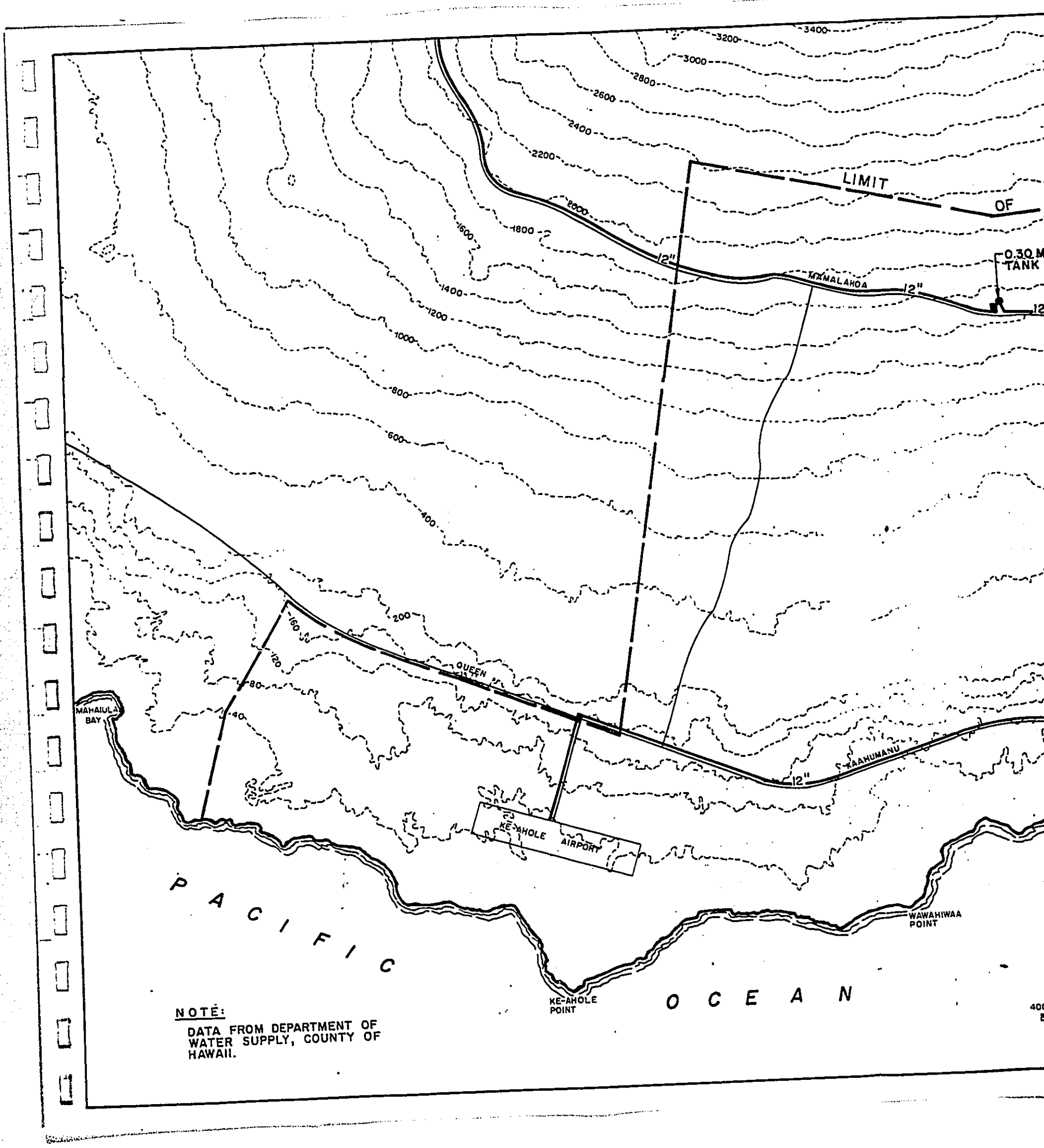


KAILUA-KONA SEWERAGE SYSTEM
PHASE IV (NORTHERN ZONE)

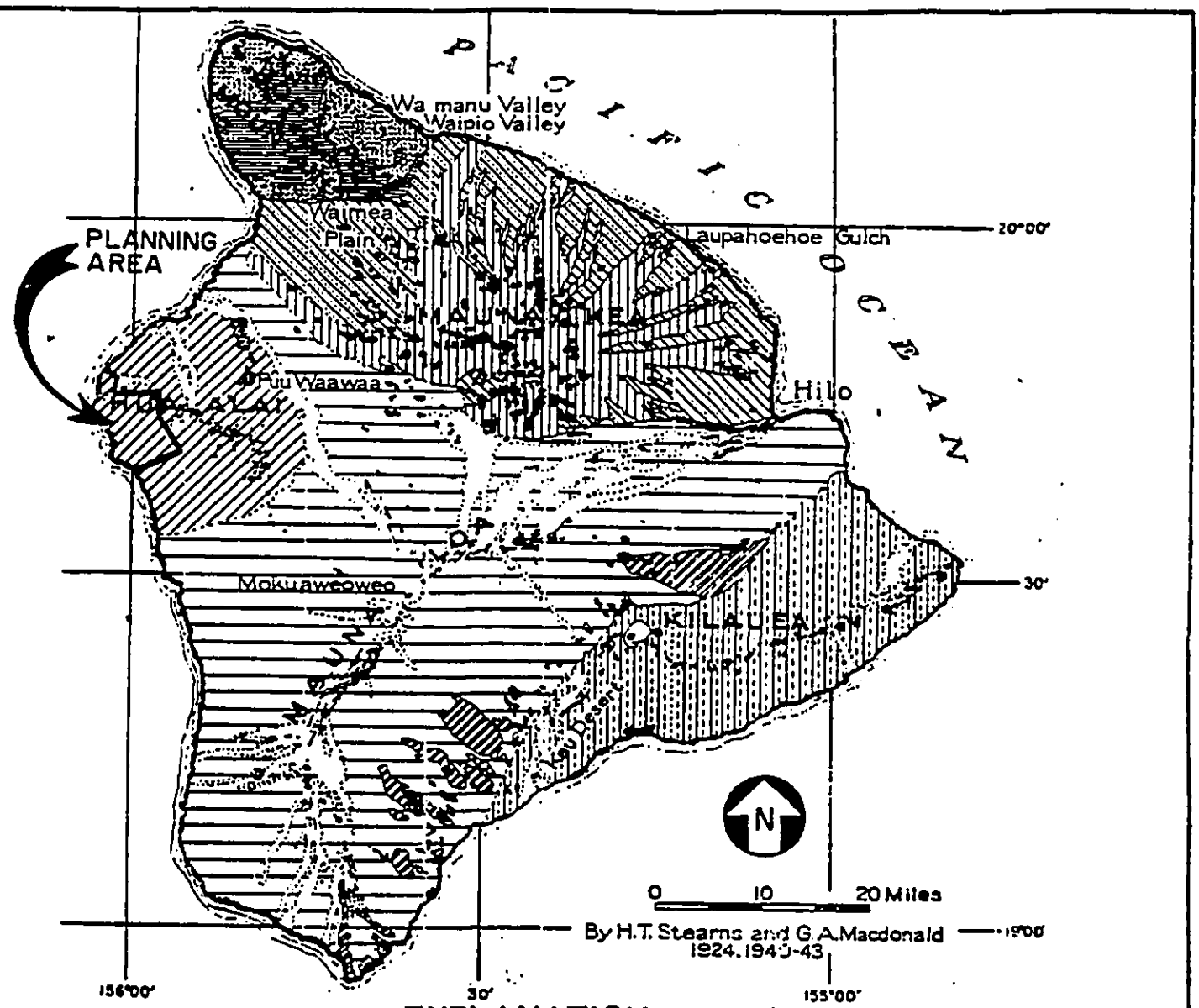
FIGURE 3-3

EXISTING WATER SYSTEM

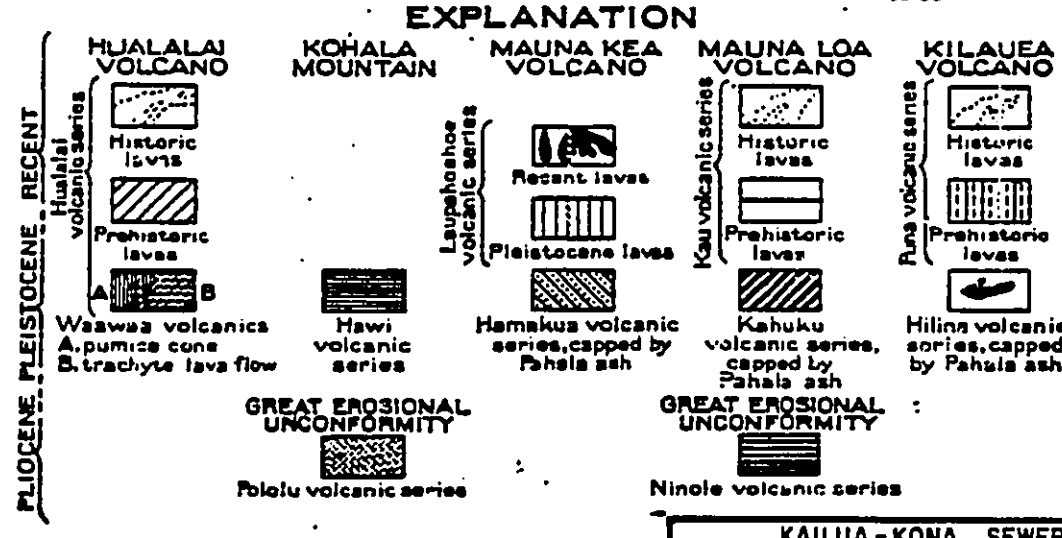
COUNTY OF HAWAII
DEPARTMENT OF PUBLIC WORKS



NOTE:
DATA FROM DEPARTMENT OF WATER SUPPLY, COUNTY OF HAWAII.



EXPLANATION



Fissure vent

Cinder and spatter cones and pit craters

SOURCE:

H. T. STEARNS, GEOLOGY OF THE HAWAIIAN ISLANDS, HAWAII, 1967

KAILUA-KONA SEWERAGE SYSTEM
PHASE IV (NORTHERN ZONE)

FIGURE 3-4

GEOLOGY MAP
ISLAND OF HAWAII

COUNTY OF HAWAII
DEPARTMENT OF PUBLIC WORKS

The planning area is comprised of strata of highly permeable aa (rough, clinkery and fragmented) and pahoehoe (smoot- and ropey surface) lava flows. The volcanic lava is too re_ent for appreciable soil formation. Soil suitable for agriculture within the planning area is minimal and is located on the higher slopes. Most of the planning area is overlain by lava wastes or very poor soil. Neither erosion nor deposition has significantly affected the top area which has an irregular surface veneer of lava rock which may or may not be slightly decomposed, interspersed with irregular-shaped pockets of ash deposits. The solid to medium dense basaltic rock deposits are irregular in thickness and are separated by thin contact zones of oxidized fragmented rock. The lava flows are layered from 2 to 17 feet in thickness. In the thicker flows, the degree of vesiculation in the uppermost crust is 20 to 35 percent, decreasing to 2 to 5 percent with a minimum amount of jointing. The closely fractured basalt ranges in size from 50 to 100 pounds.

4. Coastal Water Quality

Table 3-2 indicates the water quality standards (dry criteria) for Kona coastal waters. The State Standards that apply to the developed Kailua coastal area are the Class AA generally "dry" criteria. The 208 wastewater management plan determined that Kailua Harbor proper is a generally "wet" embayment and some coastal sectors north of the harbor are seasonally "wet." However, the "dry" criteria are more relevant to the developed areas of the Northern and Southern Zones of North Kona. A preliminary oceanographic study of the offshore coastal waters was conducted in 1973 to analyze the circulation and the existing water quality and to reconnoiter the ocean bottom. These investigations were conducted in the coastal waters classified as Class AA and Class A. The results were presented in the preliminary report entitled Master Plan for the Kailua-Kona Sewerage System, Phase IV (Northern Zone), May 1974. Figure 3-5 indicates the location of the water quality sampling stations. The data are presented

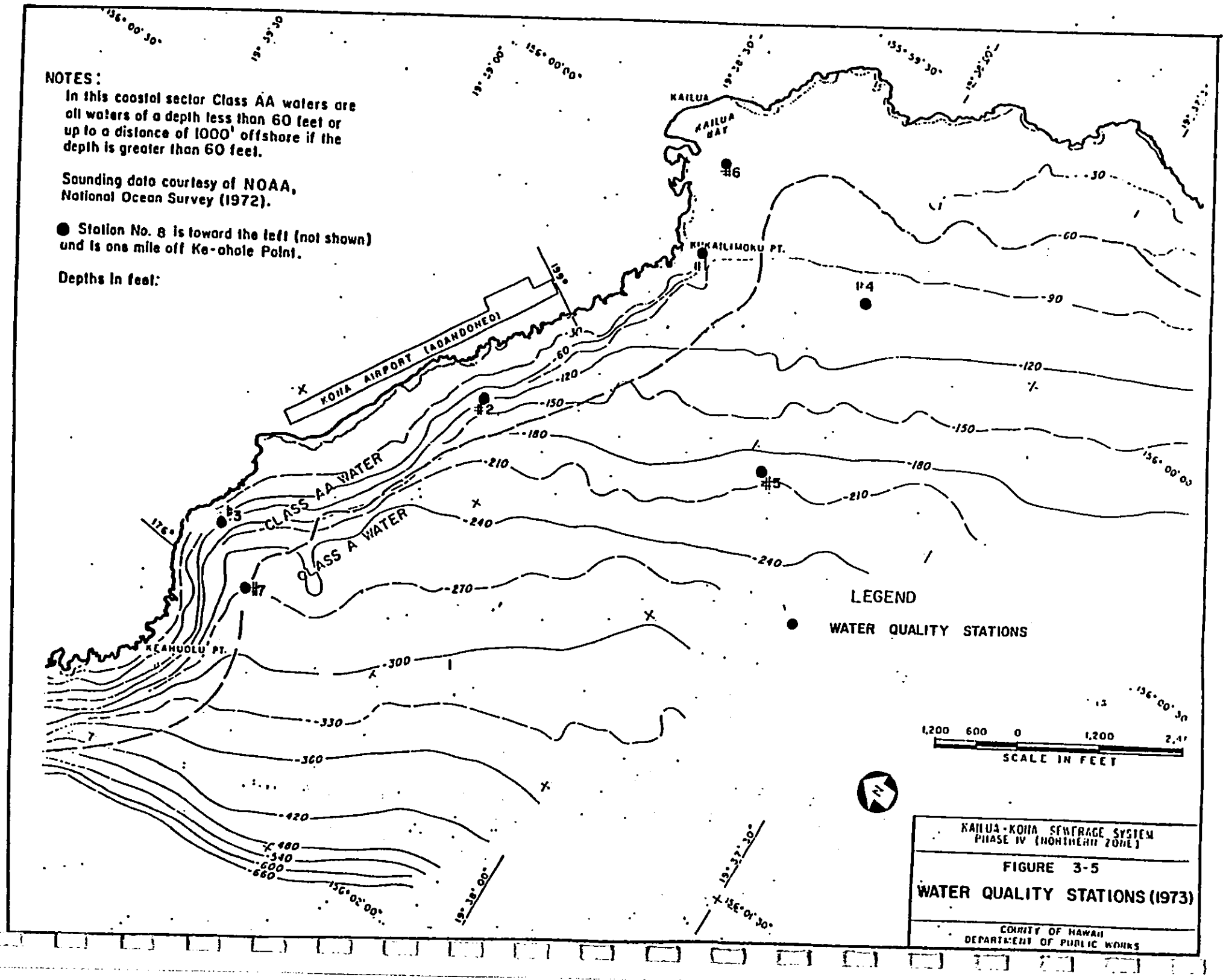
TABLE 3-2

WATER QUALITY STANDARDS FOR KONA COASTAL WATERS
(DRY CRITERIA)

Parameter	Geometric mean not to exceed the given value	Not to exceed the given value more than 10% of the time	Not to exceed the given value
Total Kjeldahl Nitrogen (ug N/l)	110.00	180.00	250.00
Ammonia Nitrogen (ug NH_4-N/l)	2.00	5.00	9.00
Nitrate + Nitrite Nitrogen (ug (NO_3 +NO_2)-N/l)	3.50	10.00	20.00
Orthophosphate Phosphorus (ug PO_4-P/l)	5.00	9.00	13.00
Total Phosphorus (ug P/l)	16.00	30.00	45.00
Light Extinction Coefficient (k units)	0.10	0.30	0.55
Chlorophyll-a (ug/l)	0.15	0.50	1.00
Turbidity (Nephelometric Turbidity Units)	0.20	0.50	1.00
Non-Filterable Residue (ug/l)	10,000.00	15,000.00	20,000.00

pH Units shall not deviate more than 0.5 units from a value of 8.1.

Dissolved Oxygen - Not less than 75% saturation.


NOTES:
In this coastal sector Class AA waters are all waters of a depth less than 60 feet or up to a distance of 1000' offshore if the depth is greater than 60 feet.
Sounding data courtesy of NOAA, National Ocean Survey (1972).
● Station No. 8 is toward the left (not shown) and is one mile off Ke-ahole Point.
Depths in feet:
KAILUA
KAILUA BAY
KIKAILIMOKU PT.
KOHA AIRPORT (ABANDONED)
CLASS AA WATER
CLASS A WATER
KEAHUOLU PT.
#1
#2
#3
#4
#5
#6
#7
LEGEND
WATER QUALITY STATIONS
1,200 600 0 1,200
SCALE IN FEET
KAILUA-KONA SEWERAGE SYSTEM
PHASE IV (NORTHERN ZONE)
FIGURE 3-5
WATER QUALITY STATIONS (1973)
COUNTY OF HAWAII
DEPARTMENT OF PUBLIC WORKS

in Table 3-3. In summary, the measurements for nutrients varied with location and no definitive description of the general nutrient structure could be determined.

The State Department of Health routinely monitors the shoreline water quality of the island. The Department had 5 fixed monitoring stations in the planning area until 1978, to gather data on the ambient levels of the various parameters in the State Water Quality Standards. The data obtained from the State Department of Health is shown in Table 3-4. The data cover the period 1973 to 1977 and measurements were taken for the water quality parameters in the State Water Quality Standards that were in effect at that time. Several parameters in the present Standards were not in effect at the time the data was collected.

The above water quality data is limited but does indicate that the water quality for the area does not meet State Standards. In general, the water quality in the Northern Zone is similar to that identified in the Southern Zone where more recent (1978) water quality surveys have been conducted and excessive levels of nutrients identified. The data indicates that cesspool and injection well pollutants are entering these Class AA waters in both the Northern and Southern Zones which, by definition, must "remain in their natural pristine state as nearly as possible with an absolute minimum of pollution or alteration of water quality from any human-caused source or actions." The obvious sources are the many cesspools and injection wells that now dispose effluents to the groundwater and which ultimately move to the shoreline waters.

5. <u>Historical and Archaeological Sites</u>

Concerned residents, governmental agencies and private developers are participating to preserve, protect and restore items of historical significance relating to early Hawaiian history.

TABLE 3-3

WATER QUALITY DATA (1973)

Station	Date	Sample Depth Ft	Turbidity FTU	(NO_3-NO_2)-N ug/l	Total Kjeldahl Nitrogen ug/l	Orthophosphate Phosphorus ug/l	Total Phosphorus ug/l
1	5 Feb 73	0	.06	44*	36	2	43*
		20	.18	0	80	0	17*
		50	.07	1	31	13*	17*
2	5 Feb 73	0	.05	36*	126*	21*	65*
		50	.29	2	82	24*	78*
		100	.17	9*	60	13*	86*
3	5 Feb 73	0	.07	16*	108	28*	20*
		50	.16	10*	52	21*	13
		100	.14	7*	64	13*	8
4	5 Feb 73	0	.07	5*	36	26*	26*
		50	.24	1	105	10*	45*
		100	.11	0	77	77*	15
5	5 Feb 73	0	.07	0	90	11*	53*
		50	.11	0	70	5	73*
		100	.09	0	52	13*	29*
2	13 Mar 73	0	.06	4*	235*	0	65*
6	13 Mar 73	0	.06	13*	226*	0	46*
7	13 Mar 73	0	.04	1	149*	0	55*
8	13 Mar 73	0	.03	0	190*	0	52*

* = Exceeds Geometric mean State Standard.

TABLE 3-4

SURFACE WATER QUALITY DATA (1973-1977)

PARAMETER		TKN	NO_3+NO_2	Total P	Turbidity	pH	DO	Temp	Salinity	Total Coliform	Fecal Coliform	Fecal Streptococcus
UNIT		ugN/l	ugN/l	u P/l	NTU	--	mg/l	°C	ppm	MPN/100 ml	MPN/100 ml	MPN/100 ml
State Standard Class AA Embayment Dry	Geometric Mean Not to Exceed	150.00	5.00	20.00	0.40	8.1	75% Satur.	Ambient	Ambient	None	200	None
	Not to Exceed Maximum Value	350.00	25.00	60.00	1.50	8.1±0.5	--	Ambient ±1°C	±10%	None	None	None
1. Kona Hilton Hotel Shoreline												
	Maximum									460.00	23.00	3.00
	Geometric Mean									42.53	5.00	3.00
	Minimum									3.00	2.00	3.00
2. Kailua Pier Station A-1												
	Maximum									1,100.00	150.00	43.00
	Geometric Mean									58.00	10.00	43.00
	Minimum									3.00	2.00	43.00
3. Kailua Pier Station B												
	Maximum	340.00	100.00	61.00	0.40			24.00		11,000.00	350.00	3.00
	Geometric Mean	340.00*	100.00*	61.00*	0.40			24.00		362.00	13.00	3.00
	Minimum	340.00	100.00	61.00	0.40			24.00		2.00	2.00	3.00
4. Kailua Pier Station C												
	Maximum									240.00	79.00	15.00
	Geometric Mean									32.78	11.75	15.00
	Minimum									2.00	2.00	15.00
5. Kailua Pier Station D												
	Maximum	280.00	310.00	100.00	1.60	7.50	6.10	26.00	32,200	540.00	240.00	23.00
	Geometric Mean	140.77	120.71*	61.57*	0.51*	7.42	5.40	24.40	31,700	43.87	13.29	6.67
	Minimum	10.00	70.00	35.00	0.10	7.30	5.10	23.00	31,200	2.00	2.00	2.00

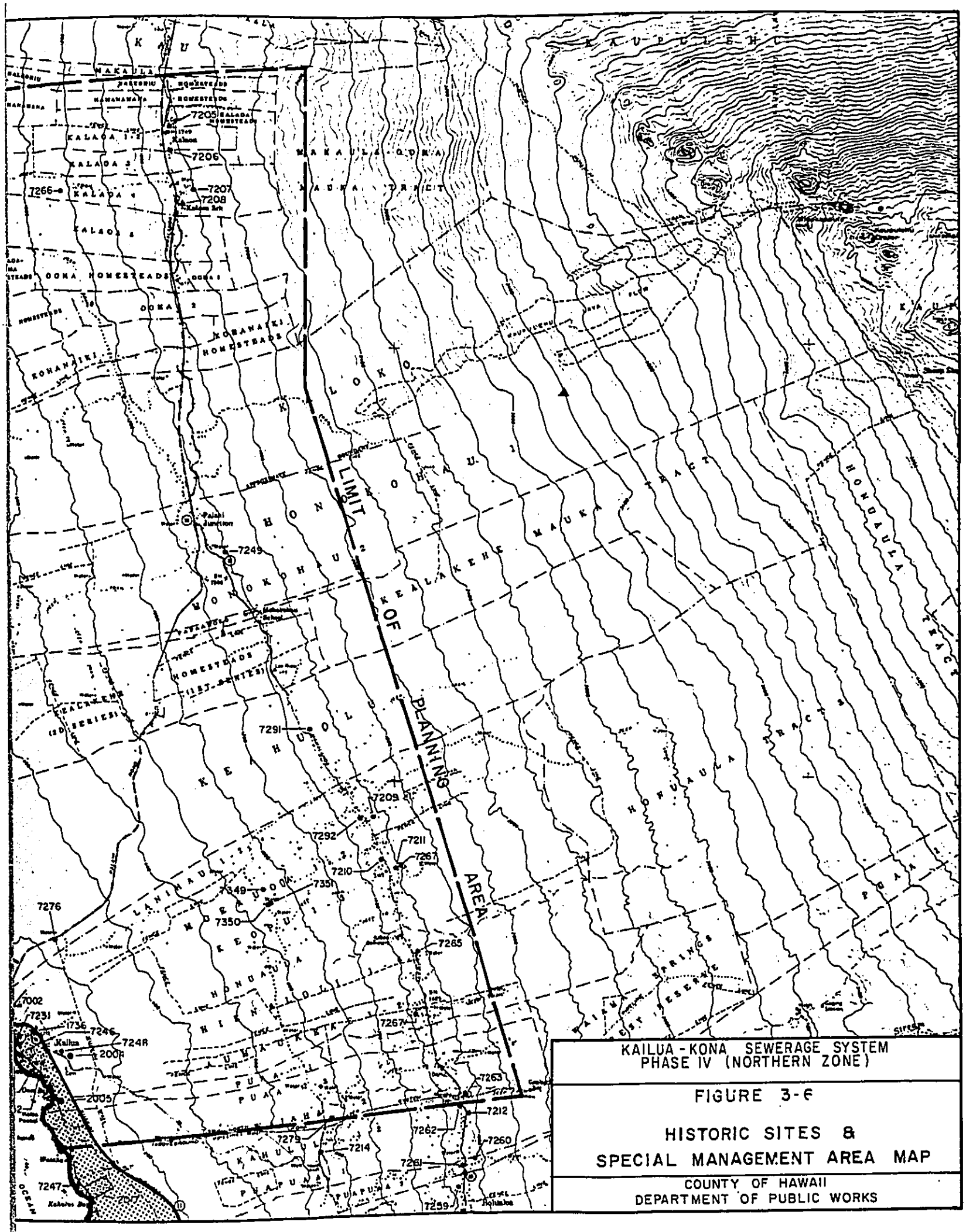
*Exceeds Geometric mean State Standard for Embayments (Dry)

The Department of Land and Natural Resources of the State of Hawaii has conducted State-wide surveys of known historical sites. These archaeological surveys have uncovered many artifacts of significance that portray the existence of early inhabitants. Numerous temples, home sites, refuge caves, petroglyphs and other artifacts have been uncovered.

Before 1800 the Kona coastline was the site of well populated fishing villages. An elaborate agricultural field system above the present village of Kailua made it possible to support an estimated population of 13,000 people. This field system formed a patterned network of elongated rectangles covering an area of 3 miles wide and 18 miles long. Orientation of the fields were designed to make maximum use of the available sunlight and exposure to periodic rain showers. King Kamehameha I, the ruler who brought the islands under one rule, made his residences at Kailua, Kealakekua, and Honaunau. He also kept his reserves of dried fish in coral block store houses at Kiholo. Traditionally, Kona has been a place of refuge, attracting the rebellious, the individualist, the escapist, and the seeker of freedom. A now famous ancient Hawaiian site, called the City of Refuge, is on the shoreline approximately 14 miles south of Kailua-Kona village.

By 1831 the population of North Kona had declined to 6,600 people. This was due to the introduction of western diseases, the passing of the sandalwood trade and the subsequent decline of the whaling industry. By 1890 the population of North Kona had declined to only 1,800 people.

A map showing the locations of known historical sites in the planning area is presented in Figure 3-6. A list of the significant historical sites is given by reference numbers in Table 3-5.


PLANNING AREA LIMIT OF
KAILUA-KONA SEWERAGE SYSTEM
PHASE IV (NORTHERN ZONE)
FIGURE 3-6
HISTORIC SITES &
SPECIAL MANAGEMENT AREA MAP
COUNTY OF HAWAII
DEPARTMENT OF PUBLIC WORKS

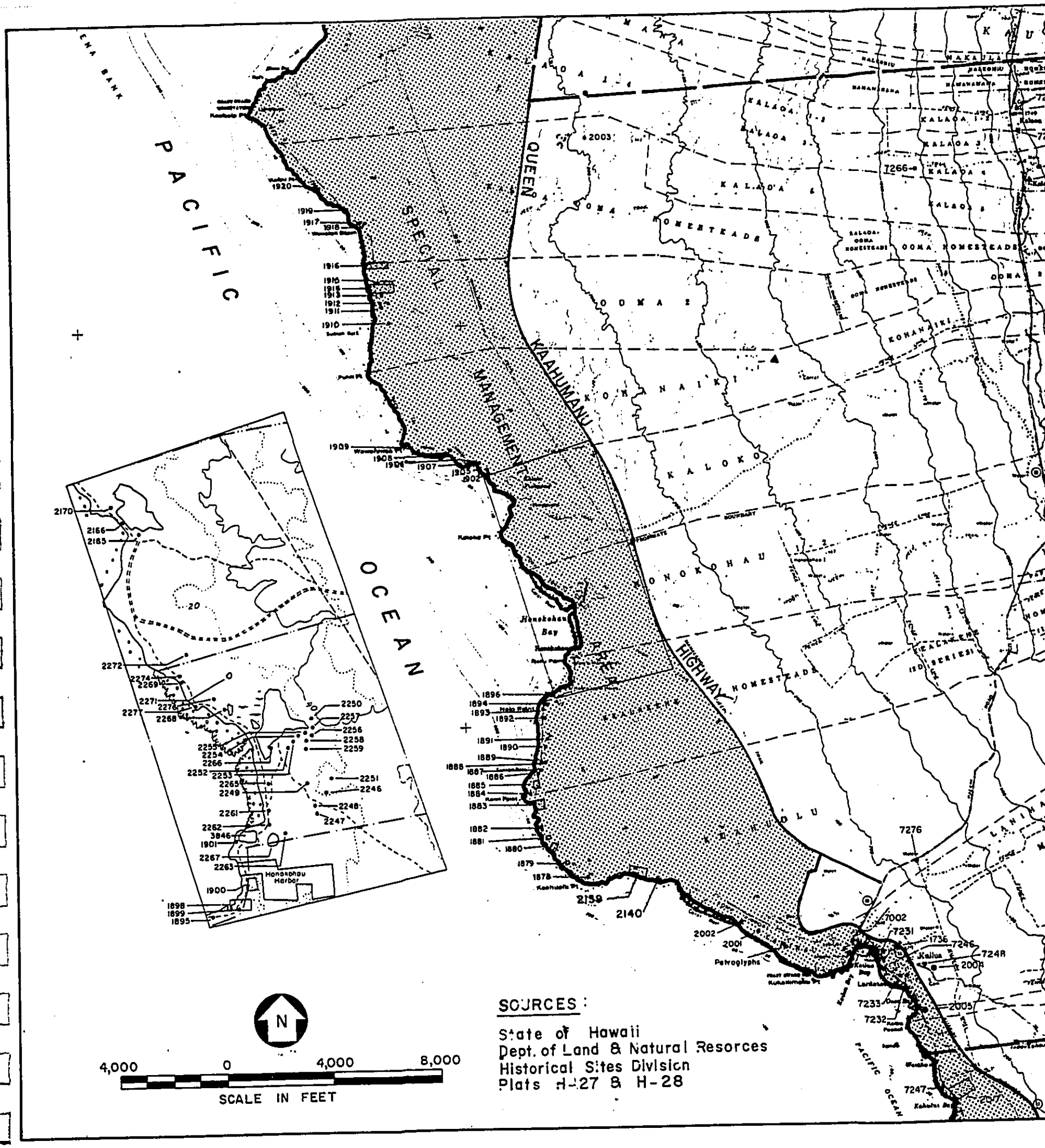

PACIFIC
OCEAN
QUEEN
KAAHUMANU
HIGHWAY
SPECIAL
MANAGEMENT
KALAOA
OOMA HOMESTEADS
KOHANAIKI
KALOKO
HONOKOHAU
HOMESTEADS
Honokohau Bay
Honokohau Harbor
Petroglyphs
Kailua
N
4,000 0 4,000 8,000
SCALE IN FEET
SOURCES:
State of Hawaii
Dept. of Land & Natural Resorces
Historical Sites Division
Plats H-27 & H-28

TABLE 3-5

REGISTERED HISTORICAL SITES LOCATED IN THE PLANNING AREA

Hawaii Register of Historical Places No.	Site Name	Remarks
10:27:3846	'Ai'Opio Pond	Recommended to National Register
10:27:1898	Alaula Bay Compex	
10:27:2251	Burial at Honomahu	
10:27:1907	Burial & Habitation	
10:27:2252	Burial Platform	
10:27:1895	Cave Shelters	
10:27:2263	Concrete & Stone Salt Pans	Recommended to National Register
10:27:1908	Enclosure	
10:27:2256	Enclosure	
10:27:2257	Enclosure	
10:27:2262	Enclosures	
10:27:2273	Enclosure/Clearing/Wall/ Cairns	
10:27:2260	Enclosure/Papamu/Petroglyph	
10:27:2269	Enclosure with Platform	
10:27:1906	Habitation	
10:27:2271	Habitation & Burial Complex	
10:27:1920	Habitation Cluster	
10:27:1910	Habitation Complex	
10:27:1916	Habitation Complex	
10:27:2258	Habitation Complex	
10:27:4163	Habitation Complex	
10:27:1897	Habitation Site	
10:27:2261	Habitation Site	
10:27:1896	Hale O Kane Heiau	
10:27:2246	Heiau	
10:27:2250	Holua & Burials	Recommended to National Register
10:27:4138	Honokohau Settlement	Placement in National Register
10:27:2002	House & Burials	
10:27:2253	House Enclosure & Platform	
10:27:2254	House Platform	
10:27:2255	House Platform	
10:27:2259	House Platform	
10:27:7002	Kamakahonu	Placement in National Register
10:27:2001	Lanihau Papamu	
10:27:2000	Lanihau Petroglyphs	
10:27:1900	Maliu Habitations	
10:27:2272	Massive Cairns & Pool	Recommended to National Register
10:27:2264	Massive Platform	
10:27:262	Ooma Refuge Caves	

TABLE 3-5 (Continued)

Hawaii Register of Historical Places No.	Site Name	Remarks
10:27:4165	Ooma II Complex	
10:27:2248	Petroglyphs	
10:27:2249	Petroglyphs	
10:27:2267	Petroglyphs	Recommended to National Register
10:27:2268	Platform	
10:27:2274	Platform	
10:27:1905	Platform & Enclosure	
10:27:2247	Possible Burial	
10:27:1901	Puoina Heiau	
10:27:1917	Shelter & Pen	
10:27:1902	Temporary Habitations	
10:27:1909	Wawaiwaa Platforms	
10:27:1918	Wawaloli Habitation	
10:27:7002	Kamakahonu, Kamehameha Residence	Placement in National Register
10:27:4138	Honokohau Settlement (Use Study Boundaries)	Placement in National Register
10:28:2005	Auhaukeae Platform	
10:28:2004	Honuaula Platform	
10:28:7001	Hulihee Palace	Placement in National Register
10:28:2017	Kahului Complex	
10:28:1736	Keopu Platform	
10:28:7231	Mokuaikaua Church	Recommended to National Register

6. Flora and Fauna

Soil cover, land use and rainfall distribution are the factors which dictate the type of vegetation in the planning area. The vegetation in the arid lava lowlands generally consist of kiawe, lantana, hale koa shrubs, and pasture grasses. The wetter upper slopes are mixed, open forests. Native forest trees include Sandalwood, Koa and Ohia.

The native birds observed in the general Kona area include the Hawaiian Hawk, Hawaiian Coot, Hawaiian Stilt, Hawaiian Short-Eared Owl, Black-Crowned Night Heron, Pintail Duck, Shoveler, and American Wildgeon. The coot, stilt, and owl species are considered to be endangered. These species (except for owl outside Oahu) are listed as endangered on the Federal and State lists of endangered species. Species that were introduced to the Hawaiian Islands from other geographic locations include shore and water birds like the sandpiper and sanderling, game birds like the chukas and pheasant, and song birds like the mynah and cardinal.

Feral goats, pigs, sheep and donkeys are found in the upper slopes of the planning area. The mongoose, rat, and mouse can be observed in the lower areas.

A flora and fauna survey of the vicinity of the proposed treatment plant site at Kealakehe was conducted in 1979 by the Division of Fish and Game, State Department of Land and Natural Resources. No endangered plants or birds were recorded. The survey included the comment that the Hawaiian goose, Hawaiian hawk and Hawaiian bat (all endangered) "...may be animals of passage over the site, however..."

The primary shrubs in the area are:

Kiawe, Algaroba - *Prosopis* sp.
Koa haole - *Leucaena glauca*

There is a scattering of:

Christmas berry trees - *Schinus terebinthifolius*
None trees - M *Norinda citrifolia*
Klu - *Acacia farnesiana*

The primary grass in the area is:

Fountain grass - *Pennisetum setaceum*

7. Coastal Zone Management Program

In response to public pressures and because of the importance of the coastal areas of the United States, Congress passed the Coastal Zone Management Act (PL 92-583) which was signed into law on October 27, 1972. This act was amended on July 26, 1976 by PL 94-370 which affirmed national interest in the effective protection and development of the coastal zone, by providing assistance and encouragement to coastal states to develop and implement rational programs for managing their coastal zones.

Guidelines and requirements for State program development and approval are contained in 15 CFR Part 923, as revised and published March 1, 1978 in the Federal Register. A summary of the requirements for program approval are that the State develop a management program that:

"(1) Identifies and evaluates those coastal resources recognized in the Act that require management or protection by the State;

(2) Reexamines existing policies or develops new policies to manage these resources. These policies must be specific, comprehensive and enforceable, and must provide an adequate degree of predictability as to how coastal resources will be managed;

(3) Determines specific uses and special geographic areas that are to be subject to the management program, based on the nature of identified coastal concerns. The basis for management uses (or their impacts) and areas should be based on resource capability and suitability analyses, socio-economic considerations and public preferences;

(4) Identifies the inland and seaward areas subject to the management program;

(5) Provides for the consideration of the national interest in the planning for an siting of facilities that meet more than local requirements; and

(6) Includes sufficient legal authorities and organizational arrangements to implement the program and to insure conformance to it."

The legislature enacted the Hawaii Coastal Zone Management Act in 1977 (Act 188, SLH 1977) which established the basic State

policy to guide State agencies and County governments in all actions affecting the State's coastal zone. This Act establishes objectives and policies for:

"1) Provision of recreational opportunities;
2) Protection and restoration of historic resources;
3) Improvement of scenic and open space areas;
4) Protection of coastal ecosystems;
5) Provision for coastal-dependent economic uses;
6) Reduction of coastal hazards; and
7) Improvement of the review process involving development activities, including permit coordination and opportunities for public participation."

The boundaries of the Special Management Areas (SMA) were established under the Shoreline Protection Act of 1975. The current SMA's include lands extending not less than 100 yards inland from the upper wash of the waves and the surrounding area extending 100 yards from the body of any surface water subject to salinity intrusion or tidal influences. The Special Management Area for the planning area is shown in Figure 3-6. The proposed project is believed to be in compliance with the SMA regulations and will be reviewed for compliance before construction.

Developments in the SMA are subject to the following guidelines established by the County of Hawaii Planning Commission:

"A. All development in the special management area shall be subject to reasonable terms and conditions set by the Authority:

1. Adequate access, by dedication or other means, to publicly owned or used beaches, recreation areas, and natural reserves is provided to the extent consistent with sound conservation principles;
2. Adequate and properly located public recreation areas and wildlife preserves are reserved;
3. Provisions are made for solid and liquid waste treatment, disposition, and management which will minimize adverse effects upon special management area resources; and
4. Alterations to existing land forms and vegetation except crops, and construction of structures shall cause minimum adverse effect to water resources and scenic and recreational amenities and minimum danger of floods, landslides, erosion, siltation, or failure in the event of earthquake.

B. No development shall be approved unless the Authority has first found that:

1. The development will not have any substantial, adverse environmental or ecological effect except as such adverse effect is clearly outweighed by public health, safety, and welfare. Such adverse effect shall include, but not be limited to, the potential cumulative impact of individual developments, each one of which taken in itself might not have a substantial adverse effect and the elimination of planning options; and

2. The development is consistent with the findings and policies set forth in Rule 9.1.2 and 9.3.

C. The Authority shall seek to minimize, where reasonable:

1. Dredging, filling or otherwise altering any bay, estuary, salt marsh, river mouth, slough, or lagoon.

2. Any development which would reduce the size of any beach or other area usable for public recreation.

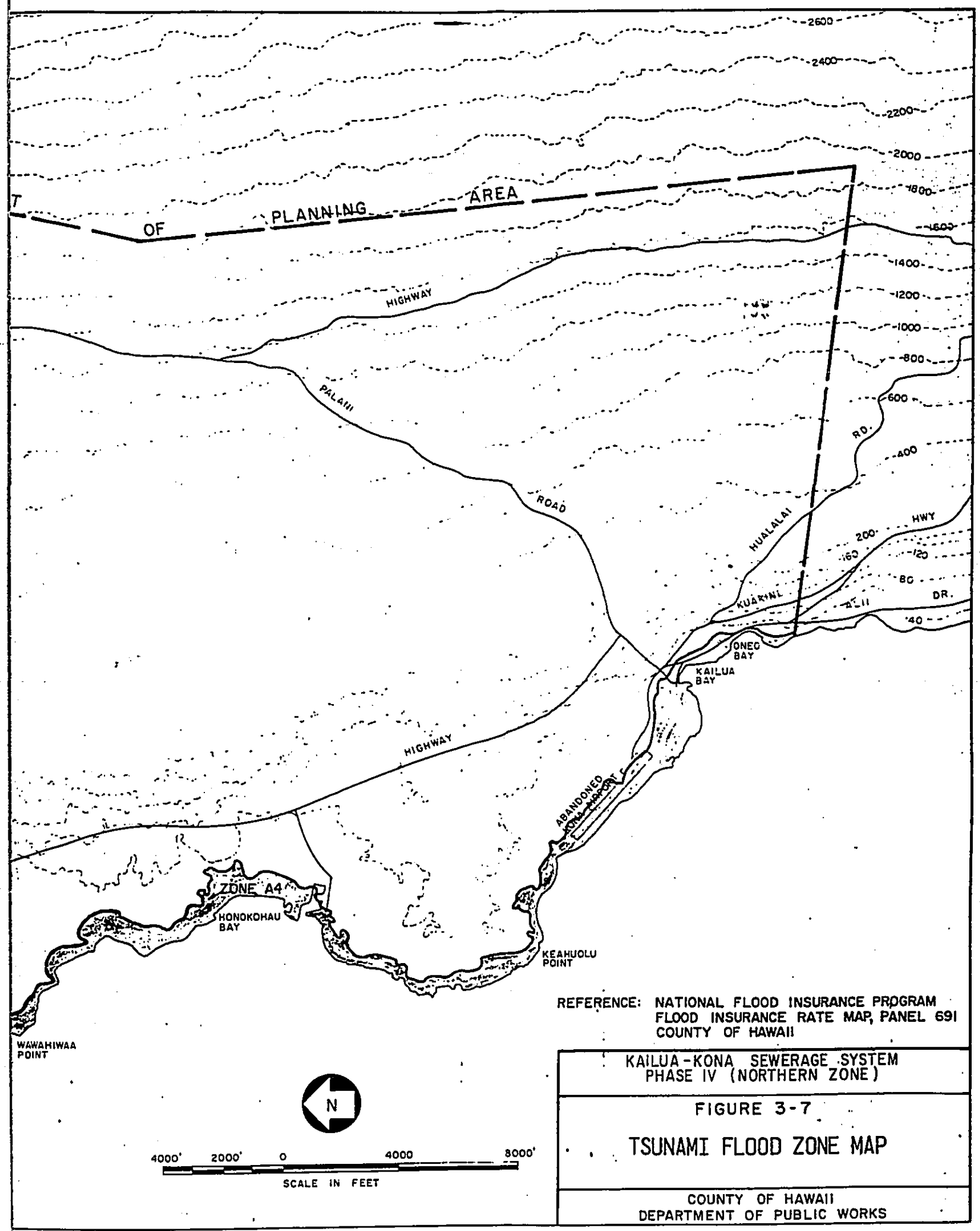
3. Any development which would reduce or impose restrictions upon public access to tidal and submerged lands, beaches, portions of rivers and streams within the special management area and the mean high tide line where there is no beach.

4. Any development which would substantially interfere with or detract from the line of sight toward the sea from the state highway nearest the coast.

5. Any development which would adversely affect water quality, existing areas of open water free of visible structure, existing and potential of fisheries and fishing grounds, wildlife habitats, estuarine sanctuaries, potential for existing agricultural uses of land."

8. Tsunami Zone

The tsunami flooding limits for the planning area are indicated in Figure 3-7. These limits were defined by the U. S. Army Corps of Engineers for the National Flood Insurance Program. These flood limits are for a 100-year tsunami.



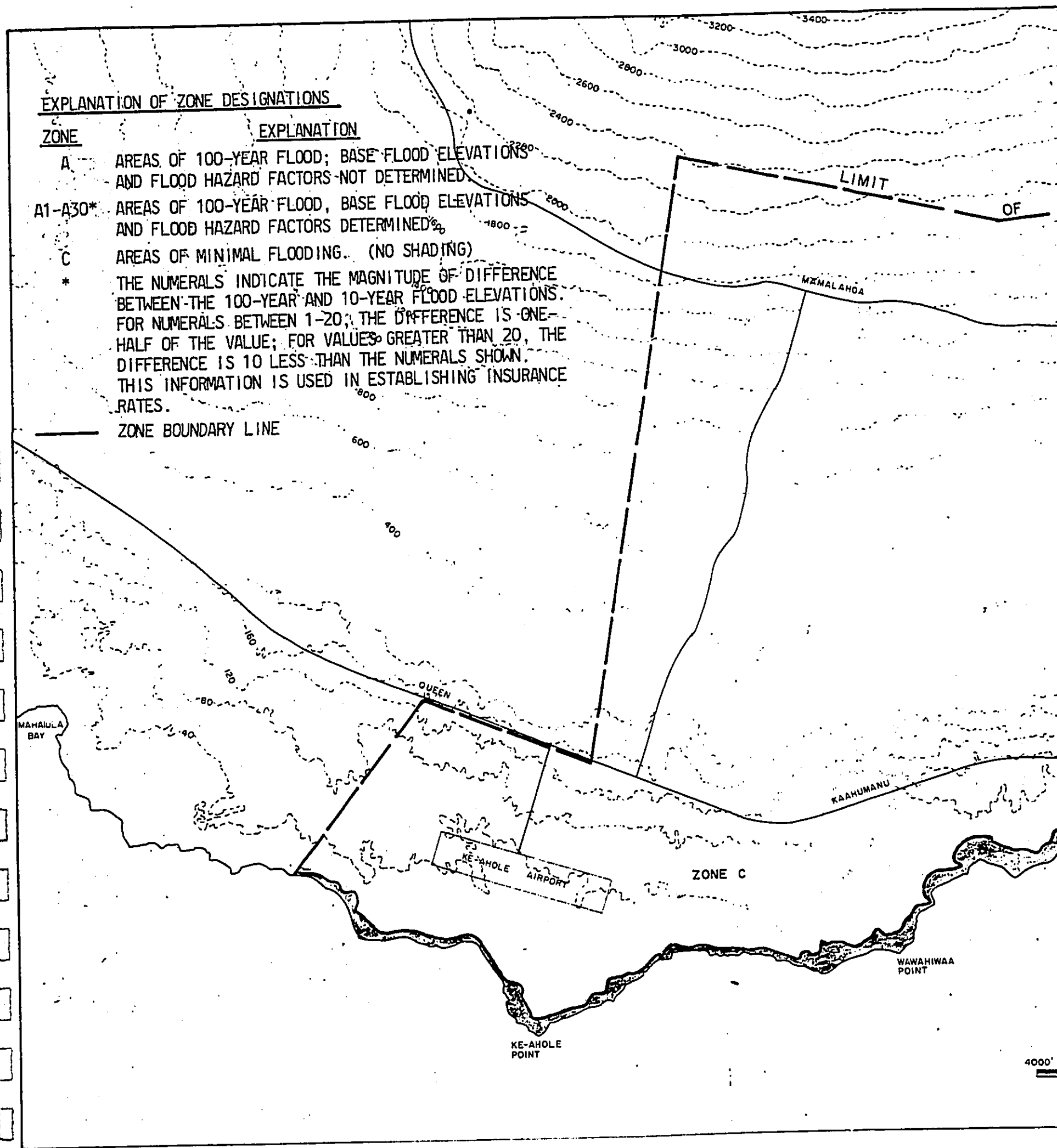
REFERENCE: NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP, PANEL 691
COUNTY OF HAWAII

KAILUA-KONA SEWERAGE SYSTEM
PHASE IV (NORTHERN ZONE)

FIGURE 3-7

TSUNAMI FLOOD ZONE MAP

COUNTY OF HAWAII
DEPARTMENT OF PUBLIC WORKS


EXPLANATION OF ZONE DESIGNATIONS
ZONE
EXPLANATION
A
AREAS OF 100-YEAR FLOOD; BASE FLOOD ELEVATIONS AND FLOOD HAZARD FACTORS NOT DETERMINED.
A1-A30*
AREAS OF 100-YEAR FLOOD, BASE FLOOD ELEVATIONS AND FLOOD HAZARD FACTORS DETERMINED.
C
AREAS OF MINIMAL FLOODING. (NO SHADING)
*
THE NUMERALS INDICATE THE MAGNITUDE OF DIFFERENCE BETWEEN THE 100-YEAR AND 10-YEAR FLOOD ELEVATIONS. FOR NUMERALS BETWEEN 1-20, THE DIFFERENCE IS ONE-HALF OF THE VALUE; FOR VALUES GREATER THAN 20, THE DIFFERENCE IS 10 LESS THAN THE NUMERALS SHOWN. THIS INFORMATION IS USED IN ESTABLISHING INSURANCE RATES.
ZONE BOUNDARY LINE
LIMIT OF
MAMALAHOA
QUEEN
KAAHUMANU
MAHAIULA BAY
KE-AHOLE AIRPORT
ZONE C
WAWAHIWAA POINT
KE-AHOLE POINT
4000'

B. SOCIAL ENVIRONMENT

1. Lifestyle and Character of the Area

Kona is generally recognized for its natural physical beauty, climate, and cultural traditions. The term "the Kona way of life" reflects the tranquil, rural atmosphere of the area. Any man-made action must be sensitive to this unique setting. The primary objective is to improve the health and economic well being of the community while preserving and maintaining this unique social climate.

The 1970 census statistics indicate that the emergence of tourism, changes in the population characteristics and income levels, and the high cost of housing are exerting economic pressures which threaten this isolated lifestyle.

The 1970 population census revealed the following trends which give an indication of the changing character of the community:

a. The number and percentage of children under 15 has been decreasing.

b. The number and percentage of elderly has been increasing.

c. A major decline in the agricultural work force in the agriculture-oriented areas adjacent to the planning area because of unstable market prices, rising production costs and better job opportunities.

d. The influx of young transients with the hope of "living off the land" but who eventually land on the welfare rolls.

e. An increase in the number of families in the low income group and their dependence on welfare.

These changes indicate that the isolated lifestyle of the community is gradually yielding to the pressures of urbanization.

2. Demographic Data

a. Current Population

The 1970 census population for the County of Hawaii was 63,468 of which 4,832 resided within the political district of North Kona. The County of Hawaii disaggregated the North Kona census population by facility planning areas and estimated that the 1970 resident population for the planning area was 2,250.

The preliminary U. S. Census data for the County of Hawaii estimated the resident population for the County as of April 1, 1980 at 92,206 of which 13,898 resided in the political district of North Kona. No estimate was given for the planning area.

b. Resident Population and Daily Visitor Projections

The Department of Public Works, County of Hawaii, has adopted the Hawaii Water Resources Regional Study "E-2" population projection for the Kailua-Kona area. Until recently, the "E-2" population projections served as the basis for all wastewater facility planning in the State of Hawaii. Subsequently, a new economic and population projection called the Series "II-F" Projection was developed which is consistent with the State's current policy of slow and controlled growth. The "II-F" population projections are lower than the "E-2" projections but the change is insignificant for the Island of Hawaii. All current wastewater facility planning in the State is required to conform with the "II-F" projections as a matter of policy. However, the County of Hawaii elected to retain the "E-2" projections for their facility planning since the costs that would be incurred in the conversion would be expensive and unjustified.

The "E-2" projection can be approximated by the equation:

$$F = P(1 + i)^n$$

where F = the projected population at the end of the time period

P = the population at the beginning of the time period

i = the rate of increase

n = time period in years

The population growth rate (i) projected by the County of Hawaii is 4.5 percent for the period 1970-1990 and 4.0 percent after 1990. The resident population projections based on the estimated 1970 census population of 2,250 for the planning area are tabulated in Table 3-6. It is believed that the 1980 census has confirmed there projections for the planning area. The entire North Kona District is experiencing a rapid growth in resident population. The 1980 census indicated a District total of 13,898 which is a 187.7 percent increase over 1970--the largest increase recorded in the State. More detailed 1980 census data was not availabe for inclusion herein.

The daily visitor projections for the planning period were based on hotel room projections for the planning area prepared by the County of Hawaii. Daily visitor projections were developed using an average hotel room occupancy rate of 1.8 persons per room per day. The estimated daily visitor projections are tabulated in Table 3-6.

3. Public Facilities

Public services are provided by the County, State and Federal governments. The County provides such services as fire protection, law enforcement, sanitation, recreation and transportation, while the State provides schools, libraries, and

TABLE 3-6

RESIDENT POPULATION AND DAILY VISITOR PROJECTIONS
FOR THE PLANNING AREA

Year	Resident Population	Daily Visitor
1970	2,250*	1,890 (estimated)
1972	2,490 (estimated)	2,300 (estimated)
1977	3,080 (estimated)	2,870 (estimated)
1980	3,500	3,100
1985	4,400	3,470
1990	5,500	3,870
1995	6,700	4,300
2000	8,150	4,730
2005	9,900	5,220
2035	32,020	9,090

*1970 U. S. Census Population

health facilities. The Federal government provides postal services and the services of the weather station at Ke-ahole Airport.

4. Recreational Areas

There are several County parks serving North Kona and located within the planning area in Kailua. Hale Halawai serves as a meeting place for the community and also provides a picnic area and rest stop. The Kailua Playground public park is used for tennis and basketball. County facilities at the State's Kailua (Airport) Park include baseball and tennis facilities. There are four additional County parks within the North Kona District. They are Hillcrest Park, Holualoa Community Center, Higashihara Park and Pahoehoe Beach Park.

There are three small boat facilities in North Kona. Both Kailua Bay and Honokohau Harbor are within the planning area and Keauhou Bay is located just south of the planning area.

C. ECONOMIC ENVIRONMENT

1. Major Employment Activities

a. Basic Industries

The basic industries in Kona are tourism, agriculture, and construction. Recent developments have changed the land use and employment patterns in Kona. Until recently, agriculture was the predominant industry in Kona. But rising costs, depressed market prices, and more attractive opportunities in other job markets have resulted in a gradual decline in agriculture. The 1960 census indicated that 58 percent of the Kona work force was employed in

agriculture but by 1975 this figure has drastically declined to 6.2 percent.

Agriculture was never a major industry in the planning area because of the scarcity of suitable soil. Much of the land remained undeveloped but the recent realization of Kona's potential for land development and tourism have resulted in a rapid expansion of the visitor and construction industry. The recent growth in hotels, condominiums, and subdivisions is evidence of this expansion. Today, tourism and tourist support related activity form the largest industry in Kona, especially in the planning area.

b. Commercial and Retail Activity

Until the early 1960's, the majority of retail activity in Kona were along the Belt Road or Mamalahoa Highway and largely conducted in family type general stores. At that time, the twenty-five (25) commercial establishments in Kailua accounted for about half of the total retail activity in Kona.

The old pattern is now radically changing. The shift is toward the centralized shopping center. These new shopping centers are being used by both shopkeepers and office users, and are aimed to cater to both visitors and to local residents. The major center of retail and commercial activity is located in Kailua Town. The general types of retail activity include food stores, general stores, apparel, furniture, hardware, eating and drinking establishments and service stations. Office type activity includes banking, real estate, finance, insurance, legal and accounting.

c. Resort Activity

The two major resort areas in Kona are Keauhou Bay and Kailua with the latter located in the planning area. The visitor industry is the most important contributor to the economic well being of the Kailua community. The average occupancy rate of the hotels in Kona has gradually declined from a peak of 81 percent in 1967 to a 1980 (9-month average) rate of approximately 59 percent. This decline can be contributed to the large increase in the number of hotel rooms and visitor oriented condominiums and apartments which cater to the tourist.

2. Economic Forecast

The latest economic statistics (County "Data Book") 198C published By the County of Hawaii, Department of Research and Development, show that tourism is the primary economic mainstay for the County and shows every indication of continuing to be So. Kona, Hilo and Kohala are the main resort centers in the County with Kona attracting the most visitors. The December 1980 statistics show a decrease in the number of westbound visitors for the County from approximately 671,000 to 595,000 for the first 9 months in 1979 and 1980, respectively.

Kona attracts more daily visitors than Hilo and other tourist destinations on the island. The economic indicators show that Kona is expected to continue to attract a larger proportion of the visitors.

Tourist related commercial and industrial development in the planning area is concentrated in the Kailua-Kona subarea. Most of the new developments are designed or located to cater more to the needs of the tourists rather than those of the local residents. Projections show that there will be an increase in eating and drinking establishments as well as other tourist oriented shops. These commercial developments are expected to be located in new hotel facilities within Kailua village instead of at its fringes.

There are 65.3 acres of commercially zoned lands in the planning area of which only 29 acres have been developed. Rezoning would not be necessary for the next ten years or more.

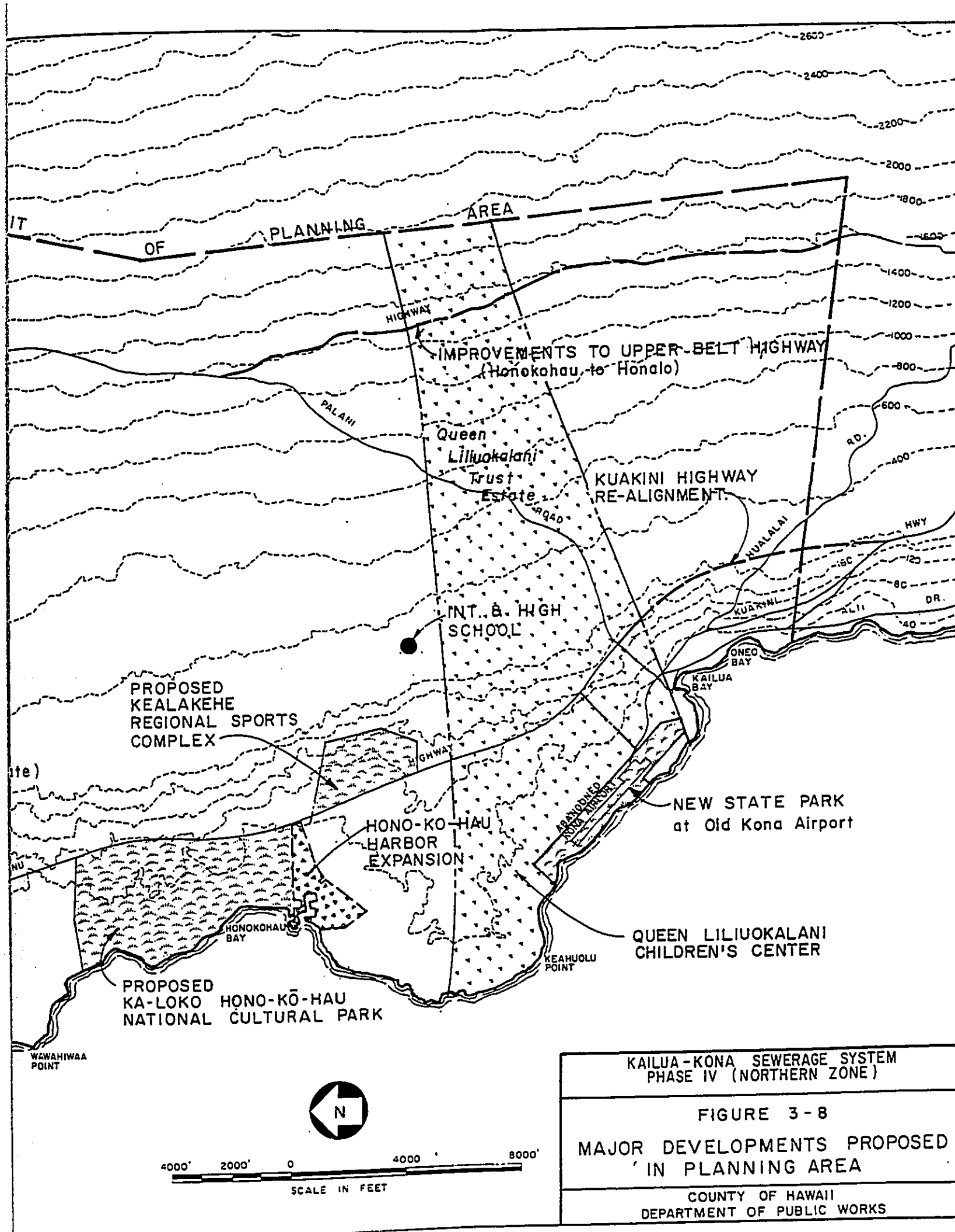
All of the industrial zoned parcels in the planning area are located in or adjacent to Kailua Village. The majority of these parcels are located in the industrial park, while others are located at the old Kona Airport and next to the new King Kamehameha Hotel.

The old airport is presently the site for a new State park. The Kona Community Development Plan indicates there are presently 260.5 acres zoned industrial. Subtracting 103.8 acres for the new State park, there should be 156.7 acres remaining for industrial use.

It is expected that the existing industrial park will reach its capacity within the next few years. Most of the present occupants of the industrial park came to Kona in response to the rapid development of the tourist activity during the 1970's. Because of this, it has become the hub of wholesaling and warehousing in West Hawaii. The Land Use Allocation Map shows the area around the Ke-ahole Airport as future industrial development, as part of either the airport operations or energy plant development.

4. Proposed Developments

An inventory of proposed and significant private land developments and long range Federal, State and County capital improvements is presented below. These proposed developments and the proposed project must be coordinated to provide an efficient, cost-effective system which satisfies the immediate and long range needs of the planning area. Figure 3-8 shows the location of the major proposed developments in the planning area.

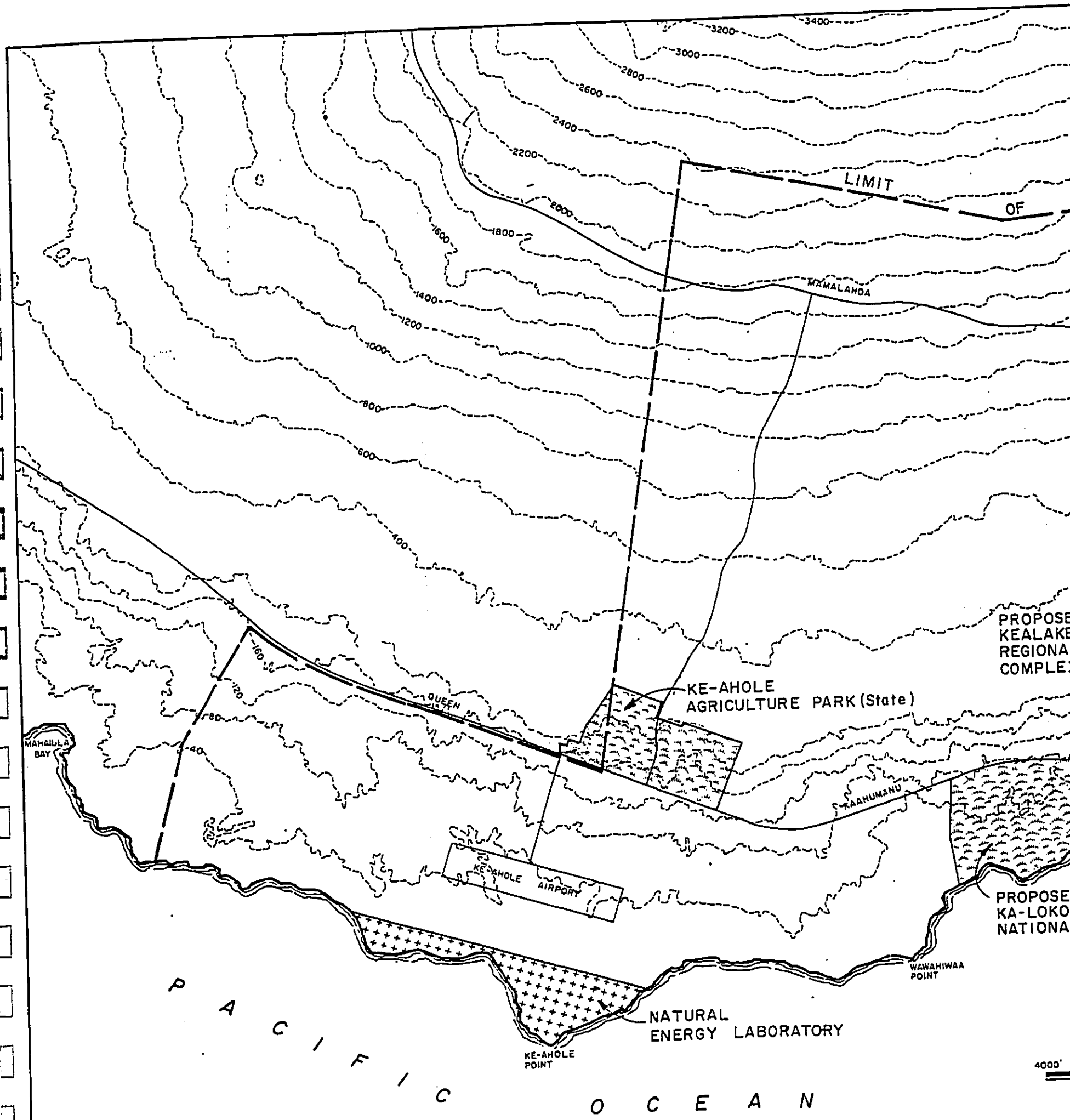


KAILUA-KONA SEWERAGE SYSTEM
PHASE IV (NORTHERN ZONE)

FIGURE 3-8

MAJOR DEVELOPMENTS PROPOSED IN PLANNING AREA

COUNTY OF HAWAII
DEPARTMENT OF PUBLIC WORKS


3400
3200
3000
2800
2600
2400
2200
2000
1800
1600
1400
1200
1000
800
600
400
160
120
80
40
LIMIT
OF
MAMALAHOA
QUEEN
KAAHUMANU
KE-AHOLE
AGRICULTURE PARK (State)
KE-AHOLE AIRPORT
MAHAILUA BAY
KE-AHOLE POINT
NATURAL
ENERGY LABORATORY
WAWAHIWAA POINT
PROPOSE
KEALAKE
REGIONA
COMPLE
PROPOSE
KA-LOKO
NATIONA
4000'
PACIFIC OCEAN

a. Ke-ahole Agricultural Park

The State Department of Agriculture is developing approximately 200 acres of State owned land for an agricultural park at Ke-ahole. The area will be divided into 5- to 15-acre leasehold plots for the cultivation of decorative plants, foliage, and other crops, primarily in shade houses. Water is provided from the County water system.

The development of the park will be in two phases according to the availability of water. The Phase I development is complete and consists of 12 leased lots of approximately 5 acres each. Phase II is in the final design phase.

b. Ka-loko Hono-kō-hau National Cultural Park

The Department of the Interior has proposed the Ka-loko Hono-kō-hau National Cultural Park in an area north of Honokohau Harbor. The proposed park will include about 1,300 acres of which 660 acres are presently privately owned. The primary purpose of the park will be the preservation of the Hawaiian culture at a location containing numerous important archaeological and historic sties. Congress has already approved the site of the park and the Department of Interior is in the process of purchasing the land. However, the limited availability of Federal funds at the present time indicates that the purchase will be delayed indefinitely or dropped.

c. Development Plans on State Lands at Kealakehe

(1) Honokohau Harbor Expansion

The State of Hawaii, Department of Transportation, Harbors Division proposes to expand the existing Honokohau Harbor to accommodate the boating needs of the area to the year 2010. The harbor is located about 3 miles northwest of the center of Kailua Town. The completed expansion of Honokohau will ultimately have 450 mooring spaces and accommodate 350

launchings per day. Its area, including shore functions, will increase from 20 acres to 65 acres.

(2) Kealakehe Regional Sports Complex

The County of Hawaii, Department of Parks and Recreation has proposed a regional sports complex at Kealakehe. This complex would be primarily used for competitive sporting events, especially those capable of attracting large number of spectators. Approximately 100 acres of land is required to accommodate all of the proposed facilities. This sports complex is located along Queen Kaahumanu Highway about 3 miles north of the center of Kailua Town.

(3) Kealakehe Intermediate and High School

A requirement for a high school at Kealakehe, east of the Kealakehe Regional Sports Complex, has been developed by both the County Recreation Plan and the Kona Community Development Plan. Several factors seems to favor the selection of this location.

- Lands are State owned.
- Kealakehe is centrally located in terms of Kailua-Kona's future growth pattern.
- Location close to a sports facility and elementary school.
- Both terrain and Queen Kaahumanu-Palani Collector Road proposals are favorable.

(4) Upper Kealakehe Plans

The State is developing lands for residential use at the eastern end of State owned lands at Kealakehe. This area is northwest of the Kealakehe Elementary School site and between the 500 and 800-foot elevations.

(5) New State Park at Old Kona Airport

The State Department of Land and Natural Resources, Division of State Parks, Outdoor Recreation and Historic Sites, has proposed to construct a State park on the grounds of the old Kona Airport. The project site covers an area of 104 acres of which 14 acres is leased by the County of Hawaii and operated as a County park. The proposed project is located 1 mile north from the center of Kailua-Kona Town. The objectives of the proposed park are to provide a needed recreational area for the people of Kona and preserve the natural and scenic beauty of the area.

(6) Kuakini Highway Realignment

This proposed project will realign approximately 3.1 miles of Kuakini Highway. This two-lane State highway will extend southeasterly from the intersection of Queen Kaahumanu Highway and Palani Road to the existing Kuakini Highway near the Kealakowaa Heiau. The highway will bypass Kailua Village thereby improving the highway system in North Kona. The project is primarily located in pasture lands, but will also pass through the Kona Heights and Kona Hillcrest Subdivisions.

(7) Improvements to Upper Belt Highway (Honokohau to Honalo)

The County of Hawaii has proposed improvements to the Upper Belt Highway from Honokohau to Honalo. The improvements would include minor horizontal realignments, resurfacing, widening of the existing pavement to a standard width of 20 feet, and property acquisition of some lands adjacent to the existing roadway.

(8) Natural Energy Laboratory of Hawaii

The Natural Energy Laboratory of Hawaii (NELH) consists of 320 acres of ocean front property located at Ke-ahole Point adjacent to the Ke-ahole Airport. This site is deemed to be one of the best in the world for ocean thermal energy conversion (OTEC) research.

NELH was established by the Hawaii State Legislature in 1974 as a facility for natural energy research and development. It is a nonprofit corporation managed by a Board of Directors. By statute, the Board consists of the Director of the State Department of Planning and Economic Development, the State Marine Affairs Coordinator, the Chairman of the Board of Land and Natural Resources, two government officials appointed by the Mayor of the County of Hawaii, and two university officials appointed by the President of the University of Hawaii.

OTEC-related experiments have been conducted at NELH since 1975. The official groundbreaking for the construction of permanent roads and facilities took place in January 1979.

NELH's major onshore user is the Seacoast Test Facility (STF). STF is a joint project of the State of Hawaii and the U. S. Department of Energy (DOE). STF is located on 5 acres near the tip of Ke-ahole Point. The groundbreaking was held in February 1980 for the construction of a laboratory building and pipeline system to begin warm water experiments by late summer. Other buildings and pipes will be constructed over the next two years. STF will conduct research on biofouling and corrosion countermeasures.

NELH staff members provided staff support and assistance for Mini-OTEC, the world's first at-sea closed-cycle OTEC plant to produce net energy. NELH obtained permits to allow Mini-OTEC to position itself in NELH's "ocean energy corridor," approximately 1,000 feet wide and 5,000 feet long, extending from Ke-ahole Point. Thus, NELH is the site of two of the nation's major OTEC seawater experiments--STF and Mini-OTEC. A third major experiment, OTEC-1, was located 14 miles northwest of NELH until its cancellation in early 1981.

(9) Recent Development

Several recent developments include a proposed Kailua-Kona shopping center and a proposed industrial subdivision by Liliuokalani Trust.

SECTION 4

RELATIONSHIP OF THE PROPOSED ACTION TO LAND USE

A. LAND USE PATTERNS

1. County of Hawaii Growth Policy

The County of Hawaii General Plan (1971) is the document which establishes the policies for the long range comprehensive development of the Island of Hawaii. The General Plan sets forth the objectives, standards and courses of action for achieving the ultimate goal of a coordinated growth of the island which enhances the health, welfare and well being of the residents. The proposed action is in conformance with the General Plan guidelines and policies.

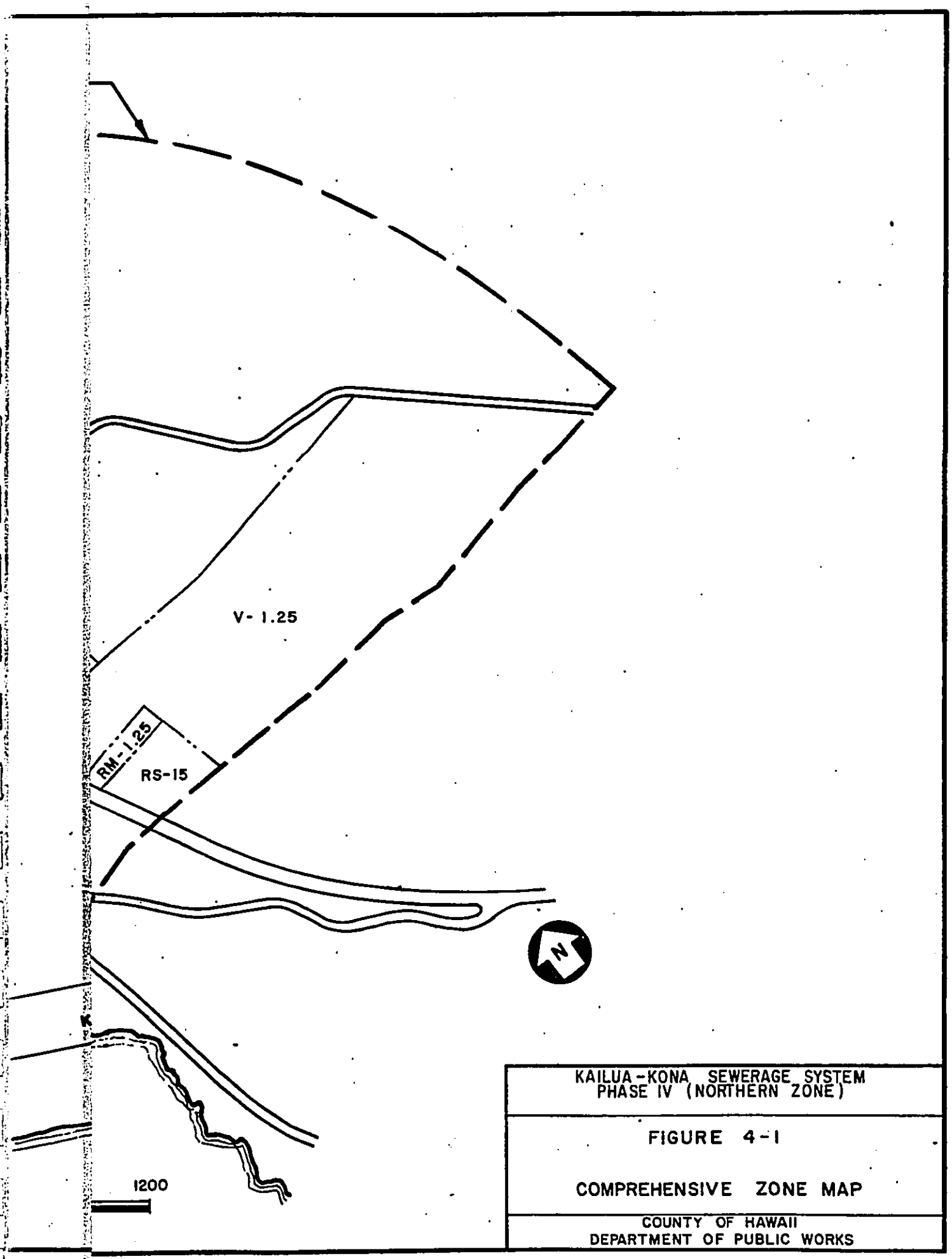
2. County of Hawaii Land Use Policy

The County of Hawaii Comprehensive Zoning Ordinance (Ordinance 63) established the procedures for the division of the County into land use districts. Regulations were created for the type, size, placement and control of structures in each land parcel within the various land use districts. The Zoning Ordinance deals with the existing status of the land parcels and the short range planning needs of the County. The Zoning Ordinance Map which indicates the land use distribution within the Kailua urban area is shown in Figure 4-1.

The Land Use Allocation Map of the County of Hawaii General Plan is the actual guide to secure long range coordinated growth and development in the County. The General Plan Land Use Allocation Map, which is reproduced in Figure 4-2, indicates the distribution and general location of various land uses in relation to each other. The various land use designations indicated on the Land Use Allocation Map are described below:

Industrial (I):	Industry
Urban Centers	
Medium Density (MD):	Village and neighborhood commercial and residential and related functions (3-story commercial; multiple residential, 35 to 11.6 units per acre; single-family residential, 5.8 units per acre).
Low Density (LD):	Residential and ancillary community and single-family residential, no more than 4 units per acre).
Resort Area (R):	Hotels and supporting services.
Agriculture Area	
Extensive (EA):	Pasturage and range lands.
Orchard (OR):	Those agricultural lands which though rocky in character and content support productive macadamia nuts, papaya, citrus and other similar agricultural products.
Open Area (OA):	Parks and Historic Sites.
Conservation Area (C):	Forest and water reserves; natural scientific preserves; open; etc.
Alternate Urban (AU):	Alternate areas for urban centers.

The Zoning Ordinance implements the General Plan along with other factors such as State Land Use Regulations, existing land use distribution, existing public facilities, public concern, and changing needs of the community. Although the Zoning Ordinance and the General Plan have separate and distinct purposes, neither one would be able to achieve its objective without the other. It should be noted that the land use designation may or may not correspond to the zoning for any given land parcel.

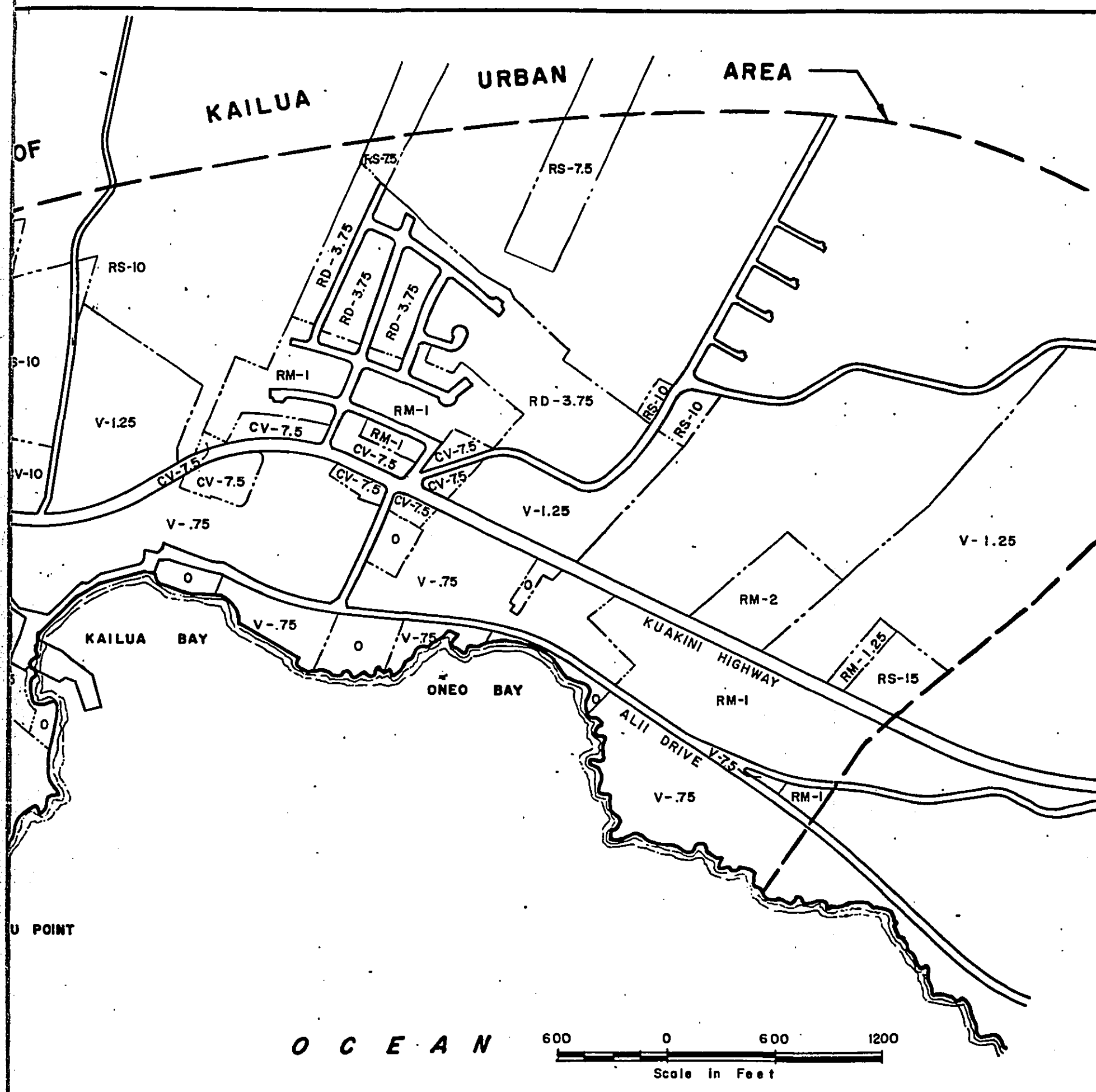


KAILUA-KONA SEWERAGE SYSTEM
PHASE IV (NORTHERN ZONE)

FIGURE 4-1

COMPREHENSIVE ZONE MAP

COUNTY OF HAWAII
DEPARTMENT OF PUBLIC WORKS


KAILUA
URBAN
AREA
OF
RS-7.5
RS-7.5
RS-10
RD-3.75
RD-3.75
RD-3.75
RM-1
RM-1
RD-3.75
RS-10
RS-10
V-1.25
CV-7.5
RM-1
CV-7.5
CV-7.5
CV-7.5
CV-7.5
CV-7.5
CV-7.5
CV-7.5
V-1.25
V-.75
O
V-.75
O
O
V-1.25
RM-2
KUAKINI HIGHWAY
RM-1.25
RS-15
RM-1
KAILUA BAY
V-.75
O
V-.75
ONEO BAY
O
ALII DRIVE
V-.75
RM-1
V-.75
O
U POINT
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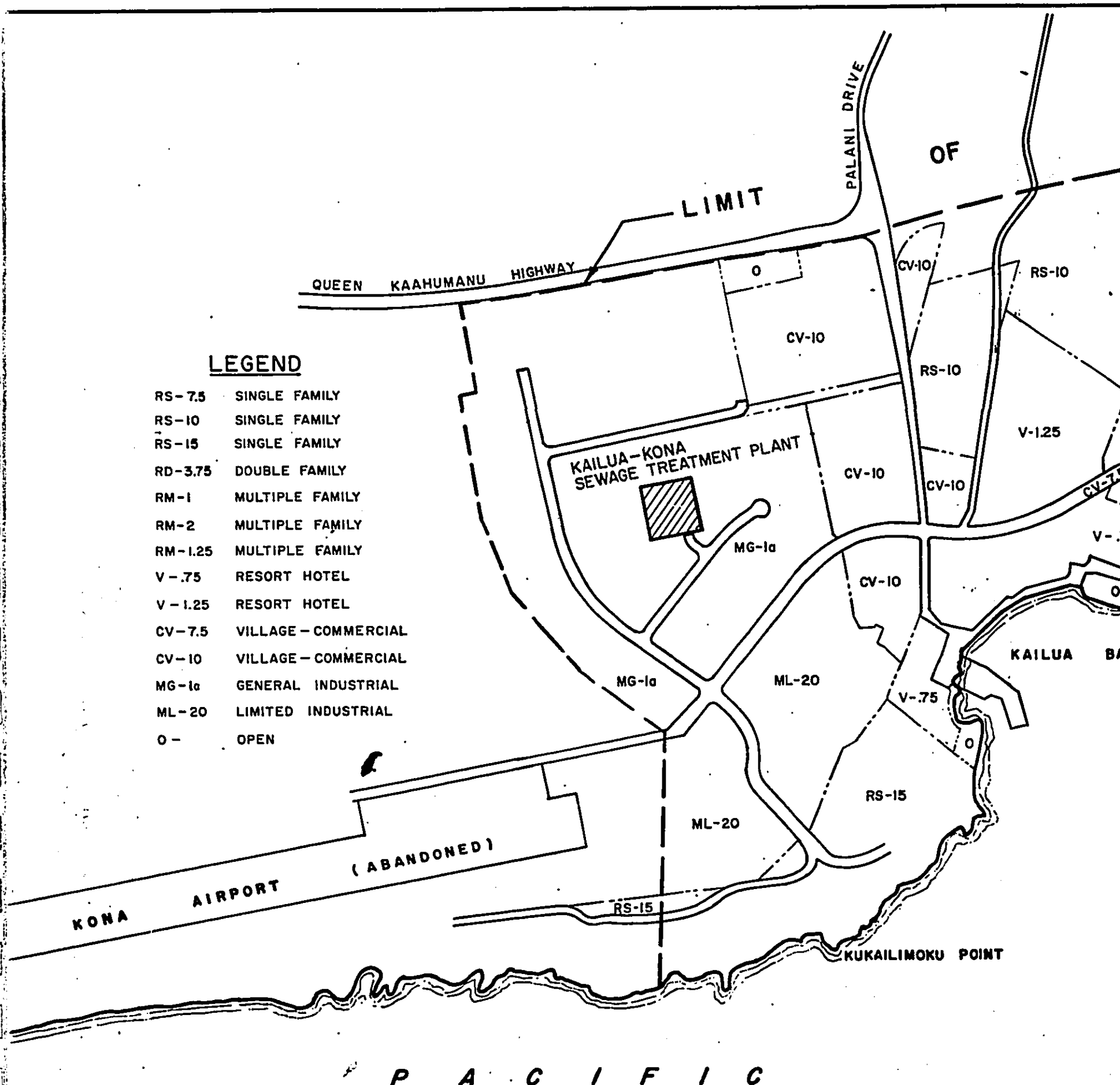
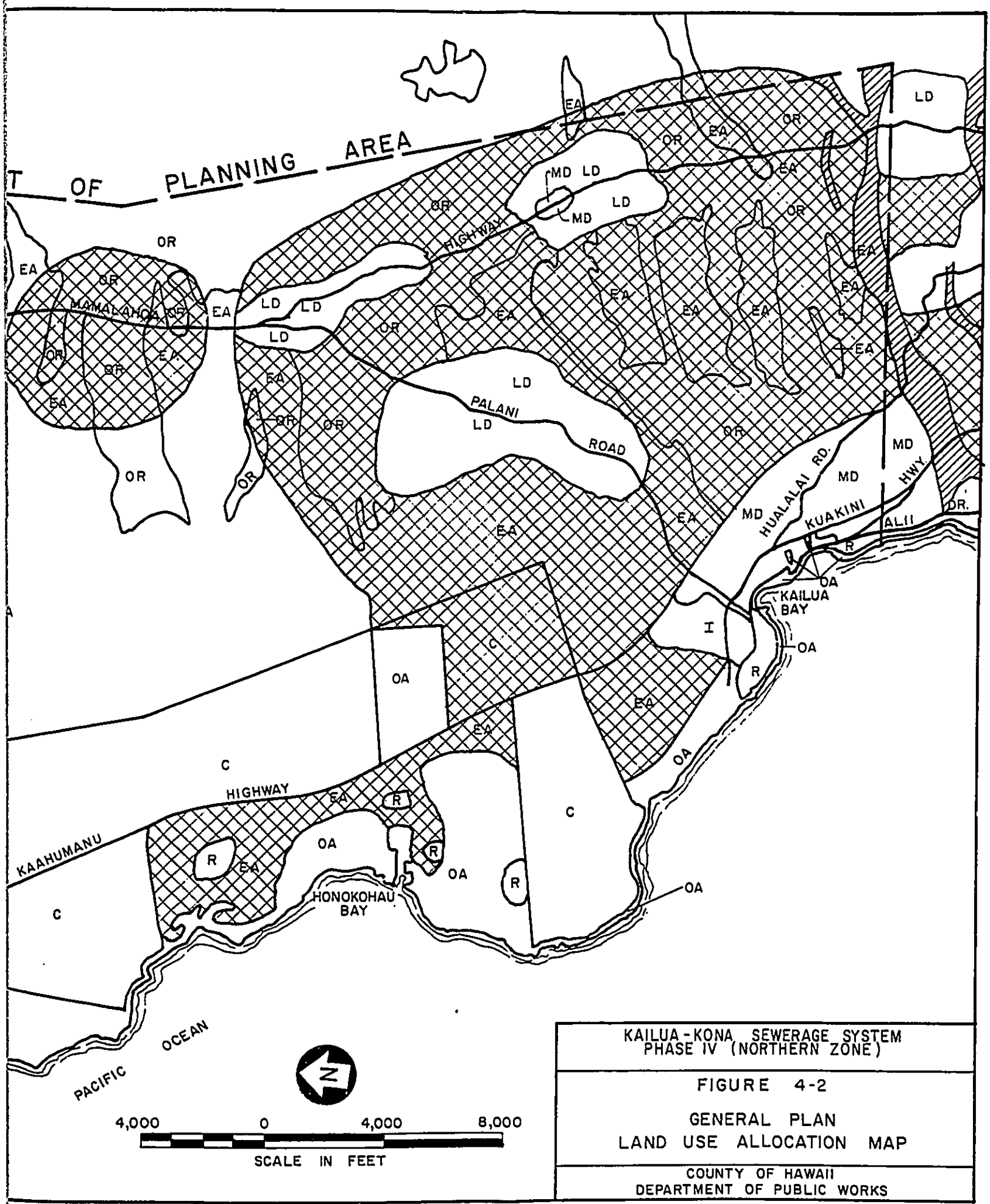
600
0
600
1200
Scale in Feet


LEGEND
RS-7.5 SINGLE FAMILY
RS-10 SINGLE FAMILY
RS-15 SINGLE FAMILY
RD-3.75 DOUBLE FAMILY
RM-1 MULTIPLE FAMILY
RM-2 MULTIPLE FAMILY
RM-1.25 MULTIPLE FAMILY
V-.75 RESORT HOTEL
V-1.25 RESORT HOTEL
CV-7.5 VILLAGE-COMMERCIAL
CV-10 VILLAGE-COMMERCIAL
MG-1a GENERAL INDUSTRIAL
ML-20 LIMITED INDUSTRIAL
O- OPEN
LIMIT OF
QUEEN KAAHUMANU HIGHWAY
PALANI DRIVE
KAILUA-KONA SEWAGE TREATMENT PLANT
KONA AIRPORT (ABANDONED)
KAILUA BA
KUKAILIMOKU POINT
PACIFIC
CV-10
RS-10
V-1.25
MG-1a
ML-20
V-.75
RS-15
O

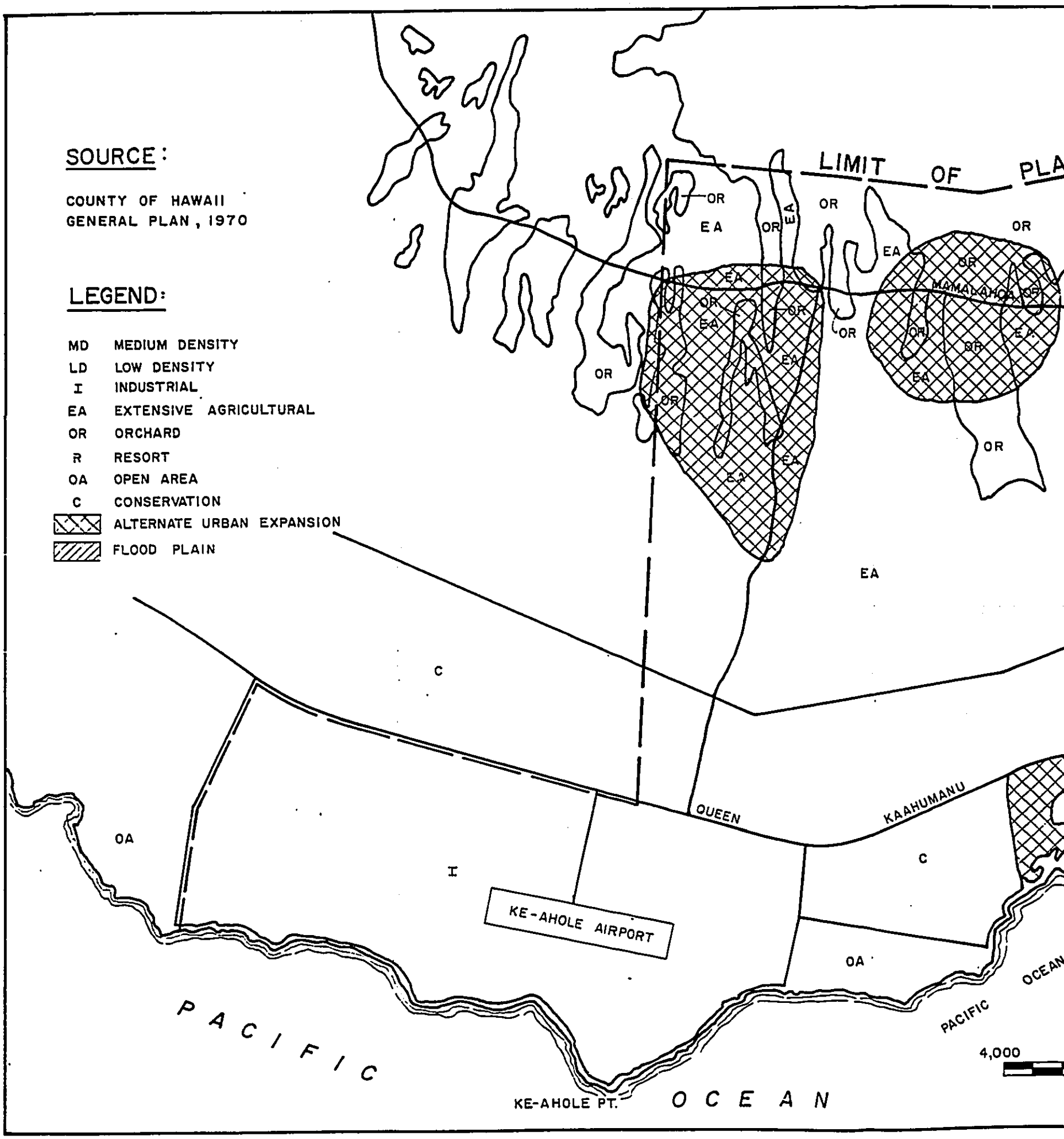


KAILUA-KONA SEWERAGE SYSTEM
PHASE IV (NORTHERN ZONE)

FIGURE 4-2

GENERAL PLAN
LAND USE ALLOCATION MAP

COUNTY OF HAWAII
DEPARTMENT OF PUBLIC WORKS


SOURCE:
COUNTY OF HAWAII
GENERAL PLAN, 1970
LEGEND:
MD MEDIUM DENSITY
LD LOW DENSITY
I INDUSTRIAL
EA EXTENSIVE AGRICULTURAL
OR ORCHARD
R RESORT
OA OPEN AREA
C CONSERVATION
ALTERNATE URBAN EXPANSION
FLOOD PLAIN
LIMIT OF PLA
MAMALAHOA
QUEEN
KAAHUMANU
KE-AHOLE AIRPORT
KE-AHOLE PT.
PACIFIC OCEAN
4,000

The planning area includes approximately 25,100 acres. The Land Use Allocation Map indicates that about 1,290 acres are planned for low density use, 500 acres for medium density and commercial use, 200 acres for resort use, 4,000 acres for industrial use, 4,930 acres for orchards use, 8,570 acres as alternate urban expansion, 8,760 acres as agriculture and the remaining 5,420 acres as conservation and open area. Nearly eighty percent of the available land is planned for agricultural and open uses, reflecting the County's General Plan policy to protect the prime agricultural lands and to protect and preserve the open space for the well-being of the County's residents.

3. State Land Use

The State land use designations of interest are Urban for the treatment plant site and Conservation for the Liliuokalani trust lands traversed by the 20-inch force main.

4. Principal Landowners

Large parcels of land in the planning area are owned by the State of Hawaii, several corporations and trust estates. Figure 4-3 indicates the principal landownerships in the planning area. The land development plans of these landowners may have a major impact on the type of growth and rate of growth for the planning area. Many of these private landowners have formulated plans for the proposed development of their lands. Generally, firm timetables are now being established for these developments.

B. COMPATIBILITY OF THE PROPOSED ACTION WITH LAND USE POLICIES

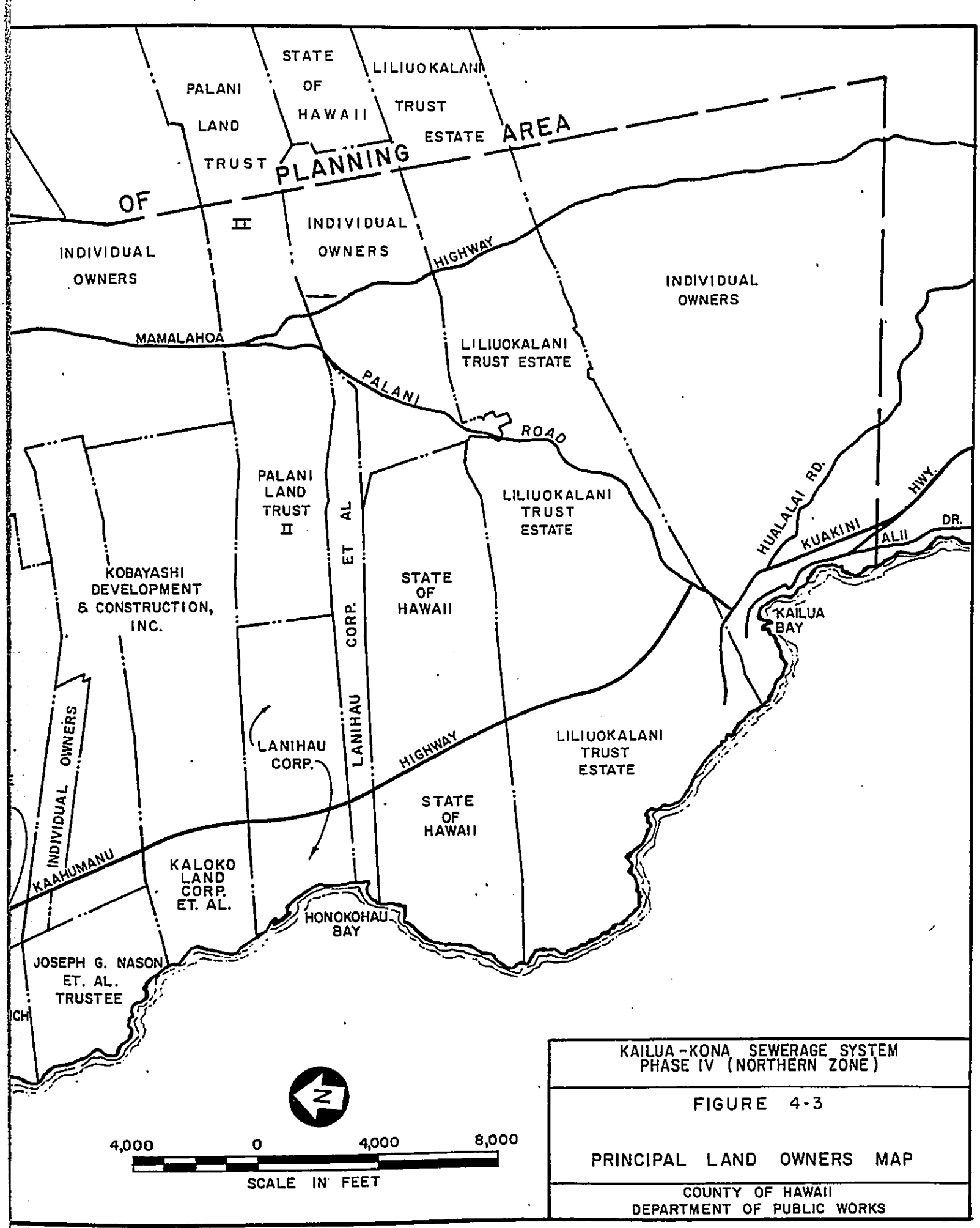
The proposed action is consistent with the existing land uses and the County's General Plan goals.

The proposed collection system will sewer the remaining unsewered urban areas of Kailua Village and the urbanized area of Kealakehe. These areas are designated for urban land uses in the General Plan Land Use Allocation Map. The urban areas proposed to be sewered

in Kailua Village and Kealakehe are designated as medium density and low density, respectively.

The remaining populated areas for which no immediate action is proposed are designated primarily for agricultural and conservation type land uses. There are two sections along Mamalahoa Highway with urban land use designations (medium density and low density) but the current land use is for agricultural purposes. It is not feasible to extend the proposed collection system to these areas until development warrants it. The no immediate action recommendation is consistent with these land uses.

The proposed wastewater treatment plant is located on lands designated as open area (parks and historic sites). Lands designated as resort and extensive agriculture are nearby. However, at this time the only development in the Kealakehe area is the recently expanded Honokohau Boat Harbor. The proposed action to process wastewater at Kealakehe is believed to be compatible with the open area designation because the low-profile facility will have a built-in capability for disposing of effluent by land reclamation. In this area of low rainfall, land reclamation of the effluent will facilitate the development of parks, golf courses and other recreational areas in the near Kealakehe.

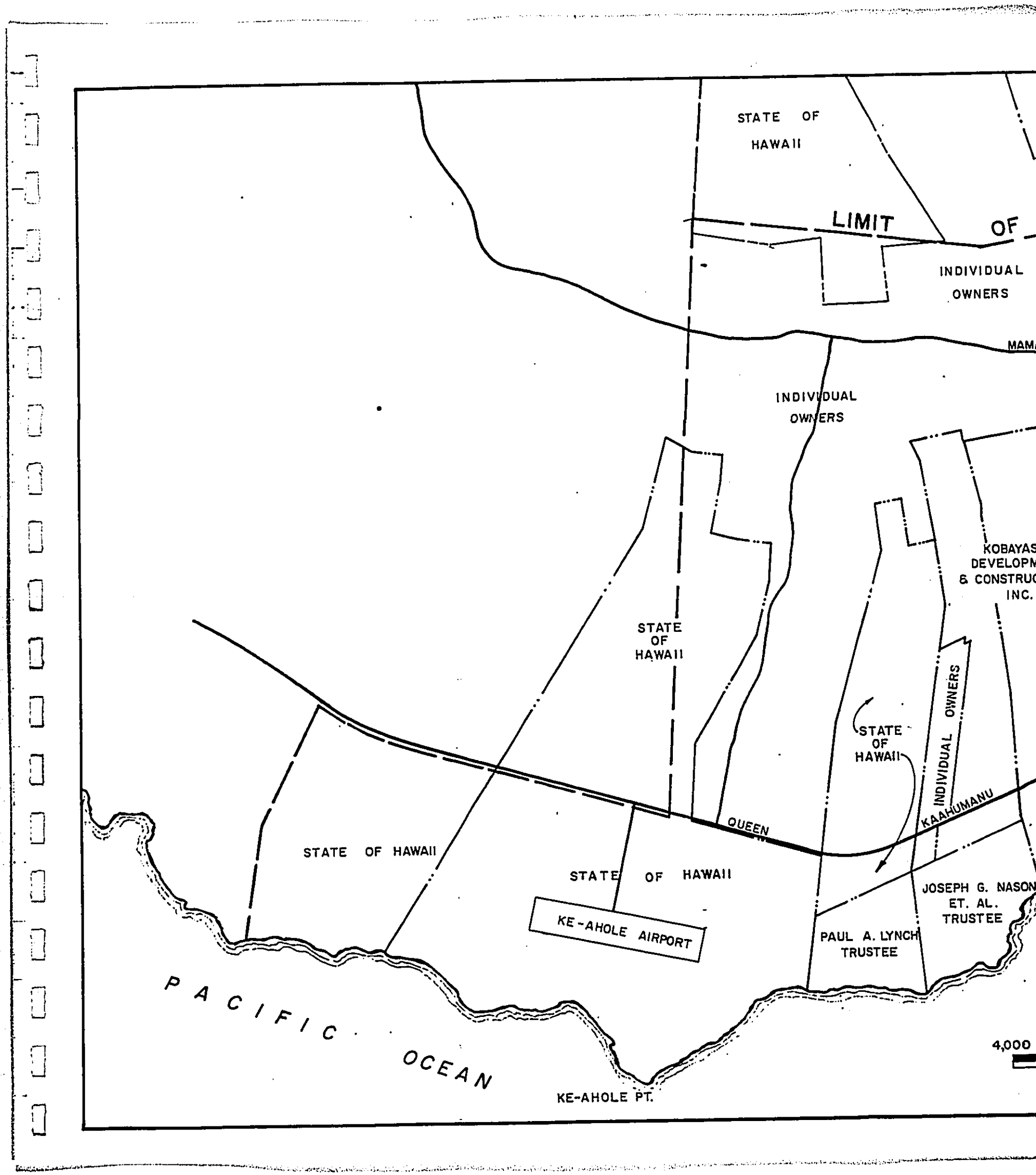


KAILUA-KONA SEWERAGE SYSTEM
PHASE IV (NORTHERN ZONE)

FIGURE 4-3

PRINCIPAL LAND OWNERS MAP

COUNTY OF HAWAII
DEPARTMENT OF PUBLIC WORKS


STATE OF HAWAII
LIMIT OF
INDIVIDUAL OWNERS
MAMA
INDIVIDUAL OWNERS
KOBAYAS
DEVELOPM
& CONSTRUC
INC.
STATE OF HAWAII
INDIVIDUAL OWNERS
STATE OF HAWAII
KAAHUMANU
QUEEN
STATE OF HAWAII
STATE OF HAWAII
KE-AHOLE AIRPORT
JOSEPH G. NASON
ET. AL.
TRUSTEE
PAUL A. LYNCH
TRUSTEE
PACIFIC OCEAN
4,000
KE-AHOLE PT.

SECTION 5

ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATIVE MEASURES TO MINIMIZE ADVERSE IMPACTS

The impacts of the proposed action on the environment may be classified in two categories: primary and secondary. Primary or direct impacts associated directly with the construction activity of the project, i.e., dust, noise, and traffic disruption are generally of a short term nature. Primary long-term impacts may occur after completion of the construction. Secondary or indirect impacts may result indirectly from the provision of a public facility such as a sewerage system. Uncontrolled population growth, urban sprawl, induced land use changes, and pollution from urban runoff are some examples of secondary impacts. Secondary impacts are generally long term in nature but short-term secondary impacts may occur during construction.

A. IMPACTS OF NO IMMEDIATE ACTION

The impacts of no action for the Upper Keopu, Kalaoa and Ke-Ahole Airport-Honokohau Harbor subareas are limited to the secondary long term type. Since no construction activity will be involved, there are no short term primary or secondary impacts. The secondary impacts are generally related to the long-term retention of the on-site systems, primarily cesspools, as the wastewater management systems for the subareas.

1. Water Quality

A potential problem with the continued use of cesspools on the Island of Hawaii is the contamination or pollution of groundwaters and surface waters by cesspool seepage because of the porous nature of the volcanic basalt substructure. The cesspools in these areas are thinly distributed over permeable soil, well suited for optimum cesspool performance. Most of the population in these subareas are located between terrain elevations of 1,000 to 2,000 feet and from 3 to 4 miles from the shoreline. It is believed that these vertical and horizontal distances of effluent travel through permeable rock to the shoreline would mitigate any adverse impacts from the continued use of widely separated cesspools in the subareas.

2. Secondary Economic and Social Impacts

The no immediate action is compatible with the agricultural lifestyle of these subareas. There are no secondary economic or social impacts anticipated. This non-action will not induce any changes in existing land uses.

B. IMPACTS OF THE PROPOSED WASTEWATER SYSTEM

The environmental impacts of the proposed wastewater management project are both primary and secondary. The primary impacts are generally short-term and associated with the construction of the facilities. The secondary impacts are generally long-term and related to the operation of the facilities.

1. Primary Impacts

The proposed wastewater project consists of the following system: the collection and transmission system, the treatment facility, and the disposal system. The short-term and long-term impacts associated with the construction of these facilities are discussed below.

a. Collection and Transmission System

The collection system consists of street branch sewers, gravity interceptor sewers, and one sewage pump station with a force main.

Installation of the buried collection system within Kailua-Kona and Kealakehe will be entirely within existing roadways. The sewage pump station will be constructed near the northern end of the abandoned airport runway and will be readily accessible. Very little flora, fauna or environmentally sensitive areas will be disturbed. There are no residences, existing or planned, near this location.

The buried force main will be constructed across a historic lava flow to the new treatment facilities. The alignment of the force main through the lava field will not have a major impact on the flora and fauna. Since the lava flow is

2. Secondary Economic and Social Impacts

The no immediate action is compatible with the agricultural lifestyle of these subareas. There are no secondary economic or social impacts anticipated. This non-action will not induce any changes in existing land uses.

B. IMPACTS OF THE PROPOSED WASTEWATER SYSTEM

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The buried force main will be constructed across a historic lava flow to the new treatment facilities. The alignment of the force main through the lava field will not have a major impact on the flora and fauna. Since the lava flow is

geologically recent, the land is relatively barren. The only vegetation is fountain grass with a scattering of shrubs. The mongoose and field mouse are the only wildlife observed in the area. The construction of the force main will require excavation of a trench and development of a minimal access road along the alignment.

Many archeological artifacts have been found in the area but most of these were along the shoreline. Since the force main will be located inland, these shoreline archaeological and historical sites will not be disturbed. Archaeological surveys have been completed for the State lands at the Old Kona Airport and for the Liliuokalani Trust lands traversed by the force main. During construction, excavation for the gravity lines, force main and pump station will be carefully examined for any archaeological artifacts. The State Historic Preservation Office will be immediately notified of any discoveries of this nature and appropriate measures will be taken to preserve and protect such artifacts.

Since the sewage pump station, force main, and the interceptor sewer along Kuakini Highway are located within the Special Management Area (SMA), a SMA permit is required for this project.

The construction related impacts for the collection system include traffic inconveniences, noise, increased vehicular emissions, and dust and particulate matter in the air. Excavation of the trenches for the sewer lines will require the use of heavy machinery. Due to the volcanic basalt substructure, some blasting may be required. These impacts will be mitigated by the existing governmental regulations which control the noise, air quality and water quality impacts of the construction industry.

b. <u>Wastewater Treatment Facilities</u>

The wastewater treatment facilities will be constructed in the barren lava field at Kealakehe. The environmental setting

of the lava fields at the plant site is identical to the description presented above for the force main.

The aerated lagoon facility will occupy approximately 30 acres of State land. The lagoons alone will occupy nearly 12 acres. The remaining areas will be occupied by control/maintenance and blower buildings, access roads and a buffer zone. The lagoons will be designed to blend in with the natural surroundings to minimize the visual impact. The treatment plant has been located in a natural terrain depression to minimize the visual intrusion into the coastal zone landscape. The lagoon dimensions will be optimized with respect to the natural topography to minimize the quantity of excavated material. The plant will be designed to utilize the excavated material as fill material and thereby reduce or eliminate the off-site disposal of excess material.

The construction related impacts at the treatment plant site will include noise, dust and increased vehicular emissions. Traffic inconveniences are not anticipated. Due to the volcanic basalt substructure, blasting may be required. An archaeological survey of the plant site in 1980 indicated no significant archaeological sites in the area. In the event any archaeological artifacts are uncovered during construction, the State Historic Preservation Office will be immediately notified and appropriate measures will be taken to preserve and protect such artifacts. As noted above, the adverse impacts of the construction work will be mitigated by adherence to regulations on the construction industry.

The potential long-term adverse impacts of the treatment plant include odors, visual intrusion, energy and noise. Aerated lagoons are the most odor free type of sewage treatment facility. Offensive odors are not generated because of the high oxygen transfer efficiency of the air diffuser equipment and the fact

The ocean portion of the outfall will be buried in a trench leading from the junction box to a nearshore water depth of approximately 60 feet where it will emerge onto the ocean floor for the rest of its alignment to a water depth of approximately 500 feet at an offshore distance of approximately 2,000 feet.

Excavation of the trench in the nearshore area will probably require blasting into the lava rock, producing some short-term turbidity and destruction of marine biota along the alignment. Trench excavation alternatives considered include a clamshell bucket and use of a spud chisel. Use of shape-charge explosives will probably be required due to the hard bottom. These explosives are less environmentally destructive than ordinary explosive charges in that the explosive force is focused and directed downward for maximum excavation effect. Use of explosives by the Contractor will be controlled to minimize the damaging effects upon the environment.

It is anticipated that the turbidity caused by excavation will be mitigated by the excavation of rock particles too coarse to remain long in suspension. The loss of fish, coral and other marine biota due to explosive effects should be localized and on a small scale, with recovery to near-original condition within a relatively short time after construction is completed. A number of large ocean outfalls have been constructed in recent years in the State of Hawaii. Each has followed a similar pattern of design and construction in the nearshore and offshore alignments. These alignments are now characterized by an increase in the marine life attracted to the armor stone used to protect and stabilize the pipes from wave forces.

2. <u>Secondary Impacts</u>

The short-term and long-term secondary impacts associated with the development of the new facilities are discussed below.

a. Collection and Transmission System

The collection and transmission system will be essentially underground and no secondary impacts are anticipated.

b. Wastewater Treatment Facilities

The proposed treatment plant site at Kealakehe is an essentially barren and unused lava field. The proximity of the plant and the availability of treated effluent for land reclamation will have a beneficial long-term impact upon the development of resort and recreational facilities in this water-short area. Tourism is the main Kona industry and it will benefit from the modern sanitary wastewater system, the availability of effluent for irrigation and the preservation of the pristine Class AA coastal waters.

c. Wastewater Disposal System

The deep ocean outfall will discharge the treated effluent in an offshore diffuser that will be located for optimum performance in dilution and plume submergence. It is not expected to have secondary impacts. The treated effluent should not include any toxic materials since the influent sewage does not include industrial wastes of any significance. However, the nearshore Class AA waters throughout the Northern and Southern Zone planning area should indicate a long-term improvement due to the subtraction of cesspool and injection well effluents.

d. Economic

The short-term costs of the interceptor sewers, pump stations, treatment plant and outfall will be shared by the Federal, State and County governments which are funded by the general public. Construction costs of the local sewer lines (improvement districts) will be shared by the County and the affected property owners. Operation and maintenance costs of the new system will be funded by a user charge to be levied on property owners. It is believed that these added costs will be acceptable to the property owners as a

SECTION 6

PROBABLE ADVERSE ENVIRONMENTAL IMPACTS WHICH CANNOT BE AVOIDED

The unavoidable, adverse impacts of the proposed action are summarized in this section and include those discussed in Section 5 which are adverse and unavoidable. The rationale for proceeding with the proposed action in spite of these unavoidable effects is presented.

A. NO IMMEDIATE ACTION FOR UPPER KEOPU, KALAOA, AND KE-AHOLE AIRPORT - HONOKOHAU HARBOR SUBAREAS

1. Unavoidable Adverse Impacts

   The adverse environmental impact of no immediate action for these subareas is the continued discharge of cesspool effluent into the ground. The potential problem associated with the use of cesspools is the contamination of the groundwater and, ultimately, the coastal waters.

2. Rationale for Proceeding

   The rationale for proceeding with the no immediate action recommentation in spite of this adverse impact is based on the following factors:

   a. The affected subareas have very low population densities.

   b. These subareas are agriculturally oriented, with large lot sizes. Cesspools therein are in compliance with public health regulations.

   c. It is believed that the large vertical and horizontal travel distances, through permeable rock, for the cesspool effluents to reach the Class AA shoreline waters are great enough that the thinly distributed effluents will have no significant effects on the shoreline waters.

B. KAILUA-KONA SEWERAGE SYSTEM

1. Primary Impacts

a. Probable Adverse Impacts

The near-term construction impacts are on air and water quality, noise and traffic. Long-term impacts include visual intrusion in the coastal zone, use of State lands, potential noise and odors from the sewage facilities, the initial capital construction costs and the costs of operation and maintenance of the facilities.

b. Rationale for Proceeding

The near-term construction impacts are believed to be conventional in nature and will be controlled through the application of existing regulations controlling air and water quality and noise in the construction industry. The plant site will be located in a natural depression. Odors and noise from the facilities will be controlled and are expected to be minimal. The capital construction and operation and maintenance costs have been minimized by selection of cost-effective alternatives during the development of the Facility Plan for the project. The ultimate objective of preserving and enhancing the pristine nature of the Class AA coastal waters of the Northern and Southern Zones is believed to be of such importance that these adverse impacts are acceptable, as mitigated.

2. Secondary Impacts

a. Probable Adverse Impacts

The proposed project will enhance the continued urbanization of the coastal sectors.

b. Rationale for Proceeding

The project conforms to and is in support of the County General Plan. The continued development of the sewerage system as a part of the Kailua-Kona infrastructure is vital to the economic health of the North Kona District.

SECTION 7
ALTERNATIVES TO THE PROPOSED ACTION

A. GENERAL

Selection of the most cost-effective alternative involves making choices among all the alternatives based on monetary, environmental, social, political and other considerations. The significant costs, effects, and benefits of each must be evaluated and careful judgement must be exercised in selecting the recommended plan. Ideally, the alternative with the lowest present worth cost, without experiencing any overriding adverse nonmonetary costs and public reaction, would be considered the recommended alternative.

1. Environmental Consideration

Provision of sewerage systems may have effects beyond the correction of water quality problems. Environmental effects may be classified as primary and secondary. Primary impacts are those arising from actual construction activity. Examples are noise, dust, traffic slowdowns and other problems arising from construction activity; disturbance of environmentally sensitive areas such as wetlands and floodplains; disturbance of historical and archaeological sites; and land removed from other potential uses. Secondary impacts are induced by the presence or absence of a sewerage system and are relatively more difficult to anticipate and evaluate. The most important secondary impacts are associated with changes of land use induced by the sewerage system and the development that can be stimulated. The provision of a sewerage system can influence the pattern of intensity of development, sometimes resulting in urban sprawl. Some adverse impacts of urbanization are traffic congestion, increased urban storm runoff, air pollution, increased transportation costs, and energy consumption.

2. Fiscal Considerations

Associated with urbanization are some fiscal impacts. These include increased costs associated with providing public

services (police, fire, water, roads, education, transportation, recreation). To cover these costs, taxes and fees must be assessed.

3. Other Considerations

Another consideration is the capability of the State and County of Hawaii to bear their shares of the project cost. In addition, the financial capability of the users to pay the operating and maintenance costs of the wastewater facilities must be assessed. An important nonmonetary consideration is that the selected plan must meet applicable regulatory requirements and design and reliability criteria. Finally, the energy and resources which must be committed to each alternative must be evaluated.

B. DISCUSSION OF ALTERNATIVES

Selection of the recommended system required careful consideration of many factors. The effects of each alternative were weighed against the other alternatives in quantitative terms. Where quantification was not possible, the comparison was made in qualitative terms.

The capital costs and operation and maintenance costs of each feasible alternative in each subarea were determined. The subarea evaluations indicated that expansion of the existing centralized collection system to serve the unsewered urban areas of Kailua-Kona and the Kealakehe subarea was the recommended alternative over the other pollution abatement systems. The optimization of the existing facilities was considered but the present STP cannot handle the projected flows. Small systems (e.g. small package plants) were considered but were not cost-effective with an existing centralized wastewater system nearby.

For these two subareas the environmental effects of the no action or small system alternatives would be to continue or increase the flow of pollutants to the shoreline in violation of State standards for Class AA waters. This would be unacceptable, especially in these rapidly developing areas.

For the thinly populated subareas of upper Keopu, Kalaoa, and Ke-Ahole Airport-Honokohau Harbor, the no immediate action alternative is recommended.

1. Determination of Areas to be Sewered by the Centralized Collection System (Figure 2-6)

   The village of Kailua-Kona is essentially sewered except for the Lono Kona and Aloha Kona Subdivisions that have developed recently at the outskirts. Cesspools are used for wastewater disposal.

   The Lono Kona Subdivision is zoned for high density uses. According to the State Department of Health Regulations, treatment works and sewers are required when the density exceeds one residential unit per 5,000 square feet. The present densities exceed this criterion. To satisfy regulatory requirements, the existing Kailua-Kona collection system must be expanded into the Lono Kona Subdivision. The present system was originally planned to include flows from the subdivision so capacity is available in the system.

   The Aloha Kona Subdivision is zoned as single family. The residential lot sizes vary from 7,500 square feet to 10,000 square feet. Cesspools are used for wastewater disposal. There have been no reports of cesspools clogging or and direct evidence of water quality problems. The need to upgrade the present method of disposal is not urgent. The use of improved onsite systems or expansion of the Kailua-Kona collection system is not recommended. One overriding consideration is that the high initial capital costs for these systems may have to be funded by the individual homeowners.

   Another high density residential area that requires sewers is the Queen Liliuokalani Village housing development in the Kealakehe subarea. The area is zoned for high density development and treatment works and sewers are required according to the State Public Health Regulations. In anticipation of a future sewer

system, sewer easements were provided when the development was constructed. In addition, several multiple family developments in the vicinity of Queen Liliuokalani Village have been completed with more planned in the near future. Like the Queen Liliuokalani Village, these developments use gang cesspools for the interim disposal of wastewater. A "dry" sewer system has been installed in one development in anticipation of a centralized collection system.

2. Alternative Treatment Systems

The treatment systems evaluated were aerated lagoons, rotating biological contactors, and activated sludge. Each of these treatment methods will produce an effluent that will meet the minimum requirements for secondary treatment as defined by the EPA.

a. Environmental Effects

The primary environmental impacts during construction are more severe for the aerated lagoons than the other treatment systems. The aerated lagoon plant will occupy up to five times the land area required by other alternatives. The dust, noise, and other construction related problems for the lagoons will be of a longer duration because much more excavation is required. However, these primary effects are only temporary and are weighed accordingly.

The secondary environmental effects are generally long term and have significant impacts. These effects have much more weight in the ranking than the short term effects. Much more noise and energy consumption are associated with the operation of the activated sludge and RBC processes because much more machinery is required than the aerated lagoon process. Aesthetically, the aerated lagoons will blend in more harmoniously with the natural features of the area. All three systems will have some degree of odors

TABLE 7-1

COST ESTIMATES FOR CENTRALIZED TREATMENT SYSTEMS
KAILUA-KONA SUBAREA (September 1979)

Item	TREATMENT ALTERNATIVE		
	Aerated Lagoon	Rotating Biological Contactor (RBC)	Activated Sludge
A. Capital Costs			
1. Construction Cost	$ 4,683,400	$ 6,024,100	$ 5,463,200
2. Step II & III Non-Construction Cost	896,500	1,153,100	1,045,700
3. Land	3,920,400 (30 Ac)	784,100 (6 Ac)	653,400 (5 Ac)
TOTAL CAPITAL COST	$ 9,500,300**	$ 7,961,300**	$ 7,162,300**
B. Annual Operation and Maintenance			
1. Annual O&M Cost	$ 156,600	$ 216,700	$ 323,000
PRESENT WORTH ANNUAL OM&R	$ 1,708,500**	$ 2,364,200**	$ 3,523,900**
C. Salvage Value (Present Worth)			
1. Structures	-0-	$ 400,800	$ 363,500
2. Land	1,962,800	392,600	282,100
TOTAL SALVAGE	(-)$ 1,962,800**	(-)$ 793,400**	(-)$ 645,600**
TOTAL PRESENT WORTH**	$ 9,246,000	$ 9,532,100	$10,040,600

but the activated sludge and RBC systems have more concentrated point sources of odor. The lagoons occupy relatively much more land which could be put to more beneficial uses. Based on these considerations, the aerated lagoon system probably has the least indirect environmental impacts.

b. Monetary Costs

The total monetary costs consist of the capital construction costs and the operations and maintenance (O&M) costs. The capital construction costs are financed by the Federal, State and County Governments while the O&M costs are financed entirely by the sewer charges levied on the users of the system. The total monetary costs for each treatment alternative are indicated in Table 7-1.

In terms of capital construction costs, the activated sludge alternative is the least costly followed by the RBC alternative and then the aerated lagoons. The land costs were included for the purposes of the cost-effective analysis although no land costs will actually be incurred. The County will obtain the land for the treatment plant from the State of Hawaii by an Executive Order through which no money is exchanged. By deducting the estimated value of the land, the capital construction cost for the aerated lagoons is the lowest and RBC is the highest.

The annual cost for operating a treatment facility consists of the following: labor, materials, power, chemicals, replacement parts, and administrative costs. Labor and administrative expenses are fixed costs which generally account for a large share of the total O&M costs. Power or energy is the next largest expense for mechanically oriented plants such as the activated sludge and RBC systems. The aerated lagoons have the lowest overall O&M costs followed by the RBC system and finally, the activated sludge.

Based on these monetary considerations, the aerated lagoon alternative has the least monetary impact.

c. Implementation Capability

The capability of the County and State governments to fund their share of the project capital costs must be assessed. Since the total public works budgets for the State and County are limited, only those projects with the greatest priority are funded. From the County's point of view, the alternative with the least capital construction costs is the easiest to implement in an austere fiscal climate. Based on the estimated total capital construction costs, aerated lagoons are the easiest to obtain appropriations for construction.

Another consideration is the capability of the users to finance the total operation and maintenance costs of the treatment facility. Since revenues from the sewer user charges must cover the entire O&M costs, each user will be assessed his proportionate share for the use of the facilities. Therefore, the alternative with the least total O&M cost is desirable.

The aerated lagoon had the lowest annual O&M cost followed by the RBC and activated sludge, respectively.

3. Alternative Effluent Disposal Systems

The effluent disposal alternatives evaluated were ocean outfall, irrigation or land treatment, and injection wells.

a. Environmental Effects

The primary environmental impacts during construction are most severe for the ocean outfall alternative. The activities related with the pipe laying on the ocean bottom will temporarily disturb the marine ecosystem near the alignment. Coral and marine habitats in direct line with the pipe

alignment will be destroyed. The construction activity will also cause some temporary turbidity. These short-term primary environmental impacts cannot be avoided. The deep ocean outfall would be designed to ensure that the effluent plume would remain submerged and outside of the Class AA waters. The zone of mixing would be established in Class A open coastal waters and would be in compliance with State water quality regulations.

The primary environmental impacts associated with the construction of the irrigation system and injection wells include noise and dust generated by the construction work; destruction of native grasses shrubs and habitats; and traffic inconveniences.

The secondary environmental effects are long term and can have significant effects. Irrigation or land reclamation has significant long term community benefits. Some of the potential benefits are:

- an increase in the total available water supply.
- conservation of potable water for drinking and other high-quality uses.
- expansion of beneficial agricultural and recreational opportunities in the area.

On the other hand, there is a slight health risk involved with the transmission of disease causing viruses. Research to date has indicated that disinfection alone does not completely destroy all the harmful viruses in the wastewater. Therefore, special care must be exercised in the application of the effluent to avoid direct human

contact. The survival rates of bacteria and viruses vary with the climatic conditions, the soil characteristics, type of crop or grass, and other factors. Specific standards or guidelines for maximum allowable concentrations of bacteria and viruses have not been established to date.

It must be noted that the land reclamation potential in the Kealakehe area at present is extremely limited. However, the resort development potential in the area within the next decade is believed to be high, increasing the future prospects for land reclamation.

The injection of effluent into the groundwater has no foreseeable long term community benefit for the planning area. The primary benefits of injection normally are to prevent saltwater intrusion into a freshwater acquifer as to replenish or recharge an acquifer. There is no such need at the present time or the immediate future for effluent injection since the potable groundwater sources for the Kona area are located a great distance from the point of injection. However, there is a potential viral contamination of the groundwater. Survival rates and migration patterns of viruses in groundwater have not been determined to date and further studies are required. However, Appendix A indicates direct movement of injected effluent to the adjacent shoreline with a resultant contamination of the Class AA waters. Therefore, use of injection wells would introduce an unacceptable contamination into the Class AA waters and defeat a basic objective of the proposed new system: to remove pollutants from the nearshore waters.

Effluent disposal by ocean outfall has no direct community benefit or recycling potentials. Since the effluent plume

will remain deeply submerged, there will be negligible effects on the limited marine ecological system in the vicinity of the discharge point. However, an important benefit of the outfall is that it can be designed for future diversion of effluent to land reclamation systems when they become viable.

Based on these impacts, effluent disposal by ocean outfall has greater beneficial impacts than the other alternatives. In addition, it will permit early construction and operation of the collection, treatment and disposal system and thereby expedite the early realization of the system benefits.

b. Monetary Costs

In terms of capital construction costs, the least costly alternative (Table 7-2) is injection wells followed by ocean outfall. Irrigation is the most costly alternative. In terms of operation and maintenance costs, the ocean outfall alternative cost is minimal. The irrigation alternative has the greatest annual cost.

Based on the present worth evaluation of construction and annual operation and maintenance costs, the injection well alternative is the least costly. The irrigation alternative has the greatest overall cost but some of these costs may be recovered by the revenue generated from the sale of effluent.

c. Implementation Capability

The construction ofthe effluent disposal system is funded by the Federal, State and County governments. The Federal share of the construction costs for alternatives in which effluent is reclaimed or reused increases from 75 percent to 85 percent. Since the State and County have limited capital improvement funds, the least costly alternative would normally be desired.

TABLE 7-2

COST ESTIMATES FOR CENTRALIZED EFFLUENT DISPOSAL SYSTEMS
KAILUA-KONA SUBAREA (September 1979)

	EFFLUENT DISPOSAL ALTERNATIVES		
	Ocean Outfall	Irrigation	Injection Wells
A. Capital Cost			
1. Construction Cost	$ 3,396,000	$ 3,653,600	$ 1,003,000
2. Step II & III Non-Construction Cost	650,000	699,300	192,100
3. Land Costs	276,000	653,400	261,400
TOTAL CAPITAL COST	$ 4,322,000**	$ 5,006,300**	$ 1,456,500**
B. Annual Operation and Maintenance Cost			
1. Annual O&M Cost	-0-	$ 58,900	$ 67,700
2. Well Replacement (every 5 years)			344,100
PRESENT WORTH	-0-**	$ 642,600**	$ 411,800**
C. Salvage Value (Present Worth)			
1. Land	$ 138,200	$ 327,100	$ 130,900
TOTAL SALVAGE	(-)$ 138,200**	(-)$ 327,100**	(-)$ 130,900**
D. Effluent Reuse Benefits			
1. Annual Benefit	-0-	$ 38,500	-0-
PRESENT WORTH	-0-**	(-)$ 420,100**	-0-**
TOTAL PRESENT WORTH**	$ 4,183,800	$ 4,901,700	$ 1,737,400

Another consideration is the capability of the users to finance the operation and maintenance of the effluent disposal system. Although the irrigation system has the highest O&M costs, revenue can be generated from the sale of effluent to offset the O&M cost as well as recover some of the capital costs. The other alternatives do not have this potential. On this basis, the irrigation system is attractive. However, it will not be available in the near future, until development concepts for the Kealakehe area becomes a reality.

C. SELECTION OF ALTERNATIVES

The selected system for the Kailua-Kona planning area was determined by evaluating the impacts of each alternative. The major considerations in the selection process were environmental impacts, monetary and implementation impacts, compliance with applicable regulations, and community benefits.

1. Collection System

The subareas that are to be sewered include the developed areas of Kailua-Kona, Kealakehe, and the Kailua-Kona Southern Zone planning area. The other subareas are inland and have thinly distributed populations. They will continue to use the present method (cesspools) of wastewater disposal. The determination of the areas to be sewered was based primarily on compliance with regulatory requirements and the water quality problems in the Class AA nearshore waters. There is evidence that the present disposal in cesspools and injection wells is causing water quality problems in the nearshore waters of the planning area. The State Public Health regulations require sewers in areas where densities exceed eight units per acre. The Kealakehe area and the Lono Kona Subdivision have densities that exceed this criterion.

Aerated lagoons were selected as the preferred method of treatment because this alternative had the lowest initial capital cost as well as the lowest annual operation and maintenance cost. In addition, the aerated lagoons have the least environmental impact.

The deep ocean outfall was selected as the preferred disposal means, with provisions for diversion of the effluent to land reclamation projects as they become viable. An important aspect of the selection of the outfall alternative is the capability to proceed quickly with design and construction of the proposed system.

SECTION 8

THE RELATIONSHIP BETWEEN LOCAL SHORT TERM USES OF THE ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG TERM PRODUCTIVITY

The proposed project will provide for a much needed wastewater system for the more populated areas in the planning area. The prime objectives of conformance with public health regulations, protecting the pristine coastal water quality and providing for collection, treatment and disposal of wastewater in an economical and environmentally acceptable manner will be accomplished by the proposed system.

The initial short term adverse impacts from the construction of the required facilities and those long term impacts from the operation of the system are to be balanced against the long term benefits of efficient and controlled wastewater management and the planned economic development of the area. The proposed action will improve the environment and thereby have the long term effect of enhancing and maintaining the quality of the environment. Groundwater and nearshore coastal waters will be positively affected by the reduction of pollution from cesspools and injection wells in the Northern and Southern Zones.

Cesspools and injection wells are generally considered short term or interim solutions to the wastewater disposal problem, except in very rural areas where the low densities make any improved system uneconomical. Any area that develops gradually from a low population density to a high population density will eventually require some form of improved wastewater system to protect the environment.

SECTION 9

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

The project will require several irreversible and irretrievable commitments of resources such as the materials, energy and capital to be invested in the new facilities and the manpower and energy to be used to operate and maintain the facilities.

The major commitments are the materials and funds associated with construction of the facilities and the Operations and Maintenance (O&M) costs.

The implementation of the proposed action will utilize resources and materials considered essential to complete the project. Financial, manpower, and material resources will be irreversible and irretrievable commitments for planning, engineering, construction, operation and maintenance of the proposed facilities. Electrical energy will also be irreversibly committed, not only for the construction of the facilities but also for their operation. Some small land easements will be required for the alignment of sewers, and a site will be acquired for the sewage pumping station and another for the treatment plant. Commitments such as land are irretrievable as long as the facility is in use, however, they are reversible and retrievable if the facility is discontinued.

Another long term commitment is the service charge that must be levied on the residents and commercial users of the wastewater facilities. Reference is made to Section 204 of the Federal Water Pollution Control Act Amendments of 1972, Public Law 92-500, which stipulates that Federal grant applicants shall receive such grants only after it has been determined that the applicant has adopted or will adopt a system of charges wherein each recipient of wastewater services will pay his proportionate share of the costs of operation and maintenance to include replacement. This commitment is necessary to justify and obtain Federal grants which allow funds of up to 75 percent of the construction costs of wastewater treatment works.

SECTION 10

AN INDICATION OF WHAT OTHER INTERESTS AND CONSIDERATIONS OF GOVERNMENTAL POLICIES ARE THOUGHT TO OFFSET THE ADVERSE ENVIRONMENTAL EFFECTS OF THE PROPOSED ACTION

Compliance with two environmental regulations helps to offset the adverse effects of the proposed action. These are the Federal Water Pollution Control Act (FWPCA), as amended, and the Hawaii Statute on Environmental Quality (Chapter 342, Hawaii Revised Statutes).

The objective of the FWPCA is to "restore and maintain the chemical, physical and biological integrity of the Nation's waters." To achieve this objective, the FWPCA mandated that the discharge of pollutants into the Nation's navigable waters be eliminated by 1985 and that a water quality be attained by July 1, 1983 which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water. The National Pollutant Discharge Elimination System (NPDES) was established to issue permits for the discharge of all effluents into the Nation's waters. One condition of this permit is that all effluents must receive at least secondary treatment before they can be discharged.

The Hawaii Statute on Environmental Quality has objectives similar to the FWPCA. Under the provisions of this Statute, the State Department of Health promulgates Public Health Regulations addressing the control and abatement of pollution. The regulations pertinent to water pollution abatement are Chapter 37: Water Pollution Control, Chapter 37A: Water Quality Standards, and Chapter 38: Private Wastewater Treatment Works and Individual Wastewater Systems. These regulations establish the effluent requirements applicable to treatment works in order to protect and preserve the water quality of the State.

The State of Hawaii and County of Hawaii share the mutual responsibility of restoring the pristine water quality of Kona. The coastal waters are classified as Class AA and Chapter 37A of the Public Health Regulations does not permit the discharge of sewage effluent into Class AA water.

In addition, the 208 Water Quality Management Plan for the County of Hawaii dated December 1980 identified disposal by cesspools and injection wells in the Northern and Southern Zones as the source of potential health hazards by contaminating groundwater and adjacent coastal waters. The proposed project will provide the wastewater facilities outlined in the "208 Plan" as planned for the Northern Zone and the treatment and disposal facilities required for the Southern Zone.

The project also conforms to the Hawaii State Plan and the State Environmental Policy Act.

SECTION 11

SUMMARY OF UNRESOLVED ISSUES

At this time there are no unresolved issues from the standpoint of potential environmental impacts.

SECTION 12

LIST OF NECESSARY APPROVALS

The following approvals and permits are required for the proposed action. None have been obtained to date but all are required prior to construction.

	Approval/Permit Required	Responsible Agency
1.	Special Management Area Permit	Planning Dept., County of Hawaii
2.	Shoreline Setback Variance	Planning Dept., County of Hawaii
3.	Construction in Navigable Waters	U. S. Army, Corps of Engineers
4.	Conservation District Use Application	State Department Land and Natural Resources
5.	State Coastal Zone Management Certification	State Department of Planning and Economic Development
6.	Shorewater Construction Permit	State Department of Transportation

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45. Young, R. H. F. and Chan P. L., "Oahu Wastewater Treatment Plant Efficiency," Journal Water Pollution Control Federation, Volume 42, No. 12, December 1970, pp 2052-2059.

APPENDIX A

EFFLUENT DISPOSAL ALTERNATIVES

by Dr. Frank L. Peterson

April 7, 1981

APPENDIX A

EFFLUENT DISPOSAL ALTERNATIVES

Nature of Problem

The present wastewater disposal system for this area consists of the Kailua-Kona STP, which treats most of the wastewater for the Kailua-Kona village, and disposes of the effluent by a combination of surface irrigation and a large-diameter injection pit. Cesspools are used as the primary means of wastewater disposal outside of the Kailua-Kona village. In addition, several hotels and condominiums along the coastal area between Kailua-Kona and Keauhou utilize small package sewage treatment plants with shallow small-diameter injection wells for effluent disposal.

The capacity of the present Kailua-Kona STP is too small to accommodate the future wastewater requirements of this area, and furthermore, the plant experiences operational and odor problems.

The cesspools are well distributed and appear to be performing satisfactorily. Nonetheless, because of the very high soil and rock permeability, and the close proximity of many of the cesspools to the shoreline, it is inevitable that leachate from the cesspools eventually discharges into the shallow coastal waters. The very fact that the cesspools operate in a trouble-free manner strongly suggests rapid movement of leachate from the cesspool sites. In fact, this has been verified by field tests performed on several cesspools along Alii Drive in Kailua-Kona in which fluorescein dye was observed to discharge into the coastal waters within 2 to 7 hours after being introduced into the cesspools (Matsuura, 1981).

The operation of the injection wells is not well documented, but since all the wells are very close to the shoreline it is certain that injected effluent discharges into shallow coastal waters. The effluent presumably has undergone secondary treatment, but the small package treatment plants used at most injection well sites in Hawaii are notorious for their poor treatment record (Petty and Peterson, 1979).

The extent, if any, of contamination of coastal waters by leachate from cesspools and injection wells is not well known. Significant levels of coliform bacteria contamination have never been detected during the several years of water quality monitoring by the Hawaii State Department of Health at their Kailua pier and Kona Hilton Hotel stations. However, nutrient levels in excess of State standards have been detected (See Table 4-4). This is indicative of the movement of leachate into the coastal waters. Generally speaking, the

quantities of cesspool leachate which discharge into the coastal waters probably are relatively small and distributed over a rather large area, and hence get mixed with seawater very rapidly. The injection well leachates from the Kailua-Kona Treatment Plant and the small treatment plants in the Southern zone are more significant flows. Because of the highly permeable nature of the volcanic rocks in this area, the possibility always exists that cesspool or injection well leachate may become channelized in a lava tube or other subsurface flow structure and discharge into the coastal waters in concentrated form, thus creating the potential for contamination of the shallow coastal waters on a local scale where the cesspools/injection wells exist.

Given the present situation in the Kailua-Kona area of rapid population growth and limited wastewater treatment capacity, unless additional treatment capacity is constructed it is inevitable that greater quantities of leachate from cesspools and injection wells will discharge into the shallow coastal waters and increase the potential for contamination of these waters. The proposed solution to the wastewater disposal problem is to construct a new centralized system for treatment and disposal of wastewaters. This plan proposes three alternative solutions for the disposal of the treated effluent from the proposed new STP near Honokohau Harbor. These disposal alternatives are: irrigation with injection well backup, ocean outfall, and injection wells. The purpose of this report is to provide a brief evaluation of the possible impacts these three alternative effluent disposal plans might have on the subsurface and coastal waters in the area.

Irrigation

This plan for wastewater disposal would utilize the treated effluent primarily for golf course and park irrigation, with injection wells as a backup during times when irrigation was not possible. The principal advantage of irrigation reuse over the other alternatives is that of water reclamation in a highly water deficient area.

Much of the effluent would evaporate and be utilized by plants. Ultimately, a small portion of the effluent would percolate down to the top of the groundwater body as return irrigation water and be transported in accordance with the regional flow pattern to the shoreline and discharged into the coastal waters (see Figure 1 for groundwater flow of area). But since the irrigation effluent would be applied over a fairly large surface area, and furthermore, the topsoil would act as a filter, the potential for contamination of coastal waters should be negligible. Contamination of groundwater in the area would not even be a consideration because all groundwater in the vicinity of the proposed STP site contains several thousand mg/l of chlorides.

Ocean Outfall

The main disadvantage of disposal by ocean outfall compared to reuse by irrigation is the wastage of usable water. The main advantage of ocean outfall disposal compared to well injection is the relatively trouble-free and non-contaminating nature of the operation.

Injection Wells

This disposal method will utilize several large-diameter injection wells probably about 150-200 feet deep. Because the waste effluent will be injected directly into the basal groundwater body, it is instructive to consider the hydrogeology of the area. Figure 1 is a cross-sectional view showing the generalized groundwater flow patterns for this area.

As was discussed previously, the subsurface materials in this area, which consist entirely of thin basaltic lava flows from Hualalai, are characterized by their extremely high permeability. Values of hydraulic conductivity are thought to range between 1,000-10,000 feet/day. Basal groundwater may become channelized locally by even higher permeability structures such as lava tubes. Consequently, occasional fresh water springs discharge along this coastline, and one such spring discharge occurs in the vicinity of Honokohau Harbor. If effluent from injection wells were to intercept such a channelized groundwater flow system extremely rapid and concentrated effluent discharge to the coastal waters could be expected.

A simplified, but instructive way of evaluating the impact of injected effluent discharge at the coastline is to assume that initially the effluent mixes with local groundwater and becomes diluted, but with time the local groundwater gets displaced until at steady state the effluent totally displaces the ambient water along its path and travels to the coast as a plume with dilution occuring only at the margins of the plume. The geometry of the effluent plume and the width along which it discharges into the coastal waters is a function of the aquifer and local flow field parameters, and can readily be calculated. The effluent would normally discharge into the shallow coastal waters within several hundred feet of the shoreline. Dilution of the effluent with seawater depends primarily on the width of the plume where it discharges into the coastal waters and the mixing capacity of the coastal waters.

Figure 2 shows a typical effluent plume which might be expected to result from waste injection wells at the proposed Honokohau STP. The plume has been calculated using the following equations:

$$r = Q/2\pi bKi \qquad (1)$$

$$L = 2\pi r \qquad (2)$$

where L is the width of the effluent plume at the coast, r is the upgradient distance the plume travels, Q is the injection rate of 2.8 mgd, b is the vertical injection interval (effluent plume thickness) which was assumed to be 100 feet, K is the aquifer hydraulic conductivity, assumed to be 3,000 feet/day, and i is the ambient flow field gradient, assumed to be 2 feet/mile. Using these values the width along which the effluent discharges into the coastal waters turns out to be approximately 3100 feet.

The major advantage of injection wells over the other disposal alternatives is one of economics. Compared to most other injection well sites in the Hawaiian Islands, this area appears to be quite favorable because the very high rock permeability should reduce well clogging problems which are common to many injection well operations in Hawaii. Furthermore, the waters along this coastline generally are energetic and the mixing capacity should be high.

The major disadvantages of injections wells compared to the other disposal alternatives are: (1) the uncertain potential for contamination of coastal waters, especially if effluent becomes channelized in local flow structures such as lava tubes which are known to occur within the general area, and (2) the potential for costly well clogging and maintainence problems which are experienced at many Hawaiian waste injection facilities.

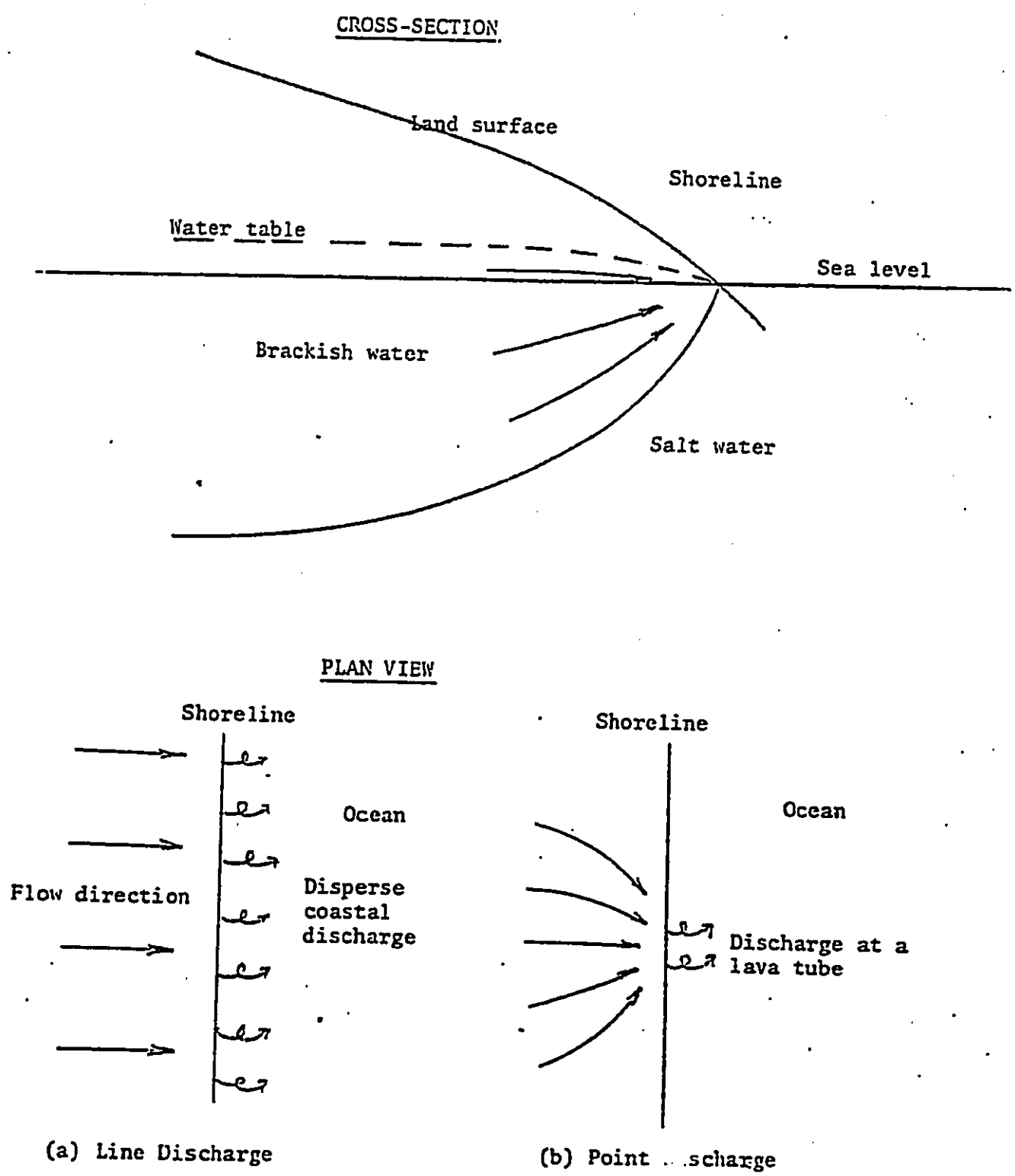


FIGURE A-1: Generalized groundwater flow patterns in Kailua-Kona area.

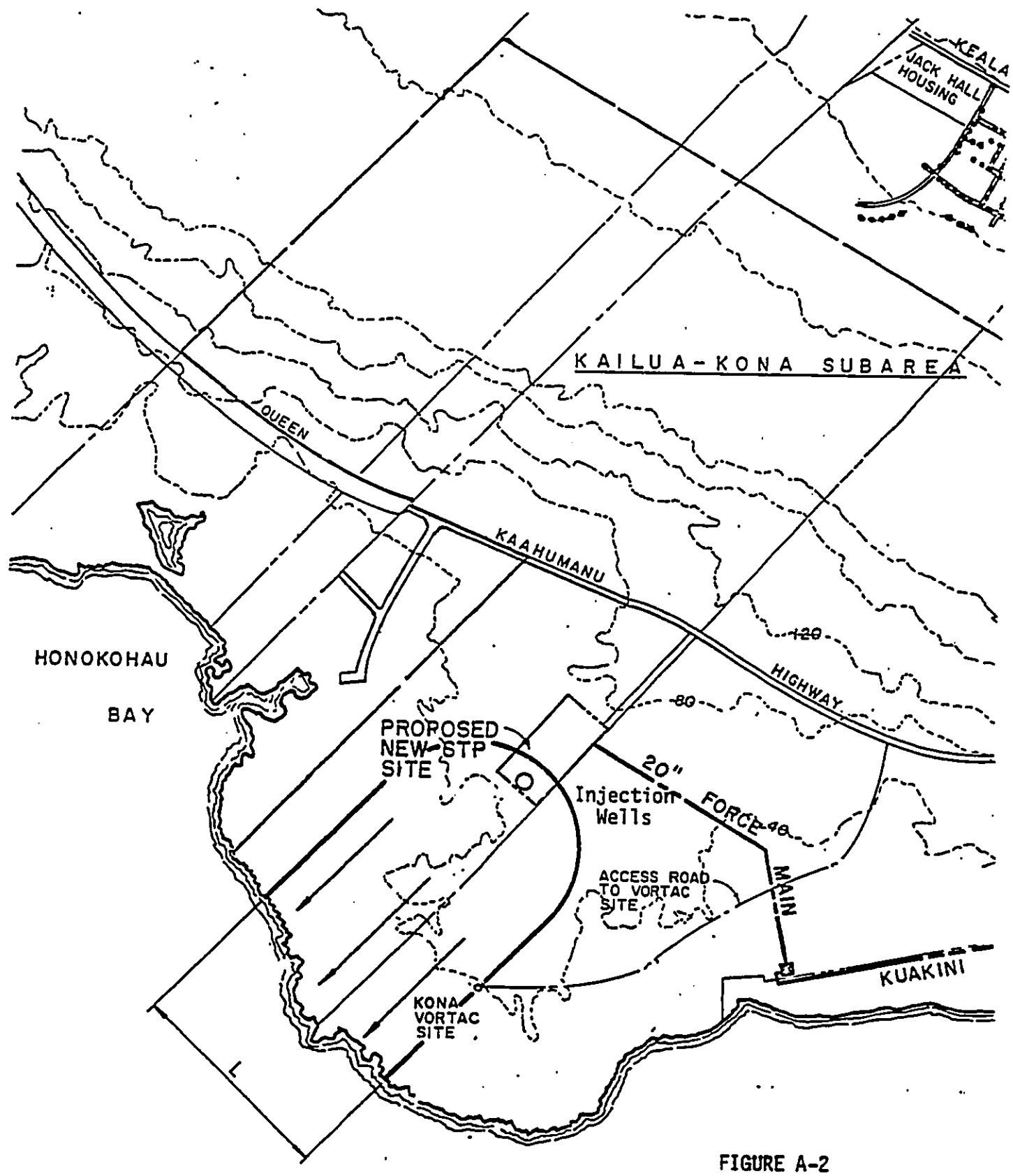


FIGURE A-2

EFFLUENT PLUME FROM INJECTION WELLS

APPENDIX B

DISPOSAL BY OCEAN OUTFALL

APPENDIX B
DISPOSAL BY OCEAN OUTFALL

A. GENERAL

Marine disposal of sanitary wastes can be accomplished with ocean outfalls. Normally an outfall consists of a pipeline to transport the wastes offshore to deep water and a diffuser section to disperse the treated effluent into the surrounding water. The more primitive outfall system consists of an outlet which discharges raw sewage into a body of water. The state of the art of outfall design has advanced in recent years where the natural processes of the receiving body of water are utilized to effectively dilute and purify the treated effluent and to transport it from the discharge site.

The vertical density stratification in the nearshore regime is utilized to keep the sewage field submerged. A multiple port diffuser section is used to produce a high dilution of the wastewater with the receiving waters. The sewage field, which develops, undergoes vertical mixing and horizontal spreading under the influence of the available nearshore currents and density stratification. The resultant large and highly diluted effluent field subsequently undergoes additional oceanic dispersion and movement away from the discharge location due to the influence of the coastal oceanic circulation.

B. DESIGN CONSIDERATIONS

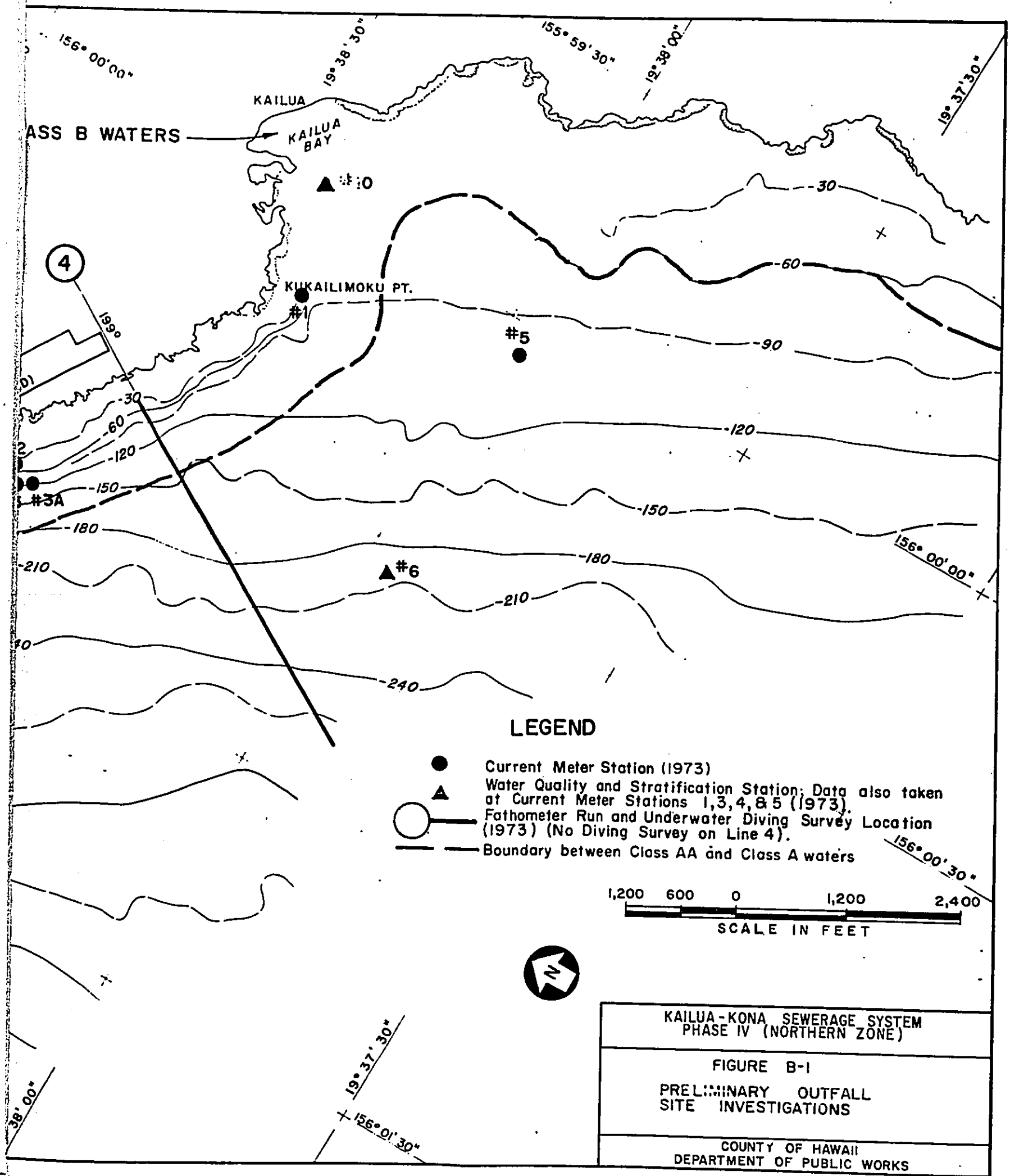
Important considerations in the design of an outfall system are the Water Quality Standards that must be maintained in the receiving waters, the seasonally varying circulation patterns at the disposal site, the seasonal extent of the vertical density stratification, the effect the effluent may have on the ecological balance existing in the area, and the potential and actual recreational use of waters in the disposal area. Other factors of significance are topography, potential wave and tsunami hazards, economics, and marine construction techniques.

A preliminary site investigation of several potential outfall sites in the Kailua-Kona coastal sector was conducted between February 5 and March 13, 1973 to obtain additional background data pertinent to the coastal sector of the study area. Circulation, stratification, water quality, and bathymetric data were taken. An underwater diving survey was also conducted to determine the general relief of the bottom and the marine life thereon. The results of the investigation are discussed briefly below and in greater detail in Appendix A, Preliminary Ocean Outfall Site Investigation of the report "Master Plan for the Kailua-Kona Sewerage System, Phase IV (Northern Zone)," R. M. Towill Corporation, 1973.

The circulation data indicated that the currents are influenced by the bathymetry. There was a southward flow during March parallel to the coastline - underwater bathymetry north of Keahoulu Peninsula and a northwesterly flow moving along the coastline south of the point. This flow had previously moved through Kailua Bay. It is quite apparent that these two transports must converge and move seaward in the vicinity of Keahuolu Peninsula. It would be necessary to specifically examine this area to determine where these two systems converge. During the investigation, a strong onshore component of short duration (1 hour) was also evident in each day's current record.

Stratification data taken on February 5 and March 13 indicated that the bottom of the surface mixed layer at those times was located deeper than 330 feet (100 meters). Oceanographic investigations by Wyrtki, et al (1967), off the leeward side of the Island of Hawaii indicate that during the winter months of anticipated minimum stratification, the mixed layer depth appears to be located at a depth of about 400 feet.

Water quality samples were taken in both Class AA waters and Class A waters. The delineation of the Class AA - Class A waters boundary is indicated in Plate B-1. The nutrient levels varied with location and depth, with some values exceeding the applicable Water Quality Standards. The standards are presented in Table 3-2.

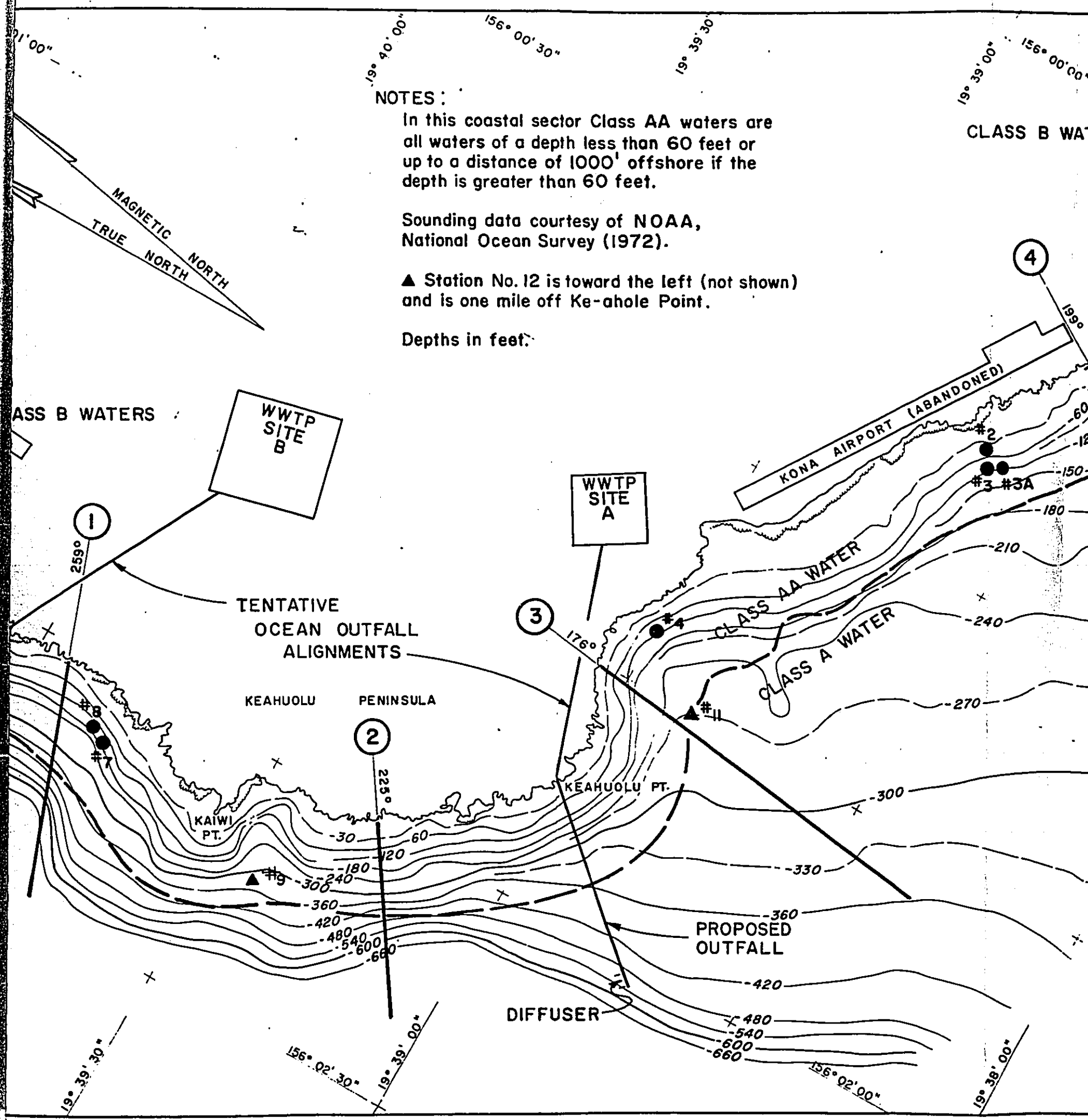


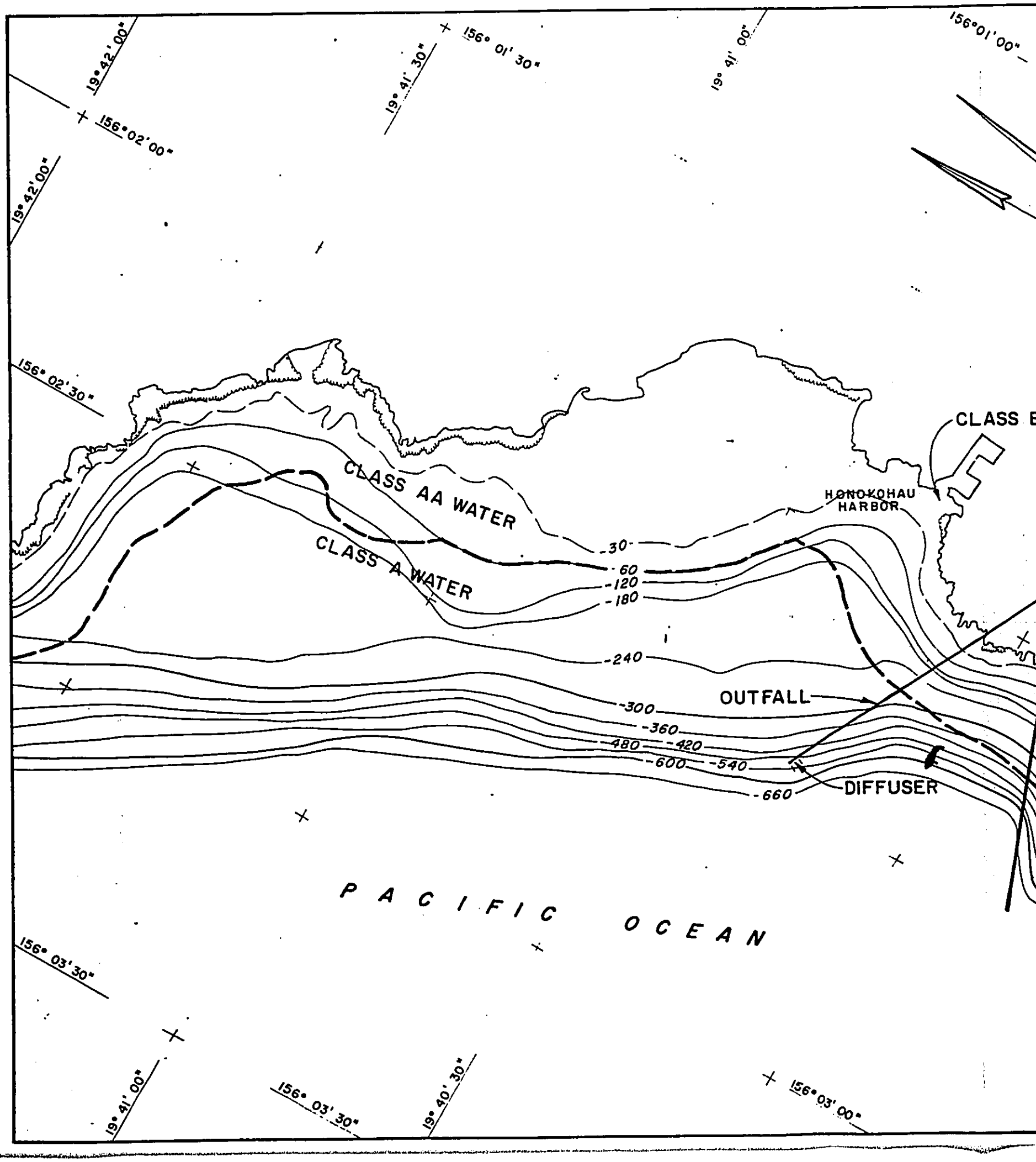
KAILUA-KONA SEWERAGE SYSTEM
PHASE IV (NORTHERN ZONE)

FIGURE B-1

PRELIMINARY OUTFALL SITE INVESTIGATIONS

COUNTY OF HAWAII
DEPARTMENT OF PUBLIC WORKS


NOTES:
In this coastal sector Class AA waters are all waters of a depth less than 60 feet or up to a distance of 1000' offshore if the depth is greater than 60 feet.
Sounding data courtesy of NOAA, National Ocean Survey (1972).
▲ Station No. 12 is toward the left (not shown) and is one mile off Ke-ahole Point.
Depths in feet.
MAGNETIC NORTH
TRUE NORTH
CLASS B WATERS
WWTP SITE B
WWTP SITE A
TENTATIVE OCEAN OUTFALL ALIGNMENTS
KEAHUOLU PENINSULA
KAIWI PT.
KEAHUOLU PT.
KONA AIRPORT (ABANDONED)
CLASS AA WATER
CLASS A WATER
PROPOSED OUTFALL
DIFFUSER
259°
225°
176°
199°
#2
#3 #3A
#4
#7
#8
#9
#11
-30
-60
-120
-180
-210
-240
-270
-300
-330
-360
-420
-480
-540
-600
-660
19° 40' 00"
156° 00' 30"
19° 39' 30"
19° 39' 00"
156° 00' 00"
156° 02' 30"
156° 02' 00"
19° 38' 00"


19° 42' 00"
156° 02' 00"
19° 41' 30"
156° 01' 30"
19° 41' 00"
156° 01' 00"
19° 42' 00"
156° 02' 30"
CLASS B
CLASS AA WATER
CLASS A WATER
HONOKOHAU HARBOR
-30
-60
-120
-180
-240
-300
-360
-480
-420
-600
-540
-660
OUTFALL
DIFFUSER
PACIFIC OCEAN
156° 03' 30"
19° 41' 00"
156° 03' 30"
19° 40' 30"
156° 03' 00"

The bathymetric data were taken by RMTC in March 1973 and by the U. S. NOAA, National Ocean Survey in late 1972. The charts indicate that an expansive fringing coral reef or table reef does not exist around Keahuolu Peninsula. The bottom slopes in the area are very steep (30°-50°), especially around Keahuolu Peninsula. At the peninsula, depths of 500 feet are reached as little as 1,000 feet from shore. The underwater survey verified the steepness of these slopes and further showed the irregular nature of the bottom. The bottom materials appears to be an extension of the lava rock found on shore, covered with a thin veneer of coral.

The coastal waters in the study area are enjoyed by SCUBA divers, pleasure crafts, snorklers, and fishermen. Glass bottom boat cruises pass through the area. The County of Hawaii Park Beach adjacent to the abandoned Kona Airport is used extensively for picnics and swimming. One design consideration in considering an outfall for this area is the preservation of the water quality in accordance with the prescribed standards for Class A and Class AA waters.

On March 13, 1973, an underwater diving survey was conducted along three selected possible outfall alignments. The purpose of the investigation was to determine the feasibility of laying a pipeline on the bottom and to evaluate the gological and biological conditions in the area. The three alignments 1, 2, 3 that were surveyed are shown on Figure 8-1. All 3 transects were commenced at the shoreline and followed to a depth of 100 feet. Visual observations could be made to an estimated depth of 125-150 feet and photographs were taken to document each survey line.

Transect #1

The shoreline is very irregular with large lava formations. The near-shore bottom, to a depth of 25-30 feet, is characterized by large boulders and lava outcroppings. The average bottom slope is about 10°-15°. The relief of boulders and lava outcroppings is about 5 to 12 feet. Numerous small coralheads (75-80% coverage) are present with

the accompanying reef fish. Bottom dwelling organisms consist primarily of urchins, starfish and sea cucumbers.

Smaller rocks and outcrops replace the large boulders at a depth of 30-50 feet. The slope remains 10-15°, and relief is 3-5 feet. Marine life is essentially as above. A ledge is encountered at a depth of about 50 feet and the slope changes drastically to 35-45°. Finger coral replaces coralheads, and relief is only 2-3 feet. Reef fish, urchins, moray eels and mollusks are the predominant biota. The same slope and characteristics are present to 100 feet and sand deposits are found interspersed with decreasing finger coral. The slope of 35-45° continues to the visual limit of about 150 feet.

Transect #2

This transect is essentially the same as #1, with irregular rocks, lava blocks and outcroppings predominating to the 30 to 40 foot depth. The slope is 10-15°, and relief is 3-7 feet. Extensive coral coverage (80%) is present at depths greater than 15 feet. Typical reef environment, as described above, is present.

At 50 feet, the slope increases abruptly to 30-45°, and relief decreases to 2-5 feet. Finger coral predominates and reef life is present. Fewer fish are found here than on transect #1, but this is likely to be coincidental. Benthic life such as sea urchins, cucumbers, starfish, etc., are present.

No discernible changes occur in slope or character to the visual limit of 130-140 feet.

Transect #3

The shoreline is again very rocky and large boulders are found in the nearshore area. The slope is slightly less than 10° and life is sparse, consisting mostly of benthic organisms.

A broad plain exists to a depth of 35 feet. The slope is less than 5°. Coralheads are present, but coverage is only 10-20%. Sand and coral rubble predominate with a few large outcroppings of rock or lava, covered with coral. Fish are virtually absent. Bottom life is very sparse, consisting of urchins, cucumbers and starfish.

At 35 feet, a large ledge is present and extends on a 50-60° slope down to 100 feet. Finger coral coverage is greater than 90%. Benthic life is abundant.

At the bottom of the ledge a sand pocket is present and extends to the visual limit of 150 feet. The slope is 20-30°, life is almost completely absent. Lava outcroppings, covered with finger coral, are present on both sides of the sand pocket.

In summary, the bathymetry of each of the transects is very rugged, steeply sloping and drops quickly to deep water. The benthic community is a function of depth and appears to be typical of the Hawaiian Islands.

C. PRELIMINARY DESIGN CONCEPT

1. Design Concept

When wastewater is discharged deep into the ocean and the ocean waters are density stratified, the wastewater is mixed with the denser layers of the ocean bottom water. The mixture rises until it meets water having a density equal to that of the mixture. Temperature measurements off nearby Ke-ahole Point have indicated that the desired density stratification exists at the outfall site.

The indications from the preliminary oceanographic data are that a deep water outfall is feasible at several locations in this coastal sector. The outlet or diffuser section must, however, be placed at a depth greater than 400 feet for high dilution and submergence of the effluent field, thereby ensuring the maintenance of the existing pristine water quality in the adjacent

The alternatives for deep ocean disposal at Wastewater Treatment Plant Sites A or B (1973 sites) each indicate that a deep ocean outfall diffuser at a depth of approximately 500 feet can meet the design requirements. The sewage field should not surface at this outfall depth. Since seasonal and diurnal stratification in this area has not been thoroughly examined and the transport of the submerged sewage field would be influenced by the currents at this significant depth, field studies will be required to comprehensively determine the deep circulation patterns and seasonal stratification at the disposal area finally selected for the outfall. The alignment selected will be influenced by the Water Quality Standards, bathymetry, economics, oceanographic factors, and construction methods. The outfall pipe size is determined by the projected ultimate peak design flow, the elevation of the proposed plant sites, and the outfall lengths.

The preliminary outfall system concept for each site consists of a short diffuser at a depth of 500 feet, with an initial dilution of 200:1 for the case of no current over the diffuser. The natural elevation at each WWTP site provides sufficient head for a gravity flow system, thereby eliminating the need for an effluent pump station.

Class AA waters. If a well designed diffuser is located at a depth greater than 400 feet, the effluent field is not expected to surface even during the winter period of minimum stratification. This is an important design objective since a surfacing effluent field could be driven onshore under the influence of the onshore surface components of winds and/or currents. Based upon the limited field data now available, it can be postulated that the Water Quality Standards for the coastal sector would not be violated if the effluent field was kept submerged and at a sufficient distance from shore.

APPENDIX C

ORGANIZATIONS AND PERSONS CONSULTED

APPENDIX C

ORGANIZATIONS AND PERSONS CONSULTED

A. FEDERAL GOVERNMENT

Chief
Fish & Wildlife Service
U. S. Department of the Interior
Room 5302
PJKK Federal Building
Honolulu, Hawaii 96813

Chief
National Park Service
U. S. Department of the Interior
Room 6305
PJKK Federal Building
Honolulu, Hawaii 96813

Chief
Geological Survey
U. S. Department of the Interior
Room 6110
PJKK Federal Building
Honolulu, Hawaii 96813

Mr. Kisuk Cheung, Chief
Engineering Division
U. S. Army Engineer District
Honolulu
Building 230
Fort Shafter, Hawaii 96858

Mr. Alvin K. H. Pang, Director
Honolulu Insuring Office
Federal Housing Administration
Department of Housing and
Urban Development
P. O. Box 3377
Honolulu, Hawaii 96801

Mr. Jack P. Kanalz
State Conservationist
USDA, Soil Conservation Service
P. O. Box 50004
Honolulu, Hawaii 96850

B. STATE OF HAWAII

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

Mr. Hideto Kono
Department of Planning and
Economic Development
State of Hawaii
P. O. Box 2359
Honolulu, Hawaii 96804

Mr. Ryokichi Higashionna
Director
State of Hawaii
Department of Transportation
869 Punchbowl Street
Honolulu, Hawaii 96813

Dr. Stephen Lau, Director
Water Resources Research Center
University of Hawaii at Manoa
Honolulu, Hawaii 96822

Mr. Franklin Y. K. Sunn
Executive Director
Hawaiian Housing Authority
P. O. Box 3046
Honolulu, Hawaii 96802

Commission on Population and the
Hawaiian Future
Office of the Governor
State of Hawaii
550 Halekauwila Street
Honolulu, Hawaii 96813

Richard L. O'Connell, Director
Office of Environmental Quality Control
State of Hawaii
550 Halekauwila Street
Room 301
Honolulu, Hawaii 96813

Dr. James S. Kumagai
State of Hawaii
Department of Health
P. O. Box 3378
Honolulu, Hawaii 96801

Mr. William Blaisdell
Planning Director
Department of Hawaiian Home Lands
550 Halekauwila Street
Honolulu, Hawaii 96813

Office of the Chancellor
University of Hawaii at Hilo
Hilo, Hawaii 96720

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

C. COUNTY OF HAWAII

Mr. Milton Hakoda
Director
Department of Parks and Recreation
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Mr. Sidney Fuke, Director
Planning Department
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Mr. Akira Fujimoto
Manager
Department of Water Supply
County of Hawaii
P. O. Box 1820
Hilo, Hawaii 96720

Director
Department of Research and Development
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

D. OTHERS

Mr. Jitsuo Niwao
Manager
Engineering Department
Hawaii Electric Light Co., Inc.
P. O. Box 1027
Hilo, Hawaii 96720

Mr. Hisashi Enomoto
Supervising Engineer
Hawaiian Telephone Company
P. O. Box 425
Hilo, Hawaii 96720

Trustees
Bernice Pauahi Bishop Estate
P. O. Box 3466
Honolulu, Hawaii 96801

Kona Outdoor Circle
President - Pearl Rein
c/o Ron Burla & Associates
P. O. Box 1148
Kailua-Kona, Hawaii 96740

Mr. Claude Onizuka
Kona Jaycees
c/o Kona Credit Union
Kailua-Kona, Hawaii 96740

Mr. Jim Potter
West Hawaii Committee
P. O. Box 1761
Kailua-Kona, Hawaii 96740

Mr. Pete L'Orange, Chairman
Kona Soil and Water Conservation District
RR #1, Box 519
Captain Cook, Hawaii 96704

Ms. Virginia Isbell
Kona Citizens Planning Council
P. O. Box 926
Kealakekua, Hawaii 96750

Ms. Jenny Paris
Life of the Land
General Delivery
Pahoa, Hawaii 96778

Manager
GASCO, Inc.
Hawaii Division
P. O. Box 1397
Hilo, Hawaii 96720

Mr. Douglas Meller
Secretary Shoreline Protection
Alliance
P. O. Box 4247
Honolulu, Hawaii 96813

Kona Civil Club
c/o Rufus Spalding
Kailua-Kona, Hawaii 96740

Ms. Faith Yates
Hawaiian Civic Club
P. O. Box 429
Kealakekua, Hawaii 96750

Mr. Joe Tassil
Organizations Kona
RR #L, Box 249-B
Holualoa, Hawaii 96725

Mr. Dave Walker
Kona Board of Realtors
c/o McCormack Realty
P. O. Box 1360
Kailua-Kona, Hawaii 96740

Mr. Fred Honda, President
Kona Hotel Manager Association
Keauhou Beach Hotel
Keauhou, Kona, Hawaii 96740

President
Kona Chamber of Commerce
P. O. Box 635
Kailua-Kona, Hawaii 96740

Mr. William Hale
Kona Conservation Group
RR #1, Box 125
Captain Cook, Hawaii 96704

Mr. Pete L'Orange
Hawaii Leeward Planning Conference
P. O. Box 635
Kailua-Kona, Hawaii 96740

Kobayashi Development &
Construction, Inc.
1150 South King Street
Suite 901
Honolulu, Hawaii 96814

Kona Coast Company
c/o Huehue Ranch
Kailua Kona, Hawaii 96740

Mr. James M. Greenwell
Lanihau Corporation
3210 E. Kopaka Street
Honolulu, Hawaii 96810

Lilioukalani Trust
First Hawaiian Bank Trust Division
P. O. Box 3200
Honolulu, Hawaii 96801

Union Investments, Inc.
460 Ena Road, Room 408
Honolulu, Hawaii 96815

APPENDIX D

COMMENTS AND RESPONSES MADE DURING CONSULTATION PROCESS

FILE COPY
FLV

R. M. TOWILL CORPORATION

PLANNERS • ENGINEERS • SURVEYORS • HYDROGRAPHERS
PHOTOGRAMMETRIC ENGINEERS • AERIAL PHOTOGRAPHERS
CONSTRUCTION MANAGEMENT

HONOLULU
677 ALA MOANA BOULEVARD SUITE 1016
HONOLULU, HAWAII 96813
TELEPHONE (808) 524-8200
CABLE ADDRESS "TOCOR"

BRANCH OFFICE:
1765 SCOTT BOULEVARD SUITE 210
SANTA CLARA, CALIFORNIA 95050
TELEPHONE (408) 985-1810

May 27, 1980

Reference: 1-13367-1-E

Mr. Edward Harada
County Engineer
Department of Public Works
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Harada:

SUBJECT: Draft Responses to Comments on EIS Preparation Notice, Kailua-Kona Sewerage System, Phase IV (Northern Zone) Kailua, Kona, Hawaii

We are forwarding herewith the draft responses to the eighteen comments received on subject EIS Preparation Notice. They have been prepared for typing on County stationery and for your signature. A copy of each comment has been included to facilitate your review.

Please send us a copy of the signed responses for inclusion with the comments in the EIS.

Very truly yours,

R. M. TOWILL CORPORATION

Stanley T. Yamanaka, Jr.

Stanley T. Yamanaka, Jr.
Chief Engineer

FLV:b65

Enclosures

D-1

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

HERBERT T. MATAYOSHI
Mayor
EDWARD K. HARADA
Chief Engineer
ARTHUR T. ISEMOTO
Deputy Chief Engineer

July 2, 1980

R. M. Towill Corporation
677 Ala Moana Boulevard
Suite 1016
Honolulu, HI 96813

Attention: Mr. Stanley T. Yamanaka, Jr.
Chief Engineer

SUBJECT: Responses to Comments on EIS Preparation Notice, Kailua-Kona Sewerage System, Phase IV (Northern Zone) Kailua, Kona, Hawaii

As requested by your letter of May 27, 1980 (Reference: 1-13367-1-E), we are enclosing a xeroxed copy of each of the responses to the eighteen comments received on subject EIS Preparation Notice. We understand that this is for inclusion with the comments in the EIS.

EDWARD HARADA
Chief Engineer

cc: Mr. Harold Sugiyama

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

PROJECT OFFICES

WAIMEA OFFICE
P. O. BOX 175
KAMUELA, HAWAII 96743

KEAUKAHA OFFICE
P. O. BOX 833
HILO, HAWAII 96720

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
P. O. BOX 1879
HONOLULU, HAWAII 96805

PROJECT OFFICES

MAUI OFFICE
P. O. BOX 33
KAHULUI, MAUI 96732

MOLOKAI OFFICE
P. O. BOX 198
HOOLEHUA, MOLOKAI 96729

KAUAI OFFICE
P. O. BOX 339
LIHUE, KAUAI 96766

February 29, 1980

Mr. Edward Harada, Chief Engineer
Department of Public Works
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Harada:

SUBJECT: Kona Sewerage System, Phase IV
Comments for Environmental Impact Statement (EIS)
Preparation Notice

The Department of Hawaiian Home Lands has reviewed the Preparation Notice for the subject project and has no comments to make since the Department does not have any land holdings in the area under study.

We do thank you for affording us the opportunity to comment on the proposed project.

Sincerely yours,

Georgianna K. Padeken
Georgianna K. Padeken
Chairman

GKP:GW:jn

D-2

DEPARTMENT OF PUBLIC WORKS
COUNTY OF HAWAII · 25 AUPUNI STREET · HILO HAWAII 96720 · TELEPHONE (808) 961-8321

HERBERT T. MATAYOSHI
Mayor

EDWARD K. HARADA
Chief Engineer

ARTHUR T. ISEMOTO
Deputy Chief Engineer

July 2, 1980

Ms. Georgianna K. Padeken
Chairman
Department of Hawaiian Home Lands
State of Hawaii
P. O. Box 1879
Honolulu, HI 96805

SUBJECT: EIS Preparation Notice
Kailua-Kona Sewerage System
Phase IV (Northern Zone)
Kailua-Kona, Hawaii

We appreciate receiving your letter on subject EIS Preparation Notice which indicated no comments.

Should there be any further questions, please call Mr. Harold Sugiyama at 961-8338.

Edward Harada
EDWARD HARADA
Chief Engineer

D-3

GEORGE R. ARIYOSHI
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF SOCIAL SERVICES AND HOUSING
HAWAII HOUSING AUTHORITY
P. O. BOX 17907
HONOLULU, HAWAII 96817

FRANKLIN Y. K. SUNN
EXECUTIVE DIRECTOR

WILLIAM A. HALL
DEPT. EXEC. DIRECTOR

IN REPLY REFER
TO: 4-105/489

March 3, 1980

Mr. Edward Harada, Chief Engineer
Department of Public Works
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Harada:

SUBJECT: Environmental Impact Statement Preparation Notice for the Kailua-Kona Sewage System, Phase 4 (Northern Zone) Kailua-Kona, Hawaii

Thank you for your letter of February 26, 1980, regarding the subject matter.

Please be advised that Hawaii Housing Authority has no comment at this time; however, it is requested that the completed EIS be forwarded for our review when it comes available.

Thank you for keeping us advised in this matter.

Sincerely,

for FRANKLIN Y. K. SUNN
Executive Director

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

HERBERT T. MATAYOSHI
Mayor
EDWARD K. HARADA
Chief Engineer
ARTHUR T. ISEMOTO
Deputy Chief Engineer

July 2, 1980

Mr. Franklin Y. K. Sunn
Executive Director
Hawaii Housing Authority
Department of Social Services and Housing
State of Hawaii
P. O. Box 17907
Honolulu, HI 96817

SUBJECT: EIS Preparation Notice
Kailua-Kona Sewerage System
Phase IV (Northern Zone)
Kailua-Kona, Hawaii

We appreciate receiving your letter on subject EIS Preparation Notice indicating no comments. The completed EIS will be forwarded for your review.

Should there be any further questions, please call Mr. Harold Sugiyama at 961-8338.

EDWARD HARADA
Chief Engineer

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

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

SUSUMU ONO, CHAIRMAN
BOARD OF LAND & NATURAL RESOURCES

EDGAR A. HAMASU
DEPUTY TO THE CHAIRMAN

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

March 6, 1980

REF NO.: APO-1440

Mr. Edward Harada
Chief Engineer
Department of Public Works
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Harada:

We have reviewed the EIS preparation notice for the Kona Sewerage System.

We recommend that a reconnaissance survey be made of the project area by a qualified archaeologist and that his findings be incorporated into the EIS and a copy of his report be forwarded to our Historic Sites Office in Honolulu (Attn: Mr. Ralston Nagata) for review and evaluation. The EIS should also determine what impact the project will have on archaeological resources. If adverse, it should also include mitigation measures.

If an outfull is to be included, we suggested that a baseline study be made of the discharge area.

Finally, the EIS should also cover odor problems which may result from transmission or treatment or malfunction.

Very truly yours,

Susumu Ono

SUSUMU ONO, Chairman
Board of Land and Natural Resources

LEND A HAND TO CLEAN OUR LAND · STATE OF HAWAII

HERBERT T. MATAYOSHI
Mayor

EDWARD K. HARADA
Chief Engineer

ARTHUR T. ISEMOTO
Deputy Chief Engineer

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

July 2, 1980

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

SUBJECT: EIS Preparation Notice
Kailua-Kona Sewerage System
Phase IV (Northern Zone)
Kailua-Kona, Hawaii

We appreciate receiving your letter on subject EIS Preparation Notice. Please be assured that your comments will be considered in the development of the EIS.

Should there be any further questions, please call Mr. Harold Sugiyama at 961-8338.

Edward Harada

EDWARD HARADA
Chief Engineer

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

P. O. Box 636, Kealakekua, Hi. 96750 March 6, 1980

Mr. Edward Harada
Chief Engineer
Department of Public Works
County of Hawaii
Hilo, Hi. 96720

Dear Mr. Harada,

Subject: Environmental Impact Statement (EIS) Preparation Notice for the Kailua-Kona Sewerage System, Phase IV (Northern Zone), Kailua, Kona, Hawaii

This is in response to your letter to Jack P. Kanalz, State Conservationist, USDA, Soil Conservation Service, on February 26, 1980.

We have reviewed the Environmental Impact Statement Notice and have no comments to offer at this time.

Thank you for the opportunity to review this document.

Sincerely,

Gary K. H. Kam
Gary K. H. Kam
District Conservationist

D-5

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

HERBERT T. MATAYOSHI
Mayor
EDWARD K. HARADA
Chief Engineer
ARTHUR T. ISHIMOTO
Deputy Chief Engineer

July 2, 1980

Mr. Gary K. H. Kam
District Conservationist
Soil Conservation Service
United States Department of Agriculture
P. O. Box 636
Kealakekua, HI 96750

SUBJECT: EIS Preparation Notice
Kailua-Kona Sewerage System
Phase IV (Northern Zone)
Kailua-Kona, Hawaii

We appreciate your letter on subject EIS Preparation Notice indicating no comment at this time.

Should there be any further questions, please call Mr. Harold Sugiyama at 961-8338.

EDWARD HARADA
Chief Engineer

HAWAII LEEWARD PLANNING CONFERENCE
P.O. BOX 836 • KAILUA KONA, HAWAII 96740

March 7, 1980

Ed Harada, Chief Engineer
Department of Public Works
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Subject: Environmental Impact Statement (EIS) Preparation Notice for the Kailua-Kona Sewage System, Phase IV (Northern Zone) Kailua-Kona, Hawaii

Dear Mr. Harada:

I have reviewed the Environmental Impact Statement Preparation Notice and have the following comments:

In projecting plant capacity, the use of census figures only measures the resident population as defined by the U.S. Census Bureau. The Kailua area has a large de facto population, who for various reasons, maintain their official residence somewhere else while actually spending the majority of their time in Kona. This de facto population should be considered.

I would also like to point out errors and omissions:

1. Page 11 b: Water Resources -

   Does not mention the Kahaluu shaft as a source of water for the Kailua and North Kona area.

2. Page 21 (3) -

   The statement that the availability for moderately priced houses in the vicinity of Kailua has resulted in a large number of families moving to this area, I feel is false.

3. Page 21 (4) -

   A major decline in the agricultural work force has been caused by other better paying job opportunities along with the reasons given in (3).

Hawaii Leeward Planning Conference appreciates the opportunity to comment on this document. As you realize, we are greatly interested in seeing the plans for the Kailua-Kona Sewage System Phase IV being implemented as soon as possible.

Sincerely,

H. Peter L'Orange

HPL/nb

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

HERBERT T. MATAYOSHI
Mayor
EDWARD K. HARADA
Director
ATSUSHI ISHIMOTO
Deputy Director

July 2, 1980

Mr. H. Peter L'Orange
Hawaii Leeward Planning Conference
P. O. Box 635
Kailua-Kona, HI 96740

D-7

SUBJECT: EIS Preparation Notice
Kailua-Kona Sewerage System
Phase IV (Northern Zone)
Kailua-Kona, Hawaii

We appreciate your letter of comments on subject EIS Preparation Notice. Please be assured that your comments will be considered in the development of the EIS.

Should there be any further questions, please call Mr. Harold Sugiyama at 961-8338.

EDWARD HARADA
Chief Engineer

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

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

GEORGE A. L. YUEN
DIRECTOR OF HEALTH

Audrey W. Marks, 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 EHS-55

March 11, 1980

Mr. Edward Harada
Chief Engineer
Department of Public Works
County of Hawaii
25 Aupuni St.
Hilo, Hawaii 96720

Dear Mr. Harada:

Subject: Request for Comments on Proposed Environmental Impact Statement (EIS) for Kailua-Kona Sewerage System, Phase IV (Northern Zone), Kailua, Kona, Hawaii

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

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

Sincerely,

Brian J. J. Choy
for MELVIN K. KOIZUMI
Deputy Director for
Environmental Health

HERBERT T. MATAYOSHI
Mayor

EDWARD K. HARADA
Chief Engineer

ARTHUR T. ISEMOTO
Deputy Chief Engineer

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

July 2, 1980

Mr. Melvin K. Koizumi
Deputy Director for
Environmental Health
Department of Health
State of Hawaii
P. O. Box 3378
Honolulu, HI 96801

SUBJECT: EIS Preparation Notice
Kailua-Kona Sewerage System
Phase IV (Northern Zone)
Kailua-Kona, Hawaii

We appreciate your letter on subject EIS Preparation Notice indicating no comments or objections to the project at this time.

Should there be any further questions, please call Mr. Harold Sugiyama at 961-8338.

Edward Harada
EDWARD HARADA
Chief Engineer

HERBERT T. MATAYOSHI, MAYOR
A. DUANE BLACK, DIRECTOR

DEPARTMENT OF RESEARCH AND DEVELOPMENT

COUNTY OF HAWAII • 25 AUPUNI STREET • HILO, HAWAII 96720 • TELEPHONE (808) 961-8366

March 13, 1980

MEMORANDUM

TO: Edward Harada, Chief Engineer

FROM: A. Duane Black, Director

SUBJECT: Environmental Impact Statement (EIS) Preparation Notice for the Kailua-Kona Sewerage Systems, Phase IV (Northern Zone), Kailua, Kona, Hawaii

Thank you for this opportunity to review and comment on the above subject. We do not have any comments at present.

We will be happy to review the EIS document when it is completed.

D-9

HERBERT T. MATAYOSHI
Mayor
EDWARD K. HARADA
Chief Engineer
ARTHURT T. ISEMOTO
Deputy Chief Engineer

DEPARTMENT OF PUBLIC WORKS

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

July 2, 1980

Mr. A. Duane Black
Director
Department of Research
and Development
County of Hawaii
25 Aupuni Street
Hilo, HI 96720

SUBJECT: EIS Preparation Notice
Kailua-Kona Sewerage System
Phase IV (Northern Zone)
Kailua-Kona, Hawaii

We appreciate your memorandum on subject EIS Preparation Notice indicating no comment at the present time.

Should there be any further questions, please call Mr. Harold Sugiyama at 961-8338.

EDWARD HARADA
Chief Engineer

United States Department of the Interior

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

IN REPLY REFER TO:
ES
Room 6307

March 13, 1980

Mr. Edward Harada
Chief Engineer
Department of Public Works
25 Aupuni Street
Hilo, Hawaii 96720

Re: EIS and Preparation Notice for the Kailua-Kona Sewerage System, Phase IV, Hawaii

Dear Mr. Harada:

We have reviewed the referenced Environmental Impact Statement Preparation Notice dated February 26, 1980 for expansion of the public sewer facilities at Kailua-Kona, Hawaii.

Most of the proposed development will occur in relatively high density urban areas where significant impacts on fish and wildlife resources are unlikely. There is, however, according to the accompanying assessment, likelihood of installing an ocean outfall. Given the pristine nature of Kona coastal waters and the high values placed on local diving, fishing and other water-based sports, we suggest you develop the appropriate sections of the EIS to describe in greater detail the existing marine environment and probable project-caused impacts therein.

We appreciate this opportunity to comment on this EIS Preparation Notice.

Sincerely yours,

Nevin D. Holmberg
for Maurice H. Taylor
Field Supervisor
Division of Ecological Services

CONSERVE AMERICA'S ENERGY

Save Energy and You Serve America!

AUPUNI ST • HILO HAWAII 96720 TELEPHONE 1311

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

HERBERT T. MATAYOSHI
Mayor
EDWARD K. HARADA
Chief Engineer
ARTHUR T. ISEMOTO
Deputy Chief Engineer

July 2, 1980

Mr. Maurice H. Taylor
Field Supervisor
Division of Ecological Services
Fish and Wildlife Service
United States Department of the Interior
P. O. Box 50167
Honolulu, HI 96850

SUBJECT: EIS Preparation Notice
Kailua-Kona Sewerage System
Phase IV (Northern Zone)
Kailua-Kona, Hawaii

We appreciate your letter forwarding comments on subject EIS Preparation Notice. Please be assured that your comments will be considered in the development of the EIS.

Should there be any further questions, please call Mr. Harold Sugiyama at 961-8338.

EDWARD HARADA
Chief Engineer

GEORGE R ARIYOSHI
GOVERNOR

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

RYOKICHI HIGASHIONNA PhD
DIRECTOR

DEPUTY DIRECTORS
JAMES R CAYETANO
JAMES B MCCORMICK
DOUGLAS S SAKAMOTO
JACK K SUWA

IN REPLY REFER TO

March 13, 1980

STP 8.5089

Mr. Edward Harada
Chief Engineer
Department of Public Works
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

D-11

Dear Mr. Harada:

Subject: EIS Preparation Notice
Kailua-Kona Sewerage System,
Phase IV (Northern Zone),
Kailua, Kona, Hawaii

Thank you for giving us the opportunity to be consulted on the above-captioned action.

In our judgment, the Environmental Impact Statement should contain a discussion on the sites under consideration and their specific impacts. The data presented in the Notice were not sufficient for us to make any specific comments at this time. In this regard, we would appreciate being involved in the review of the Draft EIS.

Very truly yours,

Ryokichi Higashionna

Ryokichi Higashionna
Director of Transportation

DEPARTMENT OF PUBLIC WORKS
COUNTY OF HAWAII - 25 AUPUNI STREET - HILO, HAWAII 96720 - TELEPHONE NUMBER 961-8321

HERBERT T MATAYOSHI
Mayor
EDWARD K HARADA
Chief Engineer
ANTHONY T ISEMOTO
Deputy Chief Engineer

July 2, 1980

Dr. Ryokichi Higashionna
Director of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, HI 96813

SUBJECT: EIS Preparation Notice
Kailua-Kona Sewerage System
Phase IV (Northern Zone)
Kailua-Kona, Hawaii

We appreciate receiving your comments on the subject EIS Preparation Notice. The EIS will include a discussion of the site under consideration and the impacts thereon. It is being prepared to take all relevant comments into account.

Should there be any further questions, please call Mr. Harold Sugiyama at 961-8338.

Edward Harada

EDWARD HARADA
Chief Engineer

DEPARTMENT OF PARKS & RECREATION — Herbert Matayoshi, Mayor

COUNTY OF HAWAII — Milton Hakoda, Director

March 14, 1980

Mr. Edward Harada, Chief Engineer
Department of Public Works
County of Hawaii
Hilo, Hawaii 96720

Subject: Kailua-Kona Sewerage System - Phase IV
EIS Preparation Notice

The following comments are offered for your review and consideration:

On page 19, f. Recreational Areas:

1. Additional County parks within the North Kona district include:
   a. Hillcrest Park - TMK: 7-5-30:26
   b. Holualoa Community Center - TMK: 7-6-03:20
   c. Higashihara Park - TMK: 7-8-05:22
   d. Pahoehoe Beach Park - TMK: 7-7-08:26, 64

2. Kailua Public Park is known as Kailua Playground and contains a tennis court and a basketball court; parking is adequate for these facilities.

3. County facilities at Kailua (Airport) Park are intended to function as a community, rather than a regional, complex. The proposed complex at Kealakehe is intended to be a regional complex.

Milton Hakoda
Director

D-12

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

DEPARTMENT OF PUBLIC WORKS

HERBERT T. MATAYOSHI, Mayor
EDWARD K. HARADA, Chief Engineer
ANTHONY T. ISEMOTO, Deputy Chief Engineer

July 2, 1980

Mr. Milton T. Hakoda
Director
Department of Parks and Recreation
County of Hawaii
25 Aupuni Street
Hilo, HI 96720

SUBJECT: EIS Preparation Notice
Kailua-Kona Sewerage System
Phase IV (Northern Zone)
Kailua-Kona, Hawaii

We appreciate receiving your letter on subject EIS Preparation Notice. Please be assured that your review comments will be considered during the development of the EIS.

Should there be any further questions, please call Mr. Harold Sugiyama at 961-8338.

Edward Harada
EDWARD HARADA
Chief Engineer

HAWAII ELECTRIC LIGHT COMPANY, INC.
P. O. BOX 1027 HILO, HAWAII 96720

ENV 2
H-W/R

March 18, 1980

County of Hawaii
Department of Public Works
25 Aupuni Street
Hilo, Hawaii 96720

Attention: Mr. Edward Harada, Chief Engineer

Gentlemen:

SUBJECT: Environmental Impact Statement (EIS) Preparation Notice for the Kailua-Kona Sewerage System, Phase IV (Northern Zone), Kailua, Kona, Hawaii

Reference is made to your letter of February 26, 1980.

We have no comments to the above subject.

Very truly yours,

Jitsuo Niwao, Manager
Engineering Department

JN:cmh

HERBERT T. MATAYOSHI
EDWARD K. HARADA
ARTHUR T. ISEMOTO

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

July 2, 1980

Mr. Jitsuo Niwao, Manager
Engineering Department
Hawaii Electric Light Company, Inc.
P. O. Box 1027
Hilo, HI 96720

SUBJECT: EIS Preparation Notice
Kailua-Kona Sewerage System
Phase IV (Northern Zone)
Kailua-Kona, Hawaii

We appreciate your letter on subject EIS Preparation Notice indicating no comment thereon.

Should there be any further questions, please call Mr. Harold Sugiyama at 961-8338.

EDWARD HARADA
Chief Engineer

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
AREA OFFICE
300 ALA MOANA BLVD., RM. 3318, P.O. BOX 50007
HONOLULU, HAWAII 96850

REGION IX
410 Golden Gate Avenue
P.O. Box 36003
San Francisco, California 94102

March 18, 1980

IN REPLY REFER TO:
9.1SS (Johnson/546-5554)

Mr. Edward Harada, Chief Engineer
Department of Public Works
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Harada:

Subject: Environmental Impact Statement (EIS) Preparation Notice for the Kailua-Kona Sewerage System, Phase IV (Northern Zone), Kailua, Kona, Hawaii

Our staff has reviewed the EIS Preparation Notice for the construction of the Kailua-Kona Sewerage System, Phase IV and have no comments to make at this time.

We would, however, welcome the opportunity to review the draft EIS at a later date.

Sincerely,

Alvin K. H. Pang
Area Manager

DEPARTMENT OF PUBLIC WORKS
COUNTY OF HAWAII - 25 AUPUNI STREET - HILO HAWAII 96720 - TELEPHONE (808) 961-8321

HERBERT T. MATAYOSHI
Mayor
EDWARD K. HARADA
Chief Engineer
ARTHUR T. IBANEZ
Deputy Chief Engineer

July 2, 1980

Mr. Alvin K. H. Pang
Area Manager, Area Office
Department of Housing and
Water Development
P. O. Box 50007
Honolulu, HI 96850

SUBJECT: EIS Preparation Notice
Kailua-Kona Sewerage System
Phase IV (Northern Zone)
Kailua-Kona, Hawaii

We appreciate your letter on subject EIS Preparation Notice indicating no comments at this time. The draft EIS will be forwarded for your review at a later date.

Should there be any further questions, please call Mr. Harold Sugiyama at 961-8338.

EDWARD HARADA
Chief Engineer

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

March 20, 1980

MEMORANDUM

To: Mr. Edward Harada, Chief Engineer
County of Hawaii Public Works Department

Subject: EIS Preparation Notice for the Kailua-Kona Sewerage System, Phase IV (Northern Zone), Kailua, Kona, Hawaii
TMK: 7-3, 4 and 5

The Department of Agriculture has reviewed the subject preparation notice and offers the following comments:

1) The negative impacts that the project may have on agricultural activities appear to be adequately addressed.

2) The Ke-ahole Agricultural Park development, mauka of the Ke-ahole Airport appears to be within the boundaries of the project planning area. Phase II of the project will include the development of approximately 114 acres for flower, foliage and shelter crops. The potential use of treated effluents for these types of crops should be considered.

Thank you for the opportunity to comment.

JOHN FARIAS, JR.
Chairman, Board of Agriculture

D-15

HERBERT T. MATAYOSHI
Mayor
EDWARD K. HARADA
Chief Engineer
ARTHURT ISEMOTO
Deputy Chief Engineer

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

July 2, 1980

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

SUBJECT: EIS Preparation Notice
Kailua-Kona Sewerage System
Phase IV (Northern Zone)
Kailua-Kona, Hawaii

We appreciate your letter on subject EIS Preparation Notice. At this time it appears that land reclamation in the vicinity of the proposed treatment plant at Kealakehe will be the recommended means of disposal. Although the Ke-ahole Agricultural Park is within the planning area, it is too far (approximately 5 miles) from the Kealakehe site for cost-effective pumping of effluent for crop irrigation.

Should there be any further questions, please call Mr. Harold Sugiyama at 961-8338.

EDWARD HARADA
Chief Engineer

DEPARTMENT OF PLANNING
AND ECONOMIC DEVELOPMENT

GEORGE R. ARIYOSHI
Governor

HIDETO KONO
Director

FRANK SERVANCE
Deputy Director

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

March 21, 1980

Ref. No. 0906

Mr. Edward Harada
Chief Engineer
Department of Public Works
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Harada:

Subject: Kailua-Kona Sewerage System
(Phase IV - Northern Zone)
EIS Preparation Notice

Thank you for giving us the opportunity to review the subject EIS Preparation Notice.

As you are aware, the Hawaii Coastal Zone Management (CZM) Program provides legislative objectives and policies relating to land and water uses within the coastal zone. While the subject Preparation Notice does not specifically address the CZM concerns, we trust that they will be more clearly assessed in the completed environmental impact statement.

We have no further remarks to offer at this time, but would like to reserve the privilege of commenting when the final statement is available for review.

Sincerely,

Hideto Kono

DEPARTMENT OF PUBLIC WORKS
COUNTY OF HAWAII • 25 AUPUNI STREET • HILO, HAWAII 96720 • TELEPHONE NUMBER (808) 961-8321

HERBERT S. MATAYOSHI
Mayor

EDWARD K. HARADA
Chief Engineer

ARTHUR I. ISHIMOTO
Deputy Chief Engineer

July 2, 1980

Mr. Hideto Kono, Director
Department of Planning and Economic
Development
State of Hawaii
P. O. Box 2359
Honolulu, HI 96804

SUBJECT: EIS Preparation Notice
Kailua-Kona Sewerage System
Phase IV (Northern Zone)
Kailua-Kona, Hawaii

We appreciate your letter on subject EIS Preparation Notice. Due consideration of Coastal Zone Management concerns will be given during the development of the EIS. We understand that you may wish to make additional comments when the EIS is available for review.

Should there be any further questions, please call Mr. Harold Sugiyama at 961-8338.

EDWARD HARADA
Chief Engineer

MEMORANDUM:

PLANNING DEPARTMENT — County of Hawaii, Hilo, Hawaii 96720

To: Harold Sugiyama
Sewers/Sanitation

Date: March 24, 1980

From: PLANNING DIRECTOR

Subject: EIS Preparation Notice
Kailua-Kona Sewerage System
Phase IV (Northern Zone).

Thank you for sending the subject text to us for review. We have noted that all potentially significant environmental concerns have been identified, and have no adverse comments to offer at this time. We will await the completion of the subsequent draft EIS, and would appreciate the opportunity to review it.

The following comments reflect minor editorial errors and concerns within the text, and are provided in a supportive manner to assist you in the preparation of the draft EIS.

1) Page 12 - The Kailua Community Development Plan (KCDP) should be changed to the draft Kona Community Development Plan.

2) Page 14 - The observed species of flora and fauna should be identified within the text by their appropriate generic and common names.

Please note that a portion of the project area is situated within the Kailua Village Special Design (KVSD) District, and may be subject to the KVSD Plan. Further, all proposed sewerage improvements within this area will be subject to review by the KVSD Commission.

At this time our office is preparing an update of the draft Kona Community Development Plan with a Kona-Kohala regional perspective. In this current planning effort we will be looking at the sewerage infrastructure plans for the North and South Kona areas. Members of my staff will be contacting you shortly to schedule an appointment-discussion of all proposed sewerage plans within the study area. We would greatly appreciate any assistance you can offer us.

Should you have any questions on the above, please contact us. Mahalo.

BS:lkt

D-17

HERBERT T MATAYOSHI
Mayor
EDWARD K SHIRADA
Chief Engineer
ARTHUR T ISEMOTO
Deputy Chief Engineer

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

July 2, 1980

Mr. Sidney Fuke, Director
Planning Department
County of Hawaii
25 Aupuni Street
Hilo, HI 96720

SUBJECT: EIS Preparation Notice
Kailua-Kona Sewerage System
Phase IV (Northern Zone)
Kailua-Kona, Hawaii

We appreciate your recent memorandum of comments upon subject EIS Preparation Notice. The editorial comments are welcomed and will be considered during the development of the EIS. We will be happy to assist your staff with planning information on the proposed sewerage plans within the study area.

Should there be any further questions, please call Mr. Harold Sugiyama at 961-8339.

EDWARD IWAADA
Chief Engineer

DEPARTMENT OF WATER SUPPLY • COUNTY OF HAWAII

P. O. BOX 1820 • HILO, HAWAII 96720 • 25 AUPUNI STREET

March 24, 1980

TO: Department of Public Works

FROM: Manager

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT PREPARATION NOTICE FOR THE KAILUA-KONA SEWERAGE SYSTEM, PHASE IV (NORTHERN ZONE), KAILUA, KONA, HAWAII

Our Department relies on groundwater sources in Kona. Concerns for cesspool seepage would be alleviated with the implementation of the proposed project.

William Sewake

H. William Sewake
Manager

QA

DEPARTMENT OF PUBLIC WORKS

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

HERBERT T. MATAYOSHI
Mayor

EDWARD K. HARADA
Chief Engineer

ANTHONY K. MORIMOTO
Deputy Chief Engineer

July 2, 1980

Mr. H. William Sewake
Manager
Department of Water Supply
County of Hawaii
P. O. Box 1820
Hilo, HI 96720

SUBJECT: EIS Preparation Notice
Kailua-Kona Sewerage System
Phase IV (Northern Zone)
Kailua-Kona, Hawaii

We appreciate your recent letter on subject EIS Preparation Notice. The existing groundwater sources in Kona are the Kahaluu and Keei wells located some distance south of the planning area. The proposed project will alleviate cesspool seepage in the lower coastal elevations to be sewered but would not affect your existing and planned groundwater sources in Kona.

Should there be any further questions, please call Mr. Harold Sugiyama at 961-8338.

Edward Harada

EDWARD HARADA
Chief Engineer

... Water brings progress...

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
BUILDING 230
FT. SHAFTER, HAWAII 96858

PODED-PV

26 March 1980

Mr. Eduard Harada, Chief Engineer
Department of Public Works
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

D-16

Dear Mr. Harada:

The U.S. Army Corps of Engineers has reviewed your Environmental Impact Statement (EIS) Preparation Notice for the Kailua Kona Sewerage System, Phase IV, (Northern Zone), Kailua-Kona, Hawaii, and we offer the following comments. We suggest you discuss whether the endangered Hawaiian Stilt and Hawaiian Coot use the general or specific project area as a habitat, and clarify that the Short-Eared Owl is only endangered on Oahu and only according to State law.

The cultural sites recently removed from the State Register of Historic Places should be considered as significant sites for planning purposes. We suggest you determine whether potential long-range environmental and social effects of the project are consistent with the Kona Community Development Plan. The potential long-range effects of the Keahole Point OTEC project should also be considered. The proposed location of the sewage treatment plant and the ocean outfall should minimize the possibility of windborne sewage odors blowing over urban areas. The generated sewage gas could be considered as a fuel to operate the sewage plant.

A Department of the Army permit will be required for any ocean outfall or construction in the wetland area at Honokohau Bay (Aimakapa'a Fishpond). The planning area for the proposed sewerage system covers a large area, most of which is subject to minimal flooding. Coastal areas are subject to 100-year tsunami flooding where the 100-year event has a one percent chance of being equalled or exceeded in any given year. We recommend locating the sewerage system outside of tsunami prone areas. If the system is located within the flood prone area, the project should be designed to minimize or eliminate infiltration of flood waters into the system and, discharge from the system into flood waters.

PODED-PV

26 March 1980

Mr. Eduard Harada, Chief Engineer

Please correct the Corps address on page 35 of the Preparation Notice to "Fort Shafter, Hawaii 96858"; we no longer have an APO address. We appreciate the opportunity to comment on this EIS Preparation Notice.

Sincerely,

KIUK CHEUNG
Chief, Engineering Division

2

HERBERT T. MATAYOSHI
Mayor
EDWARD K. HARADA
Chief Engineer
ARTHUR T. ISEMOTO
Deputy Chief Engineer

DEPARTMENT OF PUBLIC WORKS

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

July 2, 1980

Mr. Kisuk Cheung
Chief, Engineering Division
U. S. Army Engineer District,
Honolulu
Building 230
Fort Shafter, HI 96858

SUBJECT: EIS Preparation Notice
Kailua-Kona Sewerage System
Phase IV (Northern Zone)
Kailua-Kona, Hawaii

We appreciate your recent letter of comment on subject EIS Preparation Notice. The scope of your comments indicates a thorough and welcome review. Please be assured that your comments will be considered during the development of the EIS.

Should there be any further questions, please call Mr. Harold Sugiyama at 961-8338.

Edward Harada

EDWARD HARADA
Chief Engineer

APPENDIX E

COMMENTS AND RESPONSES MADE DURING REVIEW PROCESS

GEORGE R. ARIYOSHI
GOVERNOR

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
OFFICE OF THE GOVERNOR
[illegible]
ROOM [illegible]
HONOLULU, HAWAII [illegible]

RICHARD O'CONNELL
DIRECTOR

TELEPHONE NO.
[illegible]

March 31, 1980

Mr. Edward Harada
Chief Engineer
Department of Public Works
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Dear Mr. Harada,

SUBJECT: Environmental Impact Statement Preparation Notice for Kailua-Kona Sewerage System, Phase IV (Northern Zone)

We have reviewed the subject EIS preparation notice and offer the following comments:

1) Detailed figures showing the current land use districts, general plan designations and zoning of the study area should be included in the EIS.

Areas where future development is proposed or planned should be highlighted. We also recommend including some details of the land use characteristics of the southern zone, since the facility may also serve that area.

2) An archaeological reconnaissance of any of the proposed project areas is recommended.

3) The State's natural energy laboratory at Ke'ahole Point and the proposed Ke'ahole agricultural park should be researched as to their sewage treatment needs and potential use of the sewage effluent.

4) Since the use of federal funds are involved, the requirements of the National Environmental Policy Act (NEPA), should be reviewed with the U.S. Environmental Protection Agency. A joint State-Federal EIS that satisfies both federal and state requirements may need to be prepared.

Thank you for the opportunity to comment on this EIS preparation notice.

Sincerely,

Richard L. O'Connell
Director

HERBERT T. MATAYOSHI
Mayor
EDWARD K. HARADA
Chief Engineer
ARTHUR E. ISEMOTO
Deputy Chief Engineer

DEPARTMENT OF PUBLIC WORKS

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

July 2, 1980

Mr. Richard L. O'Connell
Director
Office of Environmental
Quality Control
Office of the Governor
550 Halekauwila Street
Room 301
Honolulu, HI 96813

SUBJECT: EIS Preparation Notice
Kailua-Kona Sewerage System
Phase IV (Northern Zone)
Kailua-Kona, Hawaii

We appreciate your recent letter of comment upon subject EIS Preparation Notice. Please be assured that your comments will be considered during the preparation of the EIS.

Should there be any further questions, please call Mr. Harold Sugiyama at 961-8338.

EDWARD HARADA
Chief Engineer

GEORGE ARIYOSHI
GOVERNOR

STATE OF HAWAII
ENVIRONMENTAL QUALITY COMMISSION

550 HALEKAUWILA ST.
ROOM 301
HONOLULU, HAWAII 96813

Executive Secretary
TELEPHONE NO.
(808) 548-6915

Dear Reviewer:

Attached for your review is an Environmental Impact Statement (EIS) that was prepared pursuant to Chapter 343, Hawaii Revised Statutes and the Rules and Regulations of the Environmental Quality Commission:

Title: Kailua-Kona Sewerage System Phase IV (Northern Zone)

Location: Kailua-Kona, Hawaii

Classification: Agency Action

Your comments or acknowledgement of no comments on the EIS are welcomed. Please submit your reply to the accepting authority or approving agency:

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

Please send a copy of your reply to the proposing party:

Department of Public Works
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Your comments must be received or postmarked by: July 8, 1981

If you have no further use for this EIS, please return it to the Commission.

Thank you for your participation in the EIS process.

81:536

May 27, 1981
State Energy Office has no comments.

Alfred S. Harris
Manager

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

HERBERT T. MATAYOSHI
Mayor
EDWARD K. HARADA
Chief Engineer
ARTHUR T. ISEMOTO
Deputy Chief Engineer

July 20, 1981

State Energy Office
Department of Planning and
Economic Development
State of Hawaii
335 Merchant St., Room 110
Honolulu, Hawaii 96813

Attention: Mr. Alfred S. Harris

SUBJECT: Response to Comment, Environmental Impact Statement (EIS) for the Kailua-Kona Sewerage System, Phase IV (Northern Zone)

Your letter of May 27, 1981 indicating no comment on subject EIS is acknowledged.

EDWARD HARADA
Chief Engineer

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

IN REPLY REFER TO:

002A:amn
Ser 1038

2 JUN 1981

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

Gentlemen:

Environmental Impact Statement
Kailua-Kona Sewerage System
Phase IV (Northern Zone)

The Environmental Impact Statement for the Kailua-Kona Sewerage System has been reviewed and the Navy has no comments to offer. As this Command has no further use for the EIS, the EIS is being returned.

Thank you for the opportunity to review the EIS.

Sincerely,

R. L. ELSBERND
Lieutenant Commander, CEC, USN
Deputy Facilities Engineer
By direction of the Commander

Encl

Copy to: (w/o encl)
Department of Public Works
County of Hawaii
25 Aupuni Street
Hilo, HI 96720

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

HERBERT T. MATAYOSHI
Mayor
EDWARD K. HARADA
Chief Engineer
ARTHUR T. ISEMOTO
Deputy Chief Engineer

July 20, 1981

Deputy Facilities Engineer
Headquarters, Naval Base Pearl Harbor
Box 110
Pearl Harbor, Hawaii 96860

Attention: R. L. Elsbernd
Lt. Cdr., CEC, USN

SUBJECT: Response to Comment, Environmental Impact Statement (EIS) for the Kailua-Kona Sewerage System, Phase IV (Northern Zone)

Your letter of June 2, 1981 indicating no comments on subject EIS is acknowledged.

EDWARD HARADA
Chief Engineer

GEORGE R. ARIYOSHI
GOVERNOR

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

VALENTINE A. SKEFFINGTON
MAJOR GENERAL
ADJUTANT GENERAL

THOMAS S. YIM
BRIGADIER GENERAL
DEPUTY ADJUTANT GENERAL

DANIEL K. C. AU
COLONEL
DEPUTY ADJUTANT GENERAL

HIENG

4 JUN 1981

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

Gentlemen:

Kailua-Kona Sewerage System Phase IV
Kailua-Kona, Hawaii

Thank you for providing us the opportunity to review your proposed project, Kailua-Kona Sewerage System Phase IV Environmental Impact Statement.

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

Yours truly,

JERRY M. HATSUDA
Captain, HANG
Contr & Engr Officer

cc: Dept of Public Works/Hilo
Env. Quality Commission w/EIS

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

HERBERT T. MATAYOSHI
Mayor

EDWARD K. HARADA
Chief Engineer

ARTHUR T. ISEMOTO
Deputy Chief Engineer

July 20, 1981

Office of the Adjutant General
Department of Defense
State of Hawaii
3949 Diamond Head Road
Honolulu, Hawaii 96816

Attention: Jerry M. Hatsuda
Captain, HANG
Contr & Engr Officer

SUBJECT: Response to Comment, Environmental Impact Statement (EIS) for the Kailua-Kona Sewerage System, Phase IV (Northern Zone)

Your letter of June 4, 1981 indicating no comment on subject EIS is acknowledged.

EDWARD HARADA
Chief Engineer

DEPARTMENT OF THE ARMY
HEADQUARTERS UNITED STATES ARMY SUPPORT COMMAND, HAWAII
FORT SHAFTER, HAWAII 96858

[illegible]

8 JUN 1981

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YM		STY	
REC'D JUL 7 1981 RMTC			
WYT		DXM	
GSY		YJK	
WD			

Office of Environmental Quality Control
State of Hawaii
[illegible] Street, Room [illegible]
Honolulu, Hawaii 96813

Gentlemen:

The Environmental Impact Statement (EIS) for the Kailua-Kona Sewerage System Phase IV (Northern Zone) has been reviewed and we have no comments to offer.

There are no Army installations or activities in the vicinity of the proposed project.

Sincerely,

Original signed by

ADOLPH A. RIGHT
COL, EN
Director of Engineering and Housing

Copy Furnished:
Department of Public Works
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

[illegible]

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

HERBERT T. MATAYOSHI
Mayor
EDWARD K. HARADA
Chief Engineer
ARTHUR T. ISEMOTO
Deputy Chief Engineer

July 20, 1981

Department of the Army
Headquarters United States Army
Support Command, Hawaii
Fort Shafter, Hawaii 96858

Attention: Adolph A. Right
Colonel, EN
Director of Engineering and Housing

SUBJECT: Response to Comment, Environmental Impact Statement (EIS) for the Kailua-Kona Sewerage System, Phase IV (Northern Zone)

Your letter of June 8, 1981 indicating no comment on subject EIS is acknowledged.

EDWARD HARADA
Chief Engineer

COPY

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

June 12, 1981

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

ENVIRONMENTAL IMPACT STATEMENT
KAILUA-KONA SEWERAGE SYSTEM, PHASE IV (NORTHERN ZONE)

We have no comments or objections to the subject document. Water service for the proposed project will be subject to the Department's Rules and Regulations and prevailing policies.

H. William Sewake
Manager

QA

cc - Department of Public Works, County of Hawaii

... Water brings progress...

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

HERBERT T. MATAYOSHI
Mayor
EDWARD K. HARADA
Chief Engineer
ARTHUR T. ISEMOTO
Deputy Chief Engineer

July 20, 1981

Department of Water Supply
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

Attention: Mr. H. William Sewake
Manager

SUBJECT: Response to Comment, Environmental Impact Statement (EIS) for the Kailua-Kona Sewerage System, Phase IV (Northern Zone)

Your letter of June 12, 1981 indicating no comments or objections to subject EIS is acknowledged.

EDWARD HARADA
Chief Engineer

University of Hawaii at Manoa

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

19 June 1981

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

Gentlemen:

Subject: EIS for the Kailua-Kona Sewerage System Part IV
(Northern Zone) May 1981

We have reviewed the subject EIS and offer the following comment:

The initial lagoon (No. 1) would require large amounts of oxygen to stabilize the sewage and sludge that settles out. Because the sewage enters the lagoon system untreated, this first pond would function more effectively if left unaerated and utilize anaerobic digestion to stabilize the sludge.

The settleable solids would remain in Pond 1 and thereby lessen the carryover to the remaining aerated ponds. The initial pond is made deeper to provide a zone of anaerobic digestion on the bottom and the upper zone (1-2 ft depth) near the surface remains aerobic because of the photosynthetic processes of the algae.

This EIS was reviewed by WRRC personnel. Thank you for the opportunity to comment.

Sincerely,

Edwin T. Murabayashi

Edwin T. Murabayashi
EIS Coordinator

ETM:jm

cc: H. Gee
Y.S. Fok
DPW, Hawaii County

AN EQUAL OPPORTUNITY EMPLOYER

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

HENRY T. MATAYUSHI
Mayor
EDWARD K. HARADA
Chief Engineer
ARTHUR T. ISEMOTO
Deputy Chief Engineer

(P)1513.1

JUN 22 1981

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

Gentlemen:

Subject: Kailua-Kona Sewerage System
Phase IV

We have reviewed the Environmental Impact Statement Notice and have no comments to offer at this time.

Thank you for the opportunity to review this document.

Very truly yours,

RIKIO NISHIOKA
State Public Works Engineer

ES:ja
cc: Department of Public Works
County of Hawaii

July 20, 1981

Department of Accounting and
General Services
State of Hawaii
1151 Punchbowl Street
Honolulu, Hawaii 96813

Attention: Mr. Rikio Nishioka
State Public Works Engineer

SUBJECT: Response to Comment, Environmental Impact Statement (EIS) for the Kailua-Kona Sewerage System, Phase IV (Northern Zone)

Your letter of June 22, 1981 indicating no comment upon subject EIS is acknowledged.

EDWARD HARADA
Chief Engineer

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
[illegible] STREET
HONOLULU, HAWAII [illegible]

RYOKICHI HIGASHIONNA, Ph.D.
DIRECTOR

DEPUTY DIRECTORS
JACK K. SUWA
JAMES R. CARRAS
JAMES B. McCORMACK
JONATHAN K. SHIMADA, Ph.D.

IN REPLY REFER TO

STP 8.7371

June 24, 1981

MEMORANDUM

TO: Harry Akagi, Acting Director
Office of Environmental Quality Control

FROM: Director of Transportation

SUBJECT: EIS - KAILUA-KONA SEWERAGE SYSTEM PHASE IV (Northern Zone), Kailua-Kona, Hawaii

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

We offer the following comments:

1. Page 3-21, Item 4.

The first sentence in the second paragraph, delete the word "harbors" and insert "facilities". Keauhou Harbor in the next sentence should read Keauhou Bay. Only Honokohau Boat Harbor is considered a full-fledged, all weather harbor since it will afford all the amenities expected of a complete marina. At Kailua and Keauhou Bays, open ocean moorings are available and, therefore, do not qualify the facilities as boat harbors under our definition.

2. Figures 3-8.

The Honokohau Boat Harbor boundaries are incorrectly represented. Attached is a development plan map which represents our latest efforts. These boundaries (indicated in red) were submitted as part of our Governor's Executive Order request to have the harbor area assigned to our agency.

3. Pages 5-4, 5.

Last paragraph on bottom of Page 5-4. The proximity of our harbor site to the proposed sewer treatment plant makes it imperative that the plant's adverse visual and odor impacts particularly be as unobtrusive and minimal as possible to avoid conflicting with harbor and future activities in the area. The continued development of the harbor facilities may influence developers to accelerate the realization of any plans they may have for the surrounding areas.

4. Page 12-1.

The Conservation District Use Application and a Shorewater Construction Permit are missing from the list of necessary approvals.

5. Page B-3, Item C-1, Last Sentence.

The effluent from the outfall will be a major concern should it find its way into the Honokohau Boat Harbor. This may possibly occur because the postulation that it won't is made with limited available field data. We expect traditional data will be needed to more accurately predict the effluent's behavior in coastal waters off Honokohau Bay.

6. General Comment

A general discussion on whether the sewage system will also satisfy our boat harbor needs including sewage pumpout and other sewage disposal requirements generated by harbor activities will assist us greatly in understanding the extent of the coverage under your proposed system.

Ryokichi Higashionna

Ryokichi Higashionna

Enclosure

HERBERT T. MATATOSHI
Mayor
EDWARD K. HARADA
Chief Engineer
ARTHUR T. ISEMOTO
Deputy Chief Engineer

DEPARTMENT OF PUBLIC WORKS

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

July 20, 1981

Department of Transportation
State of Hawaii
869 Punchbowl Street
Honolulu, Hawaii 96813

Attention: Ryokishi Higashionna, Ph.D
Director

SUBJECT: Response to Comment, Environmental Impact Statement (EIS) for the Kailua-Kona Sewerage System, Phase IV (Northern Zone)

We are in receipt of your letter of June 24, 1981 which forwarded comments on subject EIS. Our responses to your comments are indicated below and in the same sequence.

1. Page 3-21, Item 4

   The EIS text has been revised as indicated.

2. Figure 3-8

   The Honokohau Boat Harbor boundaries have been revised per your comment.

3. Pages 5-4, 5

   Your comment invites attention to the significance of harbor proximity in the context of adverse plant visual and odor impacts. These impacts will be made as unobtrusive and minimal as possible and should have no effect in the harbor area.

4. Page 12-1

   The two additions have been added to the list in the text.

5. Page B-3, Item C-1, Last Sentence

   An extensive ocean data collection and analysis study of the outfall site will be conducted early in the design phase. It will permit a more accurate prediction of the effluent behavior in the coastal waters. The significance of the proximity of Honokohau Harbor is recognized.

6. General Comment

   Although no special provision is made in the existing project for accommodating harbor sewage flows, the capacity of the system will be able to handle the additional flows from Honokohau Harbor. This will be a consideration during the design phase.

We appreciate your review comments.

EDWARD HARADA
Chief Engineer

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

June 24, 1981

GEORGE A. L. YUEN
DIRECTOR OF HEALTH

JOHN P. CHALMERS, M.D.
DEPUTY DIRECTOR OF HEALTH

HENRY R. THOMPSON, M.A.
DEPUTY DIRECTOR OF HEALTH

MELVIN K. KOIZUMI
DEPUTY DIRECTOR OF HEALTH

ADELINA MADRID SHAW, M.A., J.D.
DEPUTY DIRECTOR OF HEALTH

In reply, please refer to
File:

MEMORANDUM

To: Mr. Harry Akagi, Acting Director
Office of Environmental Quality Control

From: Deputy Director for Environmental Health

Subject: Environmental Impact Statement (EIS) for Kailua-Kona Sewerage System Phase IV (Northern Zone), Kailua-Kona, Hawaii

Thank you for allowing us to review and comment on the subject EIS. On the basis that the project will comply with all applicable Public Health Regulations, please be informed that we do not have any objections to this project.

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.

For MELVIN K. KOIZUMI

cc: Department of Public Works, Hawaii

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

HERBERT T. MATAYOSHI
Mayor

EDWARD K. HARADA
Chief Engineer

ARTHUR T. ISEMOTO
Deputy Chief Engineer

July 20, 1981

Department of Health
State of Hawaii
P. O Box 3378
Honolulu, Hawaii 96801

Attention: Mr. Melvin K. Koizumi
Deputy Director of Health

SUBJECT: Response to Comment, Environmental Impact Statement (EIS) for the Kailua-Kona Sewerage System, Phase IV (Northern Zone)

Your letter of June 24, 1981 indicating no objection to the project of subject EIS is acknowledged.

EDWARD HARADA
Chief Engineer

GEORGE R. ARIYOSHI
GOVERNOR

STATE OF HAWAII
DEPARTMENT OF SOCIAL SERVICES AND HOUSING
HAWAII HOUSING AUTHORITY
P. O. BOX 17907
HONOLULU, HAWAII 96817

PAUL A. TOM
EXECUTIVE DIRECTOR

WILLIAM A. HALL
ASSISTANT EXEC. DIRECTOR

IN REPLY REFER

TO:

June 25, 1981

MEMORANDUM:

TO: The Honorable Donald A. Bremner, Chairman
Office of Environmental Quality Control

FROM: Paul A. Tom, Executive Director

SUBJECT: Environmental Impact Statement for Kailua-Kona Sewerage System Phase IV (Northern Zone)

The Hawaii Housing Authority has reviewed the EIS for the subject project and has no specific comments to offer relative to the proposed action. The Authority is, however, highly supportive of this action as it will assist this agency in the development of affordable housing for the low- and moderate-income families in the Kona area.

Thank you for the opportunity to comment on this matter.

PAUL A. TOM, Original Signed
PAUL A. TOM
Executive Director

HIKick

cc: Department of Social Services and Housing
✓Department of Public Works (County of Hawaii)

81 JUL 30 P5:12
RECEIVED

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

HERBERT T. MATAYOSHI
Mayor
EDWARD K. HARADA
Chief Engineer
ARTHUR T. ISEMOTO
Deputy Chief Engineer

July 20, 1981

Hawaii Housing Authority
Department of Social Services
and Housing
P. O. Box 17907
Honolulu, Hawaii 96817

Attention: Mr. Paul A. Tom
Executive Director

SUBJECT: Response to Comment, Environmental Impact Statement (EIS) for the Kailua-Kona Sewerage System, Phase IV (Northern Zone)

Your letter of June 25, 1981 indicating no specific comments on subject EIS is acknowledged.

EDWARD HARADA
Chief Engineer

United States Department of the Interior

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

IN REPLY REFER TO:
ES
Room 6307
1-2-81-INT-39

JUN 25 1981

Office of Environmental Quality Control
Office of the Governor
550 Halekauwila Street, Room 301
Honolulu, Hawaii 96813

Re: EIS for Kailua-Kona
Sewerage System Phase IV
Kailua-Kona, Hawaii
County, HI

We have reviewed the subject Environmental Impact Statement (EIS) and offer the following comments.

The description of the flora in the project area is inadequate. As a minimum, a comprehensive species list should be included. There are native Hawaiian plants and animals in the general area of the project; from the information provided in the EIS it is impossible to determine if they will be impacted. In a June 12, 1981 letter to Dr. James Kumagai of M & E Pacific, Inc., we advised that no Federally listed species of plants or animals occurred at the project sites.

We appreciate this opportunity to comment.

Sincerely yours,

Ernest Kosaka

Ernest Kosaka
Project Leader for
Office of Environmental Services

cc: NMFS
HDF&G
EPA, San Francisco
Dept. of Public Works, Hilo, HI

DEPARTMENT OF PUBLIC WORKS
COUNTY OF HAWAII · 25 AUPUNI STREET · HILO HAWAII 96720 · TELEPHONE (808) 961-8321

HERBERT T MATAYOSHI
Mayor
EDWARD K HARADA
Chief Engineer
ARTHURT ISEMOTO
Deputy Chief Engineer

July 20, 1981

Fish and Wildlife Service
U. S. Department of the Interior
300 Ala Moana Blvd.
P. O. Box 50167
Honolulu, Hawaii 96850

Attention: Mr. Ernest Kosaka
Project Leader for Office of
Environmental Services

SUBJECT: Response to Comment, Environmental
Impact Statement (EIS) for the
Kailua-Kona Sewerage System,
Phase IV (Northern Zone)

We are in receipt of your letter of June 25, 1981 which forwarded comments on subject EIS. We offer herewith our response to your comments.

The planned collection system will be constructed in existing road alignments. Where off-road alignments are planned, the terrain consists of lava beds from the Hualalai series and is mid-Pleistocene in age, with minimal vegetation. A flora and fauna survey was conducted in July 1979 by Mr. Nelson Santos, Biologist, State Division of Fish and Game. We have now included his species list in Section 3 of the EIS text.

We appreciate your review comments.

Edward Harada

EDWARD HARADA
Chief Engineer

CONSERVE AMERICA'S ENERGY

Save Energy and You Serve America!

GEORGE R. ARIYOSHI
Governor

CHARLES G. CLARK
Superintendent

STATE OF HAWAII
DEPARTMENT OF EDUCATION
P. O. BOX 2360
HONOLULU, HAWAII 96804

OFFICE OF THE SUPERINTENDENT

June 26, 1981

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

Gentlemen:

SUBJECT: Environmental Impact Statement
Kailua-Kona Sewerage System Phase IV

At the present time, the Department of Education does not have any comments to offer on the subject sewerage system. We do note, however, that the County Recreation Plan and the Kona Community Development Plan have designated a high school site near the proposed Kealakehe Regional Sports Complex.

This designation should be tentative only as the Department of Education selects school sites on the basis of a site selection study conducted by the Department of Accounting & General Services. This site selection study is initiated only after evaluation of the area indicates that there is sufficient student enrollment to justify a new school.

The Department has and will continue to monitor student enrollment growth in the Kona area. Should there be any questions, please contact Mr. Howard Lau at 737-5231.

Sincerely,

CHARLES G. CLARK
Superintendent

CGC:HL:jl

cc: Hawaii District
DAGS
Dept. of Public Works, County of Hawaii

AN EQUAL OPPORTUNITY EMPLOYER

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

HERBERT T. MATAYOSHI
Mayor
EDWARD K. HARADA
Chief Engineer
ARTHUR T. ISEMOTO
Deputy Chief Engineer

July 20, 1981

Department of Education
State of Hawaii
P. O. Box 2360
Honolulu, Hawaii 96804

Attention: Mr. Charles G. Clark
Superintendent

SUBJECT: Response to Comment, Environmental Impact Statement (EIS) for the Kailua-Kona Sewerage System, Phase IV (Northern Zone)

Your letter of June 26, 1981 indicating no comments on subject EIS is acknowledged.

EDWARD HARADA
Chief Engineer

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

PODED-PV

29 June 1981

Donald A. Bremner, Chairman
Environmental Quality Commission
550 Halekauwila Street, Room 301
Honolulu, HI 96813

Dear Mr. Bremner:

Thank you for the opportunity to review the Environmental Impact Statement (EIS) for the Kailua-Kona Sewerage System, Phase IV. Based on this review, we provide the following comments:

The proposed sewer treatment plant site and most of the proposed sewer facility alignments are not within any designated tsunami or riverine flood plains, but rather in an area of minimal flooding of Zone C designation. A portion of the 30" ocean outfall alignment is situated within the coastal flood plain or tsunami inundation area. All public utilities and facilities such as sewer systems within flood-prone areas should be designed to minimize or eliminate the infiltration of flood waters into the systems and discharges from the system into flood waters.

Sincerely,

KISUK CHEUNG
Chief, Engineering Division

1 Incl
Expl of Zone Designation

Copy Furn: (wo incl)
Mr. Edward Harada, Chief Engineer
Department of Public Works
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

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

HENRY T. MATAYOSHI
Mayor
EDWARD HARADA
Chief Engineer
ARTHUR I. ISHIDO
Deputy Chief Engineer

July 20, 1981

U. S. Army Engineer District, Honolulu
Department of the Army
Fort Shafter, Hawaii 96858

Attention: Mr. Kisuk Cheung
Chief, Engineering Division

SUBJECT: Response to Comment, Environmental Impact Statement (EIS) for the Kailua-Kona Sewerage System, Phase IV (Northern Zone)

We are in receipt of your letter of June 29, 1981 which offered review comments on subject EIS. We offer herewith our responses to the comments.

The design phase of the proposed wastewater project will include consideration of the tsunami and flooding information forwarded by your letter. The proposed facilities will be designed to minimize or eliminate the infiltration of flood water into the systems and discharges from the system into flood waters.

Your review comments are appreciated.

EDWARD HARADA
Chief Engineer

June 29, 1981 Kailua-Kona

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

Re: Expanded Sewerage System Planned For Kailua-Kona

You are studying the possible environmental impact of an expanded sewerage system for Kona on the Big Island. Please remember that there are two delicate treasures for which the outfall sewage effluent as now planned will likely damage or destroy:

1. The precious coral bed off Keahole Point
2. The Seacoast Test Facility of the Natural Energy Laboratory of Hawaii

THE PRECIOUS CORAL BED ... off Keahole Point has been designated as a Protected Marine Fisheries Resource under the Hawaii Coastal Zone Management Program of the State and Federal governments. One of five such designated beds in the State of Hawaii. "It is unlawful to take or destroy pink or gold coral in water subject to the jurisdiction of the State" and "the use of nets, dredges, trawls, mops, explosives or any other destructive or non-selective means to take pink or gold coral is prohibited".

The problem is that the sewage effluent from a properly operating aerated lagoon may have whole feces and large particulate matter removed, human pathogenic bacteria reduced but the end product is heavy in microscopic particulates, rich in other bacteria - and viruses - with a high content of eutrophic nutrients.

Witness: ...the extreme dangerxd damage done to the coral reefs of Pago Pago Bay in American Samoa from supposedly treated sewage effluent and wastewater from the fish canneries.

...and the notorious reputation of the Hyperion Sewage Treatment Plant of Los Angeles where, when the plant malfunctions — often! — whole fecal matter is cast up on the beaches which then have to be closed off to all swimming and fishing.

THE SEACOAST TEST FACILITY...of the Natural Energy Laboratory of Hawaii, commonly thought of as OTEC. Here the prime research is on biofouling to be followed by aquaculture, both of which would be severely distorted by any artificial change in the biota of natural seawater, making the research and facility worthless.

What about the direction the sewage effluent will take from the outfall?? Best guesses arethat the massive ocean gyre, or eddies influencing current, sweep north toward these two targets about half the time, south the other half with a titanic churning motion overall upsetting the Kona Coast ecosystem.

Then WHAT IS THE BEST ANSWER? Kona badly needs an expanded sewerage system. What is the balance between people and treasures:

...Tertiary treatment of effluent as chlorination after the lagoon, to reduce living organisms including viruses?
...Injection wells instead of outfall, hoping for some filtration effect and using up nutrients in aquifers before mixing with seawater?
...Holding, then dumping effluent only at the time of the southward current?
...There must be more for the research scientists, environmental engineers and politicians to integrate. Let's just not be in a big hurry and thoughtlessly damage our two treasures.

Clark Richardson
74-5049 Oaipan Street
Kailua-Kona, HI 96740
Phone 329-2033

References: Hawaii Coastal Zone News 5:12 April/May '81
WEST HAWAII TODAY June 19, 1981

c.c. County Public Works, NELH, HCZM/HI DEED

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

HERBERT T. MATAYOSHI
Mayor
EDWARD K. HARADA
Chief Engineer
ARTHUR T. IZUMOTO
Deputy Chief Engineer

July 20, 1981

Mr. Clark Richardson
74-5040 Onipaa Street
Kailua-Kona, Hawaii 96740

Dear Mr. Richardson:

SUBJECT: Response to Comment, Environmental Impact Statement (EIS) for the Kailua-Kona Sewerage System, Phase IV (Northern Zone)

We are in receipt of your letter of June 29, 1981 which commented upon subject EIS. Your letter raises several valid topics of concern about the environmental effects of the proposed outfall. Pertinent quantitative and qualitative aspects of the problem are discussed below.

The precious coral bed is located at 19 degrees 46.0 minutes North latitude and 156 degrees 06 minutes West longitude, thus placing the bed 7 miles from the proposed outfall site. The bed is also located several hundred feet deeper than the proposed diffuser. Since the effluent plume will rise to some depth shallower than the diffuser, and be diluted with distance from the outfall, no interaction between the precious coral and the outfall effluent is likely.

The quantity of the effluent to be discharged is very much smaller than at the Hyperion Outfall, and the characteristics are different in that no significant industrial wastes will be included in the Kona wastewater.

The dilution and transport characteristics of Pago Pago Harbor are not at all comparable to those at the proposed site in that Pago Pago is a stratified embayment receiving cannery wastes directly to its surface layer and Kona is an open coast.

Experience with existing outfalls on Oahu has shown the effects of nutrients, viruses, and bacteria to be insignificant. The effects of the present outfall at Sand Island have been almost indiscernable and yet the discharge is at a shallower depth than that proposed for Kona and the flow is more than an order of magnitude larger with less treatment (to date) prior to discharge. Similarly, the Hokapu Outfall is functioning without detrimental effects. The Waianae and Hawaii Kai Outfalls have somewhat similar volumes to the proposed outfall but discharge in less than 50 feet of water along open coastlines. These two outfalls have had no detrimental effects. In general,

detrimental effects from wastewater discharges have been associated with: discharges in embayments, rivers, lakes, or estuaries; discharges of significant amounts of oxygen demanding, settleable or floatable material; and discharges of significant amounts of toxic or disease causing materials. None of these conditions will exist with the proposed outfall.

The water quality characteristics of both the surface and deep waters of interest to the NELH facility at Ke-ahole Point vary in nutrient concentration by much more than a factor of two under natural conditions. The depths from which NELH takes water will be above and below the anticipated plume level of the outfall. The distance, mixing, quantity of discharge and other dilution and transport factors assure that the effect of any portion of the plume that might find its way to the vicinity of the NELH facility would not be discernable compared to the naturally occurring background variation.

The seawater environment in Hawaii has been shown to be particularly effective in causing a high rate of human bacterial die-off and virus inactivation. This condition, along with effluent dilution, should result in undetectable levels of enteric bacteria and viruses within a few hundred meters of the diffuser. No effect from the discharge with respect to bacteria and viruses is expected at the NELH, the precious coral beds, or the Kona shoreline.

We appreciate the thoughtful review comments offered by your letter.

EDWARD HARADA
Chief Engineer

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
HONOLULU AREA OFFICE
300 ALA MOANA BLVD., RM. 3318, P.O. BOX 50007
HONOLULU, HAWAII 96850

June 30, 1981

REGION IX

IN REPLY REFER TO:
9.1SS (Johnson/
546-5554)

Mr. Donald A. Bremner, Chairman
Office of Environmental Quality Control
550 Halekauwila Street, Room 301
Honolulu, HI 96813

Dear Mr. Bremner:

Subject: Environmental Impact Statement
Kailua-Kona Sewerage System Phase IV

The Honolulu Area Office has reviewed the Environmental Impact Statement that reviews the impacts that would result from the construction of a sewerage disposal system in Kailua-Kona.

We support the action and find that the proposed action does not conflict with any HUD project in the area.

Sincerely,

David Bell
Acting Area Manager

cc: Dept. of Public Works
County of Hawaii

DEPARTMENT OF PUBLIC WORKS
COUNTY OF HAWAII · 25 AUPUNI STREET · HILO, HAWAII 96720 · TELEPHONE (808) 961 8321

HERBERT T. MATAYOSHI
Mayor
EDWARD K. HARADA
Chief Engineer
ARTHUR T. ISEMOTO
Deputy Chief Engineer

July 20, 1981

Honolulu Area Office
U. S. Department of Housing and
Urban Development
300 Ala Moana Boulevard, Room 3318
P. O. Box 50007
Honolulu, Hawaii 96850

Attention: Mr. David Bell
Acting Area Manager

SUBJECT: Response to Comment, Environmental Impact Statement (EIS) for the Kailua-Kona Sewerage System, Phase IV (Northern Zone)

Your letter of June 30, 1981 indicating support of the proposed project in subject EIS is acknowledged.

EDWARD HARADA
Chief Engineer

DEONOF R ARIYOSHI
Governor
HIDETO KONO
Director
FRANK SKIRVANEK
Deputy Director

DEPARTMENT OF PLANNING
AND ECONOMIC DEVELOPMENT

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

July 1, 1981

Ref. No. 3332

Mr. Harry Akagi
Acting Director
Office of Environmental Control
550 Halekauwila Street
Honolulu, Hawaii 96813

Dear Mr. Akagi:

Subject: Kailua-Kona Sewerage System, Phase IV, Kailua-Kona, Hawaii, Environmental Impact Statement

We have reviewed the subject Environmental Impact Statement (EIS) and offer the following comments.

As you will note from the Coastal Zone Management (CZM) Program approval criteria summarized on pages 3-14 of the EIS, the State's coastal zone includes seaward as well as inland areas. In Hawaii, the CZM Program's objectives and policies serve as a management guide for uses affecting resources seaward to the limit of the State's jurisdiction.

To assist decision makers in determining the proposed project's consistency with these CZM policies, we recommend that a detailed description of the marine life that exists in the affected area be provided. A discussion of any adverse impacts on marine ecosystems together with possible mitigation measures would also be appropriate.

This is of particular concern since an assessment of the proposed activity's consistency with CZM policies will be required in conjunction with the U.S. Army Corps of Engineers permit application. In accordance with provisions of the National CZM Act, the activity must be certified with the State's CZM program before the Federal agency may issue the permit. You may wish to reference this requirement in Section 12 of the EIS, noting that our department is the responsible reviewing agency.

Thank you for giving us the opportunity to comment on this EIS.

Sincerely,

Hideto Kono

cc: Dept. of Public Works,
County of Hawaii

HERBERT T MATAYOSHI
Mayor
EDWARD K HARADA
Chief Engineer
ARTHURT ISEMOTO
Deputy Chief Engineer

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

July 20, 1981

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

Attention: Mr. Hideto Kono
Director

SUBJECT: Response to Comment, Environmental Impact Statement (EIS) for the Kailua-Kona Sewerage System, Phase IV (Northern Zone)

We are in receipt of your letter of July 1, 1981 which offered review comments on subject EIS. We offer herewith our responses to these comments.

The observations of a Marine Biologist (Dr. Ralph Bowers) during an underwater survey (1973) of prospective outfall sites in the coastal sector have been recorded and are now included in Appendix B of the EIS. In addition, a new marine biology survey is scheduled early in the design phase along the outfall alignment, after it is selected.

We have added the State CZM Program Certification requirement to Section 12 of the EIS.

Your review comments are appreciated.

EDWARD HARADA
Chief Engineer

GEORGE R. ARIYOSHI
GOVERNOR

HENRY T. ARAKI
ACTING DIRECTOR

TELEPHONE NO.

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL

July 1, 1981

Edward Harada, Director
Department of Public Works
County of Hawaii
25 Aupuni Street
Hilo, Hawaii 96720

SUBJECT: Environmental Impact Statement for Kailua-Kona Sewerage System Phase IV (Northern Zone)

Dear Mr. Harada:

We have reviewed the subject statement and offer the following comments for your consideration:

JOINT EIS PROCESS

The proposed action involves federal, state, and county actions. According to the National Environmental Policy Act of 1969 regulations and Chapter 343, Hawaii Revised Statutes, a single EIS may be used to fulfill both federal and state EIS requirements. Chapter 343, Hawaii Revised Statutes states,

> Whenever an action is subject to both the National Environmental Policy Act of 1969 (Public Law 91-190) and the requirements of this chapter, agencies shall cooperate with federal agencies to the fullest extent possible to reduce duplication between federal and state requirements. Such cooperation shall to the fullest extent possible include joint environmental impact statements with concurrent public review and processing levels at both levels of government.

How will the federal EIS requirement be met? Why wasn't a joint EIS prepared?

WASTEWATER TREATMENT (p. 2-15)

The EIS should indicate that the proposed wastewater

treatment facility will be located near the federal cultural park, Kaloko-Honokohau.

AERATED LAGOONS

We are concerned about the impact of aerated lagoons. First, the EIS does not indicate whether the lagoons will be located within a flood zone. Will the lagoons be subject to flooding or localized flooding? What mitigation measures will be proposed if this condition occurs?

Secondly, further consideration should be given to the long-term impacts. As experienced in other areas where rapid urbanization has occurred, residential and commercial areas may be developed nearby thus generating complaints about the odors that may be present from time to time.

EFFLUENT DISPOSAL (p. 2-15)

The EIS indicates that effluent disposal will be at nearby golf courses as they develop. What golf courses are being considered? Has highway irrigation been considered?

CORRECTION

The EIS states, "The coot, stilt, and owl species are considered to be endangered." It should be noted that species (except for owl outside Oahu) are listed as endangered species on the federal and state list of endangered species.

POPULATION PROJECTIONS (p. 3-16)

The EIS cites E-2 population projections instead of the II-F projections which are lower figures presently used by the State. The State has attempted to maintain growth management control by using II-F projections. Since sewage treatment facilities are considered growth inducing factors, a discussion should specify why the proposed action will not use the state population projections and what state policies support the use of E-2 projections.

PROPOSED DEVELOPMENTS (p. 3-24)

The EIS should also indicate the proposed Kailua-Kona shopping center and a proposed industrial subdivision by Liliuokalani Trust.

GOVERNMENT POLICIES

The EIS should discuss the proposed action in relation

to the Coastal Zone Management Program, the Hawaii State Plan, and the State Environmental Policy Act.

DOCUMENTATION

Page 5-2. The EIS should document the statement, "Very little flora, fauna or environmentally sensitive areas will be disturbed." Who conducted the flora and fauna surveys?

Page 5-3. The EIS discusses archaeological survey, however, no identification of the surveyor has been made. Since the proposed area is rich in archaeological history and artifacts, the surveys should [illegible] [illegible]ented.

SLUDGE (p. 5-5)

The EIS does not indicate what will happen to the sludge (the material that settles to the bottom of the lagoons). Where will it be disposed? Will it be incinerated?

GROWTH IMPACT (p. 5-6)

The EIS should expand its discussion regarding the growth inducing impact of the proposed action. Because the project will increase the facility's capacity to handle approximately 1 mgd more, consideration should be given to the maximum number of persons the proposed action will serve. How many people does the present system serve? How many people will the proposed system serve?

OUTFALL - MARINE FAUNA

The EIS lacks discussion regarding the impact on the marine fauna. Since no survey has been conducted about the marine life of the proposed action, we question the conclusion that there may be minimal impact caused by the ocean outfall system. What impact will the outfall have on the rich fishing grounds?

Consideration should be given to the time of construction. Since the humpback whale migrate to Hawaii from November-May, blasting offshore may affect the whales. More importantly, the waters offshore to the 100 fathom mark around the State of Hawaii has been proposed as a marine sanctuary for the humpback whale. The proposed action will directly affect the proposal area. As a result, a discussion of the impact on construction and the whale is warranted.

In addition, recent concerns have been expressed regarding the relationship of ocean construction and ciguatera. Although more research is being conducted on ciguatera, a discussion of

this topic in relation to the ocean outfall system should be given.

For your convenience, we have listed the commenting parties and attached their comments when appropriate.

We thank you for the opportunity to review the subject statement. We look forward to the revised EIS.

Sincerely,

Harry Y. Akagi
Acting Director

Attachment
cc: R.M. Towill Corp. (with attachments)

GEORGE R. ARIYOSHI
GOVERNOR

JOHN FARIAS, JR.
CHAIRMAN BOARD OF AGRICULTURE

STATE OF HAWAII
DEPARTMENT OF AGRICULTURE
1428 SOUTH KING STREET
HONOLULU, HAWAII 96814

July 7, 1981

MEMORANDUM

To: Office of Environmental Quality Control

Subject: Kailua-Kona Sewerage System Phase IV

The Department of Agriculture has reviewed the subject Environmental Impact Statement and finds that our concerns have been adequately addressed.

Thank you for the opportunity to comment.

JOHN FARIAS, JR.
Chairman, Board of Agriculture

DEPARTMENT OF PUBLIC WORKS
COUNTY OF HAWAII • 25 AUPUNI STREET • HILO HAWAII 96720 • TELEPHONE (808) 961-8321

MINORU T. MATAYOSHI
Mayor

EDWARD K. HARADA
Chief Engineer

ARTHURT KUMUTO
Deputy Chief Engineer

July 20, 1981

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

Attention: Mr. John Farias, Jr.
Chairman, Board of Agriculture

SUBJECT: Response to Comment, Environmental Impact Statement (EIS) for the Kailua-Kona Sewerage System, Phase IV (Northern Zone)

Your letter of July 7, 1981 indicating that your concerns have been addressed in subject EIS is acknowledged.

EDWARD HARADA
Chief Engineer

United States Department of Agriculture
Soil Conservation Service
P. O. Box 50004
Honolulu, Hawaii
96850

July 6, 1981

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

Gentlemen:

Subject: Kailua-Kona Sewerage System Phase IV (Northern Zone)

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

Thank you for the opportunity to review this document.

Sincerely,

JACK P. KANALZ
State Conservationist

cc: Dept. of Public Works, County of Hawaii

The Soil Conservation Service is an agency of the Department of Agriculture

SCS-AS-1
10-78

DEPARTMENT OF PUBLIC WORKS
COUNTY OF HAWAII · 25 AUPUNI STREET · HILO, HAWAII 96720 · TELEPHONE (808) 961 8321

HERBERT T. MATAYOSHI
Mayor
EDWARD K. HARADA
Chief Engineer
ARTHUR T. ISHIMOTO
Deputy Chief Engineer

July 20, 1981

Soil Conservation Service
United States Department of
Agriculture
P. O. Box 50004
Honolulu, Hawaii 96850

Attention: Mr. Jack P. Kanalz
State Conservationist

SUBJECT: Response to Comment, Environmental Impact Statement (EIS) for the Kailua-Kona Sewerage System Phase IV (Northern Zone)

Your letter of July 6, 1981 indicating no comment on subject EIS is acknowledged.

EDWARD HARADA
Chief Engineer

HERBERT T. MATAYOSHI
Mayor
EDWARD K. HARADA
Chief Engineer
ARTHUR T. ISEMOTO
Deputy Chief Engineer

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

July 20, 1981

Department of Land and Natural Resources
State of Hawaii
P. O. Box 621
Honolulu, Hawaii 96809

Attention: Mr. Susumo Ono
Chairman, Board of Land and Natural Resources
and State Historic Preservation Officer

SUBJECT: Response to Comment, Environmental Impact Statement (EIS) for the Kailua-Kona Sewerage System, Phase IV (Northern Zone)

We are in receipt of your letter of June 19, 1981, which presented comments upon subject EIS. We offer herewith our responses to those comments.

As indicated in the EIS, all areas with planned off-road construction have been surveyed by archaeologists and no interference with any archaeological site is foreseen. Copies of these reconnaissance reports by Lloyd J. Soehren have been forwarded to the State Historic Preservation Office.

The recommendation to submit a detailed copy of the proposed route to your historic sites office for review prior to construction is accepted and will be accomplished during the imminent design phase of the project. The project specifcations will require the contractor(s) to contract with a qualified archaeologist to monitor construction activities. The project will conform to 36 CFR 800 and all relevant communications will be addressed to the State Historic Preservation Office.

For this type of treatment process, lagoon depths vary anywhere from about 10 to 20 feet depending on volume requirements, land availability and the limits of the particular aeration system. Total processing time in this type of system for secondary treatment ranges from 10 to 20 days depending primarily on the number of lagoons, assuming other factors (temperature, decay rates, etc.) are constant. At Kealakehe, the planned lagoons will be approximately 15 feet deep, with a process time of approximately 16 days.

For the aerated lagoons, the processes involved include aerobic stabilization of organic matter and anaerobic digestion of sludge solids. In the aerobic reduction of organic matter, bacteria utilize organic matter as food and through growth and respiration convert organic matter to soluble inorganic end products and more biomass. The heavier biomass and dead and decaying biomass settle to the bottom as sludge and undergoes anaerobic digestion.

In this type of lagoon (aerated), no sludge handling is required over the design life of the plant. Settled solids on the bottom of the lagoon are expected to undergo anaerobic digestion. In this process, solids are digested and broken down by anaerobic bacteria. Ultimately, inorganic soluble end products result. To summarize, organic matter (sludge) is converted to soluble inorganic end products which are carried away in the effluent.

In this process, there will always be a relatively constant quantity of organic sludge accumulating and being converted to soluble end products. This layer of sludge on the bottom of the lagoons is not expected to exceed a few inches in depth. Inorganic matter (sand, grit) will tend to accumulate over the life of the plant but with screens and a grit chamber ahead of the lagoons this quantity will be minimized.

As there is no sludge recycling and/or transfer of sludge between lagoons, the only mass balance involves transfer and reduction of suspended solids and BOD between each lagoon. The effluent is expected to be 10 percent of the influent BOD and suspended solids. For the proposed 4-pond system, the following reduction through the plant is applicable (as a percentage of plant influent):

Lagoon 1 Influent = 100%
Lagoon 1 Effluent = 47%
Lagoon 2 Effluent = 30%
Lagoon 3 Effluent = 19%
Lagoon 4 Effluent Cell 1 = 13%
Lagoon 4 Effluent Cell 2 = 10%

The aeration system is reliable in that component parts may require shutdown for maintenance or repair but the entire system continues to operate. The only time the entire aeration system may shut down is during a power failure. However, an emergency generator will supply power to the aeration system during these times.

The proposed treatment plant will include an analytical laboratory, complete with air monitoring equipment. A properly working lagoon system does not generate any odors. However, the possibility of pathogen and odor transfer does exist, however small, and therefore the concern has some foundation. Before the plant is put into operation, baseline data from daytime and

nighttime air samples will be obtained. After the plant is in operation, additional samples, upwind and downwind, daytime and nighttime will be analyzed for pathogens and odorous gases.

We have reviewed the access road alignment shown in the Kealakehe development plan prepared by Charles Yoon in 1968. It would move the access road intersection onto the Queen Kaahumanu Highway approximately 1,000 feet north from the planned intersection. This recommended adjustment will be considered and discussed with your staff during the design phase of the project.

When wastewater is discharged deep into the ocean and the ocean waters are density stratified, the wastewater is mixed with the denser layers of the ocean bottom water. The mixture rises until it meets water having a density equal to that of the mixture. Temperature measurements off nearby Ke-ahole Point have indicated that the desired density stratification exists at the outfall site. An extensive ocean data collection and evaluation effort is planned for the proposed outfall site early in the design phase to verify the existence of the desired density stratification. The EIS text has been revised to include the above.

The use of explosives and alternatives for trenching is now amplified in Section 5 which also describes the effects and mitigative measures.

We appreciate your careful review of the EIS and the resulting recommendations.

EDWARD HARADA
Chief Engineer

HERBERT T. MATAYOSHI
Mayor
EDWARD K. HANADA
Chief Engineer
ARTHUR T. ISEMOTO
Deputy Chief Engineer

DEPARTMENT OF PUBLIC WORKS

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

July 20, 1981

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

Attention: Mr. Harry Y. Akagi
Acting Director

SUBJECT: Response to Comment, Environmental Impact Statement (EIS) for the Kailua-Kona Sewerage System, Phase IV (Northern Zone)

We are in receipt of your letter of July 1, 1981 which offered comments on subject EIS. We offer herewith our responses to these comments.

Joint EIS Process

A Joint EIS was not prepared because of a working agreement between the State Department of Health and the U. S. Environmental Protection Agency (Region IX) to recognize an accepted EIS prepared under Chapter 343, HRS, for wastewater facility plans. The EPA will issue a Finding of No Significant Impact (FONSI) upon completion of the EIS according to State regulations.

Wastewater Treatment (p. 2-15)

The proximity of the proposed Kaloko-Honokohau National Cultural Park is described in Section 3 and indicated on Figure 3-8.

Aerated Lagoons

The lagoons are located in an area of minimal flooding of Zone C designation. They will be protected by elevated berms which will deny any flooding, highly unlikely at the selected site.

The proposed treatment plant will be designed to minimize or eliminate all odors. Odor control will be effected through close process control and frequent air sampling with the monitoring equipment planned for the plant's analytical laboratory.

Effluent Disposal (p. 2-15)

The original Kealakehe Development Plan developed for the State Department of Land and Natural Resources in 1968 envisaged a public golf course for the State lands at Kealakehe, together with resort hotels and an all-weather marina. There has been and is considerable developer interest in the development of the public golf course. It is the most likely use of these State lands.

Highway irrigation has not been specifically considered but is certainly a future potential use of the treated effluent.

Correction

The recommended additional note has been inserted into the EIS text in Section 3.

Population Projections (p. 3-16)

The rationale for use of the E-2 population projections is included in Section 3-B-2-b and has been accepted by the State Department of Health and the EPA.

Proposed Developments (p. 3-24)

The recent developments have been included in the EIS text.

Government Policies

An additional note on compliance with CZM Special Management Area regulations has been included in Section 3. The project conforms to the Hawaii State Plan and the State Environmental Policy Act. This has been noted in Section 10.

Documentation

Page 5-2. The Flora and Fauna Survey was conducted by Nelson Santos, Biologist, State Fish and Game Division. The survey data has now been amplified in Section 3.

Page 5-3. The State lands at Kealakehe were surveyed by Mr. Lloyd Soehren, Archaeologist. Copies of his reports are on file in the State Historic Preservation Office. The Liliuokalani Trust lands at Kealakehe were surveyed by the Archaeological Research Center, Hawaii, Inc.

Sludge (p. 5-5)

In this type of lagoon (aerated) no sludge handling is required over the design life of the plant. Settled solids on the bottom of the lagoon are expected to undergo anaerobic digestion. In this process

solids are digested and broken down by anaerobic bacteria. Ultimately, inorganic soluble end products result. Organic matter (sludge) is converted to soluble inorganic end products which are carried away in the effluent.

In this process, there will always be a relatively constant quantity of organic sludge accumulating and being converted to soluble end products. This layer of sludge on the bottom of the lagoons is not expected to exceed a few inches in depth. Inorganic matter (sand, grit) will tend to accumulate over the life of the plant but with screens and a grit chamber ahead of the lagoons, this quantity will be minimized.

Growth Impact (p. 5-6)

Section 6 includes a discussion of the secondary impact of the project on growth. The essential elements of the project are all quantified to the scale indicated by the accepted population projections. Present flows into the existing plant are approximately 550,000 gallons per day, indicating that approximately 5,500 people are serviced in the Northern Zone. The new plant's planned capacity of 2,800,000 gallons per day will ultimately accommodate approximately 28,000 people (in both the Northern and Southern Zones).

Outfall - Marine Fauna

Appendix B has now been expanded to indicate the results of the 1973 underwater survey by Dr. Ralph Bowers.

The effects on marine fauna near the proposed outfall can be evaluated in light of experience with five outfalls on Oahu. Observations at these outfalls indicate that an increase in the fish population can be expected near the outfall due to increases in habitat and particulate food sources. These effects do not extend any significant distance and no general effect to the area is expected due to the small volume of discharge and the inadequate time available to planktonic organisms to respond to the localized higher nutrient levels.

The Kona coast is apparently visited by few humpback whales. The prime breeding grounds are the Molokai Channel, the Penguin Banks, and the waters bounded by Kahoolawe, Lanai, Molokai, and Maui. The effect of blasting on the whales, assuming they were present, is not known. The whales return to the waters around Kahoolawe each year, in spite of the Navy target practice, suggesting that the whales are not extremely sensitive to blasting or explosions.

The dinoflagellate causing Ciguatera grows primarily on frondose algae which are most commonly occurring in water depths up to 20 feet. When a new surface is exposed (for example, during construction) the frondose

algae may colonize the new surfaces, thereby starting the mechanism for potential Ciguatera problems. However, recent work has indicated that where the newly exposed surface is sterile (rock or other inorganic material) the algae may still colonize the site, but the toxic dinoflagellates do not. Apparently the new surface must have some proportion of organic material in order for the mechanism to occur. Trenching for the new outfall will be through basalt with no organic material present. An outbreak of Ciguatera poisoning is therefore not expected. Also, the length of the pipeline route between zero and 20 feet is very short, since depth increases rapidly off the Kona coast. No Ciguatera outbreaks have occurred during the construction or expansion of Honokohau Harbor, which is adjacent to the proposed site and resulted in a much larger exposure of new surface area than expected with the outfall trench.

We appreciate the thorough review of the EIS by your office.

EDWARD NARADA
Chief Engineer

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

HERBERT T. MATSUBAYASHI
Mayor
EDWARD K. HARADA
Chief Engineer
ARTHUR T. ISEMOTO
Deputy Chief Engineer

July 20, 1981

Water Resources Research Center
University of Hawaii at Manoa
State of Hawaii
Holmes Hall 283, 2450 Dole St.
Honolulu, Hawaii 96822

Attention: Mr. Edwin T. Murabayashi
EIS Coordinator

SUBJECT: Response to Comment, Environmental Impact Statement (EIS) for the Kailua-Kona Sewerage System, Phase IV (Northern Zone)

We are in receipt of your letter of June 19, 1981 which presented several comments upon subject EIS. We offer herewith our considered responses to those comments.

Your letter suggests the possibility of using an anaerobic pond as the initial lagoon in the lagoon type wastewater treatment system because loading rates in the first pond indicate that large amounts of oxygen would be required. Hence, your recommendation suggest utilizing a facultative pond with a thin aerobic layer.

It is true that this type of system can significantly reduce land requirements, equipment costs, overall capital costs and power costs. If the thin aerobic layer maintained by photosynthetic organisms can be constantly maintained, this would be a more suitable system. It is unfortunate, however, that maintenance of this layer to prevent the release of odorous compounds is not likely. Seasonal and daily variations in loading rates, the consumption of oxygen by photosynthetic organisms in the evenings, wind action and the absence of process controls, contribute to the possibility of total anaerobic conditions and the production and release of odors.

Since the ponds will be located in an environmentally sensitive area (resort), the likelihood and disadvantage of odor production far outweigh the monetary savings.

As for the aerated lagoons, the first lagoon is designed to receive large amounts of oxygen. The entire liquid column is kept aerated while settled solids undergo anaerobic digestion. Process controls such as airflow controls, recirculation and residual dissolved oxygen increase the flexibility of the plant to process upsets and hence this reduces significantly the possibility of odors.

We appreciate your review comments.

EDWARD HARADA
Chief Engineer

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

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

SUSUMU ONO, CHAIRMAN
BOARD OF LAND & NATURAL RESOURCES

TOSHI A. HANAMI
DEPUTY TO THE CHAIRMAN

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

June 19, 1981

Office of Environmental Control
550 Halekauwila Street
Honolulu, Hawaii 96813

Gentlemen:

We have reviewed the EIS for the Kailua Kona Sewer System, Phase IV and have some comments to offer.

Our records show that the route of the proposed sewer system occurs in areas where archaeological sites are located, including sites listed on the National Register of Historic Places and the Hawaii Register of Historic Places.

A portion of the route occurs in the Kona Field System (site #6601), a site eligible for the National Register of Historic Places. The Kona Field System is characterized by numerous agricultural sites/features associated with the prehistory of North and South Kona. This agricultural system is such that many sites have not yet been recorded. It is highly probable that the developer will encounter unrecorded sites if the proposed route diverges from existing highways and roadways, as implied by the maps in the EIS. It is also highly probable that subsurface sites will be discovered during trenching.

Accordingly, we recommend:

1) That the developer submit a detailed copy of the proposed route to our historic sites office (Ph. 6408) for review prior to construction.

2) That construction outside of any existing roadway corridor require an archaeologist and a copy of the reconnaissance report be sent to our historic sites office for review and evaluation prior to construction. At such time, determination can be made of measures to mitigate adverse effects.

3) As it is highly probable that subsurface features will be found during construction, the developer should contract with a qualified archaeologist to monitor construction activities.

4) The project must conform to 36 CFR 800 (Protection of Historic and Cultural Properties), and all communications pursuant to these regulations should be addressed to the State Historic Perservation Officer.

The description of the proposed wastewater treatment does not indicate pond depths, processing time, the natural processes at work, or the mass balance at each stage. The reliability of the aeration system and the down time needed for routine maintenance and repairs are not described. Standby measures to cope with equipment or power failure are also not described.

We recommend including daytime and nighttime air samples as part of the baseline data. After the treatment plant is in operation, additional samples, upwind and downwind, nighttime and daytime should be taken. All samples should be analyzed for pathogens and odorous gasses. These tests are needed to validate long term plans for use of areas downwind to the plant.

We further recommend that access to the treatment plant follow the alignment shown in the Kealakehe development plan prepared by Charles Yoon in 1968. This will avoid duplication of roadways in the future. Because of the plant site width, the Yoon alignment will need some adjustment. Alternatively, the plant layout may be adjusted.

We are concerned with the possiblity that the effluent plume will surface. The conclusions appearing on pages B-3 and B-4 should be supported with additional explanation and information.

In trenching the nearshore ocean floor, alternatives to blasting should be considered. If, because of the rocky bottom, no alternative is feasible, then this should be stated. Blasting is indiscriminately destructive of biota and habitat. Shock waves are generated extending the range of detrimental effects. Regardless of the trenching method employed there will be adverse impacts on the marine environment and these should be described in Section 6.

Very truly yours,

SUSUMU ONO
Chariman,
Board of Land & Natural Resources
& State Historic Perservation Officer

COPY

DEPARTMENT OF PARKS & RECREATION
COUNTY OF HAWAII
HILO, HAWAII 96720

July 9, 1981

Office of Environmental Quality Control
550 Halekauila Street, Room 301
Honolulu, Hawaii 96813

Subject: Kailua-Kona Sewerage System Phase IV - EIS

We have no adverse comments to offer on the subject report.
Thank you for the opportunity to review the document.

Milton T. Hakoda
Director

encl. - EIS

cc: Dept. of Public Works, County of Hawaii

DEPARTMENT OF PUBLIC WORKS
COUNTY OF HAWAII · 25 AUPUNI STREET · HILO HAWAII 96720 · TELEPHONE (808) 961-8321

EDWARD K. HARADA
Chief Engineer
ARTHUR T. ISEMOTO
Deputy Chief Engineer

July 20, 1981

Department of Parks and
Recreation
County of Hawaii
Hilo, Hawaii 96720

Attention: Mr. Hilton T. Hakoda
Director

SUBJECT: Response to Comment, Environmental
Impact Statement (EIS) for the
Kailua-Kona Sewerage System,
Phase IV (Northern Zone)

Your letter of July 9, 1981 indicating no comment on subject EIS is acknowledged.

EDWARD HARADA
Chief Engineer