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HONOLULU, HAWAII 96843

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KAZU HAYASHIDA
Manager and Chief Engineer

October 21, 1980

Mr. Donald Bremner
Chairman
Environmental Quality
Commission
Room 301
550 Halekauwila Street
Honolulu, Hawaii 96813

Dear Mr. Bremner:

Subject: Revised Environmental Impact Statement (EIS) for Waipahu 16-Inch Water Main From Waikele Road to Waipahu Wells, Waipahu, Oahu, Hawaii

We request Mayor Fasi's acceptance of the revised EIS for the waterline project be published in your EQC Bulletin. Enclosed are twenty (20) copies of the revised EIS and a copy of the letter indicating Mayor Fasi's acceptance.

Should you have questions or require additional information, please call Lawrence Whang at 548-5221.

Very truly yours,

Kazu Hayashida

KAZU HAYASHIDA
Manager and Chief Engineer

Encl.

cc: Stanley S. Shimabukuro & Associates, Inc.

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REVISED

ENVIRONMENTAL IMPACT STATEMENT

WAIPAHU 16-INCH WATER MAIN FROM WAIKELE ROAD TO WAIPAHU WELLS

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BOARD OF WATER SUPPLY

REVISED
ENVIRONMENTAL IMPACT STATEMENT

FOR

WAIPAHU 16-INCH WATER MAIN
FROM WAIKELE ROAD TO WAIPAHU WELLS

Waipahu, Oahu, Hawaii

THIS ENVIRONMENTAL DOCUMENT IS SUBMITTED
PURSUANT TO CHAPTER 343, HRS

PROPOSING AGENCY: Board of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu, Hawaii 96843

ACCEPTING AUTHORITY: Mayor
City and County of Honolulu

Board Members:

Yoshie H. Fujinaka, Chairman
Dat Quon Pang, Vice Chairman
Ryokichi Higashionna
Terisita R. Jubinsky
Wallace S. Miyahira
Robert Adrian Souza
Claude T. Yamamoto

Kazu Hayashida OCT 8 1980

KAZU HAYASHIDA — Date
Manager and Chief Engineer

Prepared For: Stanley S. Shimabukuro and
Associates, Inc.
1126 12th Avenue, Suite 309
Honolulu, Hawaii 96816

By: Environment Impact Study Corp.
1166 Fort Street Mall, Suite 207
Honolulu, Hawaii 96813

October, 1980

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SUMMARY

WAIPAHU 16-INCH WATER MAIN
FROM WAIKELE ROAD TO WAIPAHU WELLS
Waipahu, Oahu, Hawaii

PROPOSING AGENCY:	Board of Water Supply City and County of Honolulu
ACCEPTING AUTHORITY:	Mayor City and County of Honolulu

The Board of Water Supply proposes to install 9,600 linear feet of 16-inch pipe, linking the existing Waipahu Wells to the existing 16-inch water main at the corner of Waipahu Street and Waikele Road. The new 16-inch main will be placed from Waikele Road along Waipahu Street, a private road, Paiwa Street, and a cane haul road and Mahoe Street mauka of the H-1 Freeway.

The primary objective of the proposed improvements is to insure greater continuity of flow by having parallel mains between Waipahu Wells and the Ewa-Waianae system. The proposed improvements will:

1. Provide greater flexibility in the distribution system to the Waipahu area and the Ewa-Waianae system;

2. Provide adequate fire protection for the residential area mauka of the Waipahu Sugar Mill, via the distribution system; and

3. Permit utilization of the design capacity of the Waipahu Well field (if allowed by the State Board of Land and Natural Resources in the future).

The existing 16-inch line runs from Waipahu Wells to Kunia Road along Waipahu Street. However, the water pressure from the line originating at Hoaeae Wells blocks further westward flow of water in the existing 16-inch line. Besides the objectives stated above, the proposed line, therefore, would not only enable uninterrupted westward flow of water but would provide an important backup to a line already 10 years old.

The proposed project will be funded by the Board of Water Supply, City and County of Honolulu. Construction costs are estimated at $1,000,000. Construction is anticipated to begin after November, 1980.

The land on which the project is located was formed by lava flows from the ancient Koolau volcano. Soils in the vicinity of the site are primarily of the Molokai and Waipahu Series. The climate of the area is generally hot and dry. Winds are generally light and from the northeast.

Vegetation along the proposed alignment consists primarily of sugar cane, road-side weeds, and introduced plants. Wildlife consists primarily of birds. No threatened or endangered species of plants or animals were found along the alignment during a reconnaissance survey.

There are no archaeological sites in or close to the project alignment.

Potable water, electricity, and telephone service are available in the project vicinity. Police and fire protection are also available. Response time for fire and police services is estimated at 4 minutes.

The proposed 16-inch transmission line is in compliance with land use plans, policies, and controls for the area.

Anticipated adverse impacts associated with the proposed project primarily involve construction activities. For example, there would be an increase in existing noise during construction of the transmission line. Another impact would be generation of dust during trenching for the line. There will be some traffic disruption along portions of Waipahu Street and Paiwa Street. All of these impacts are not anticipated to be significant, can be mitigated, and will be of short duration, lasting only for the required construction period.

Long-term impacts from the proposed action include positive impacts on water supply for the Waipahu area and for the Ewa-Waianae system.

SECTION 1

DESCRIPTION OF THE PROPOSED PROJECT

I. INTRODUCTION

The Board of Water Supply (BWS), City and County of Honolulu, proposes phased installation of approximately 9,600 linear feet of 16-inch pipe, linking the existing Waipahu Wells to the existing 16-inch water main at the corner of Waipahu Street and Waikele Road. Providing this transmission system will enable the westward movement of water from Waipahu Wells to the Ewa-Waianae system.

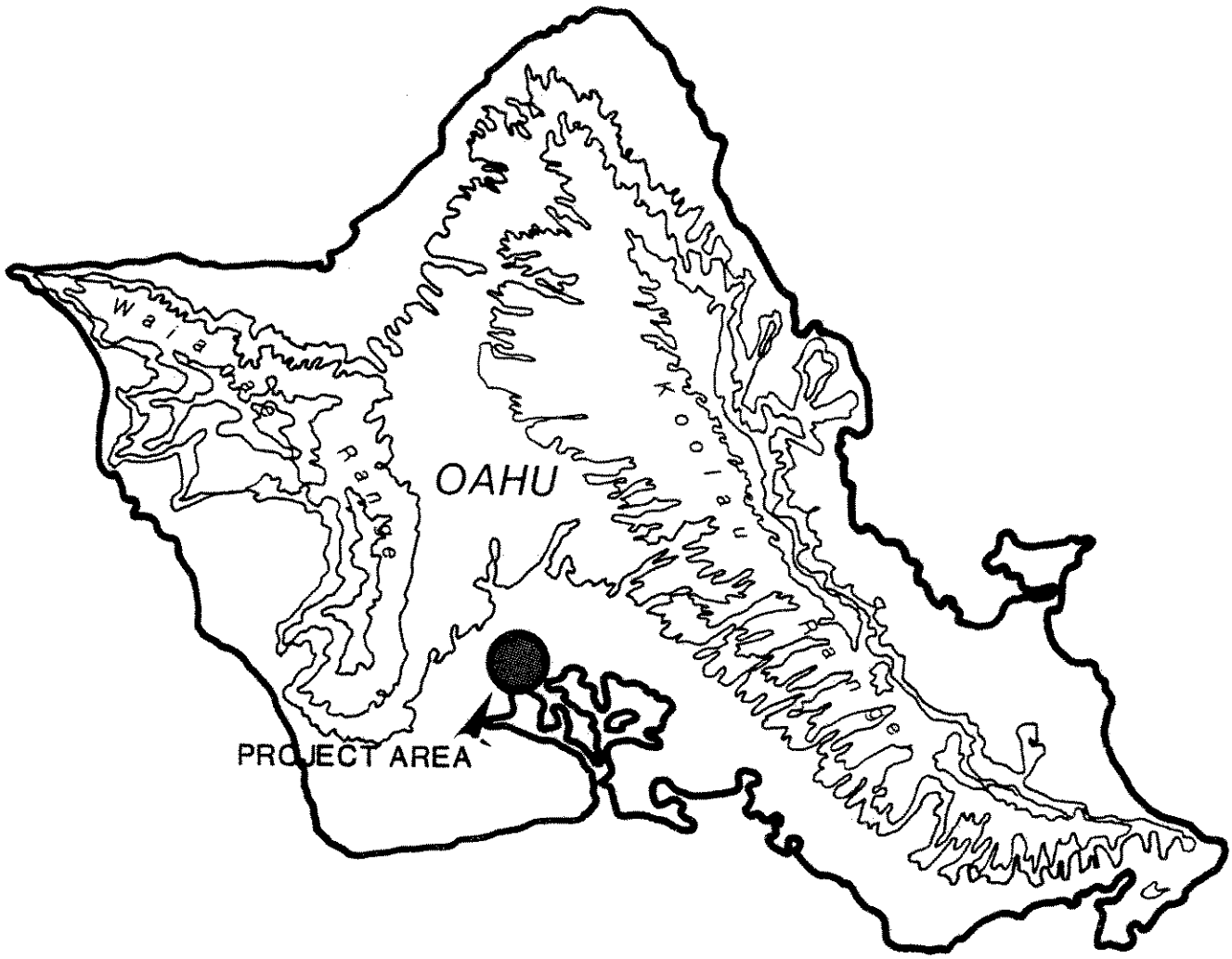
The proposed project is located in the town of Waipahu, on the island of Oahu. The 16-inch main will be placed from Waikele Road along Waipahu Street, a private road, Paiwa Street, and a cane haul road and Mahoe Street mauka of the H-1 Freeway. Note Figures 1-1, 1-2, 1-3A and 1-3B.

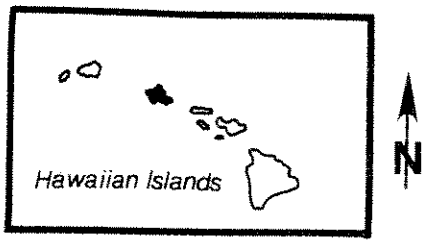
II. PROJECT OBJECTIVES

The primary purpose of the proposed project is to insure continuity of flow by having parallel mains between Waipahu Wells and the Ewa-Waianae system.

This project will:

1. Provide greater flexibility in the distribution system to the Waipahu area and the Ewa-Waianae system;



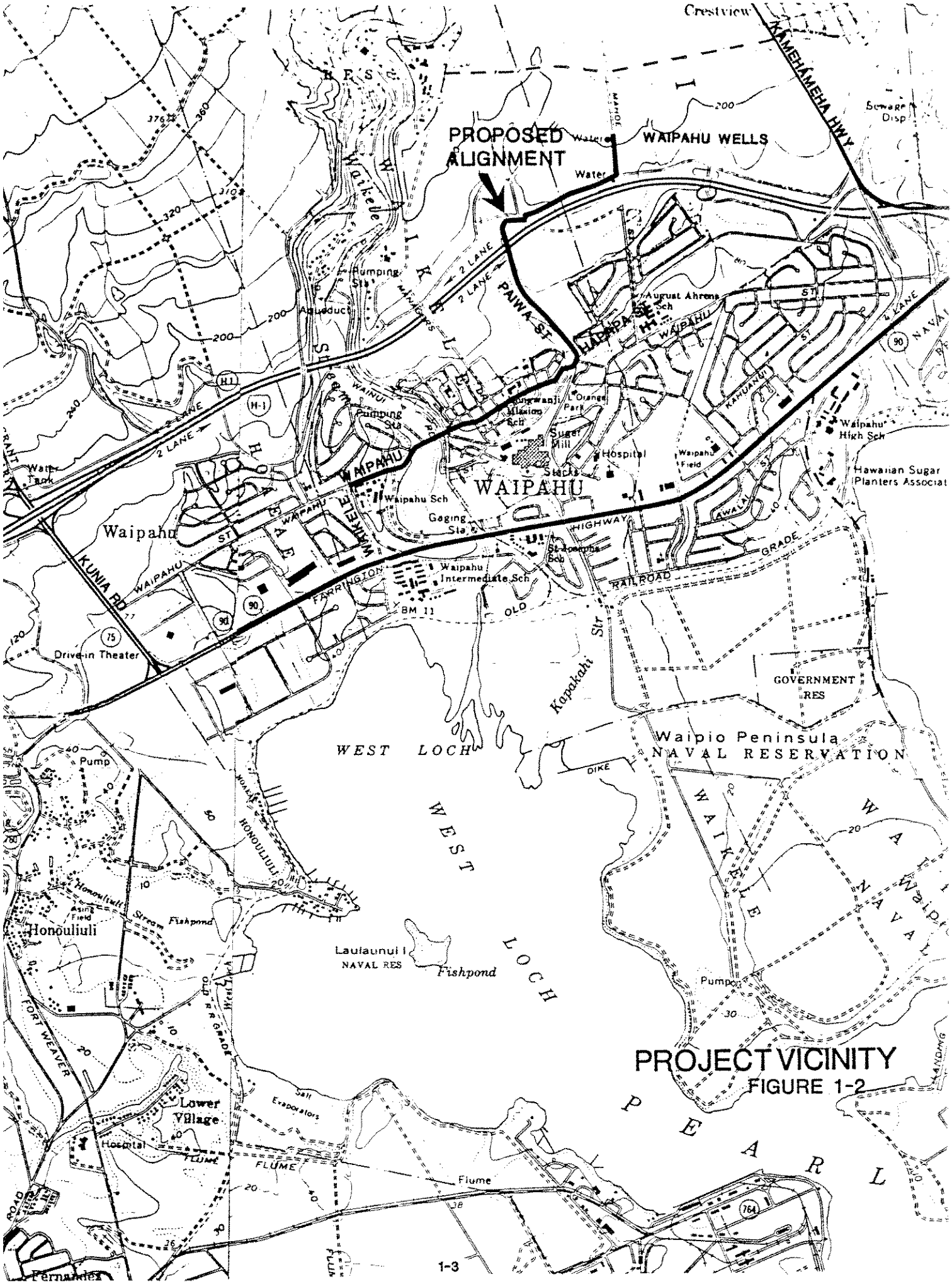


E I.S.C.

LOCATION MAP

WAIPAHU 16" WATER MAIN FROM
WAIKELE ROAD TO WAIPAHU WELLS

FIGURE 1-1



PROJECT VICINITY
FIGURE 1-2

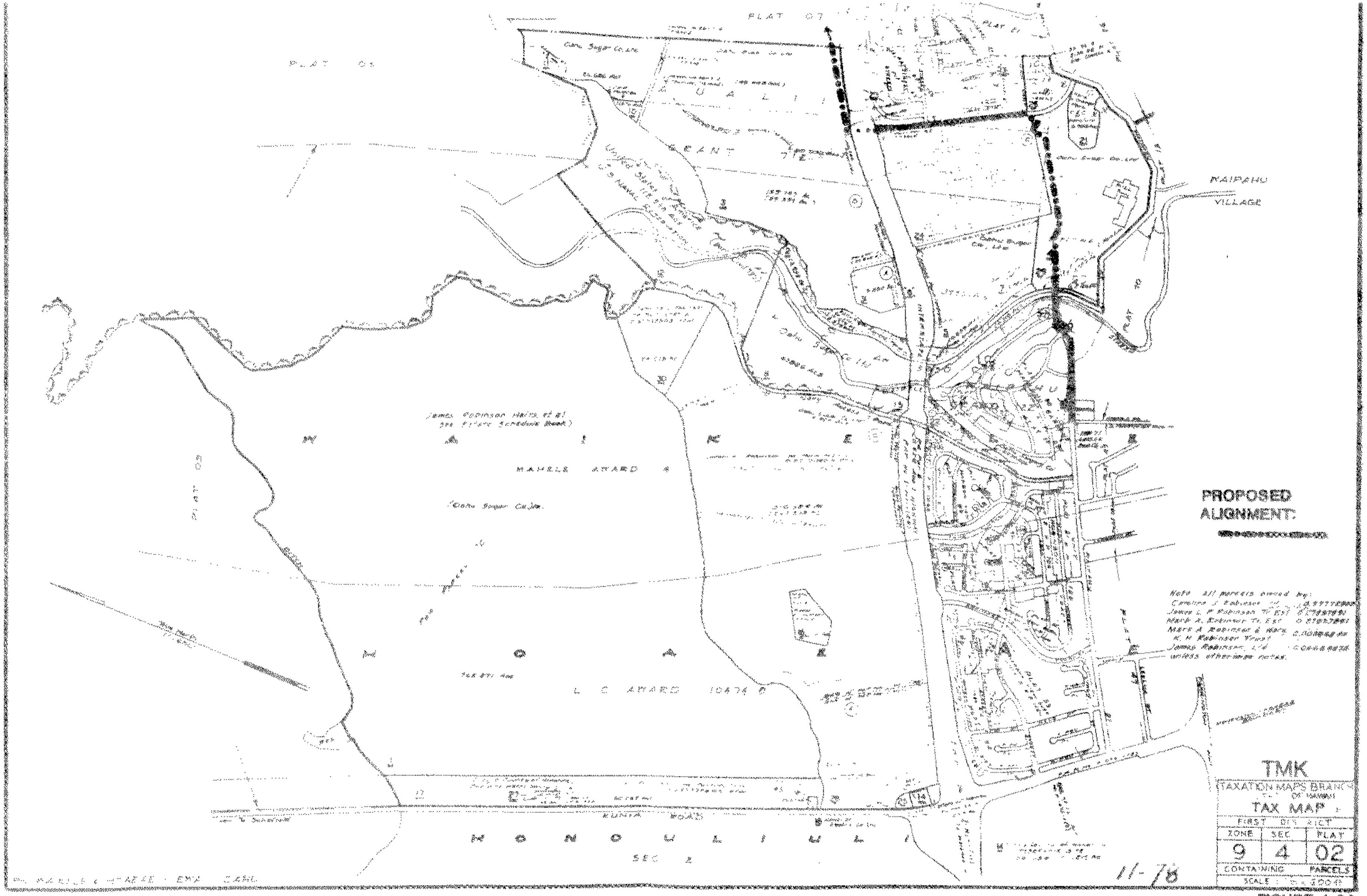

PROPOSED
ALIGNMENT:
KAIPAHU
VILLAGE
PLAT 07
PLAT 03
HONOULIULI
SEC 2
L C AWARD 10474
MAHELE AWARD
KUNIA ROAD
Note: All parcels owned by:
Caroline J Robinson
James L P Robinson Tr Est
Mark A Robinson Tr Est
Mark A Robinson & Wars
K H Robinson Trust
James Robinson Ltd
unless otherwise noted.
TMK
TAXATION MAPS BRANCH
STATE OF HAWAII
TAX MAP
FIRST DIVISION
ZONE 9
SEC 4
PLAT 02
CONTAINING
PARCELS
SCALE
11-78

FIGURE 1-3A

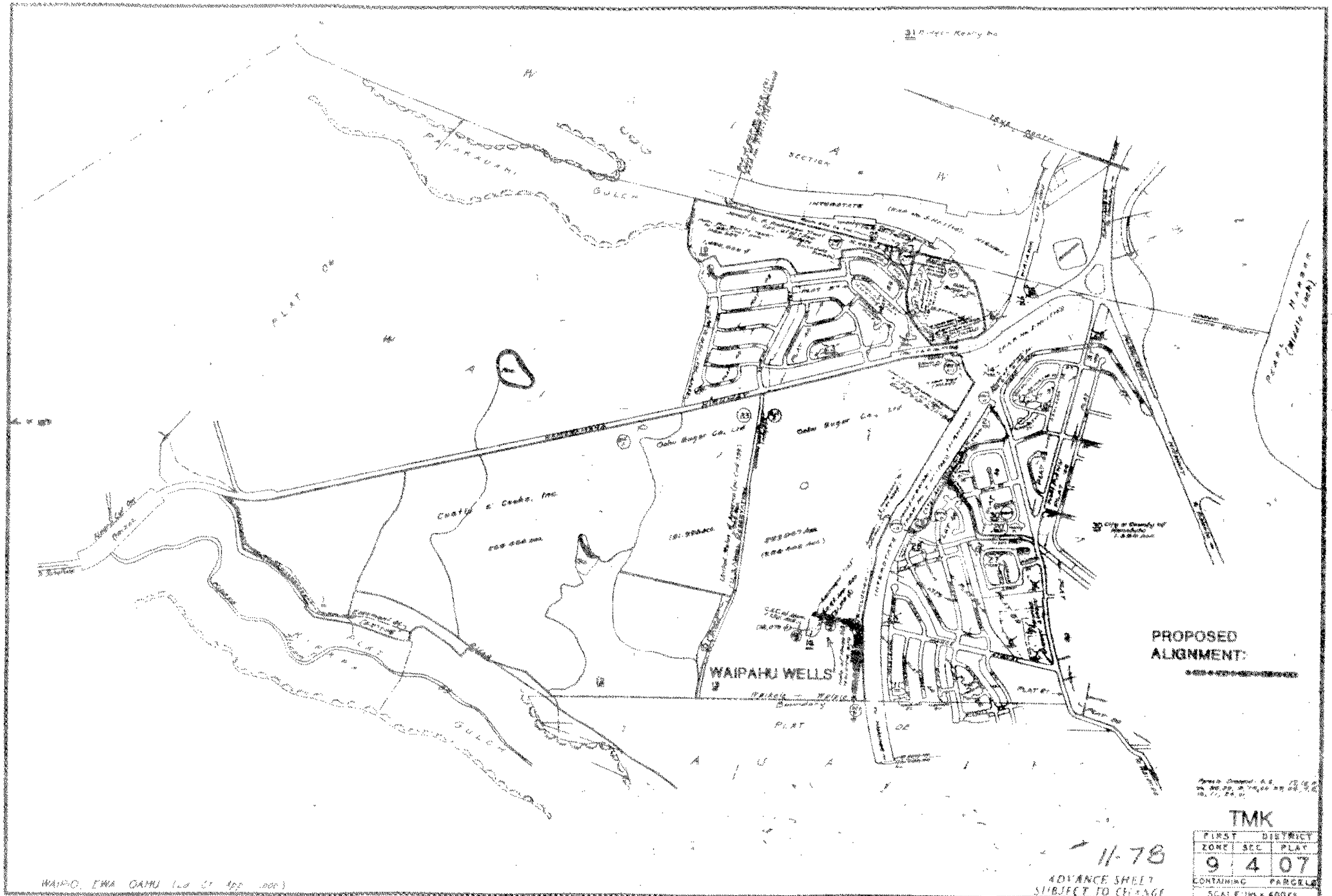

PROPOSED
ALIGNMENT:
WAIPAHU WELLS
Oahu Sugar Co., Ltd
Castle & Cooke, Inc.
TMK
FIRST DISTRICT
ZONE SEC PLAT
9 4 07
CONTAINING PARCELS
11-78
ADVANCE SHEET
SUBJECT TO CHANGE
PEARL HARBOR (Middle Loch)
WAIPIO, EWA, OAHU

FIGURE 1-3B

2. Provide adequate fire protection for the residential area mauka of the Waipahu Sugar Mill, via the distribution system; and

3. Permit utilization of the design capacity of the Waipahu Well field (if allowed by the State Board of Land and Natural Resources in the future).

The existing 16-inch line runs from Waipahu Wells to Kunia Road along Waipahu Street. However, the water pressure from the line originating at Hoaeae Wells blocks further westward flow of water in the existing 16-inch line. Besides the objectives stated above, the proposed line, therefore, would not only enable uninterrupted westward flow of water but would provide an important backup to a line already 10 years old.

III. EXISTING WATER SYSTEM

A. General Background

Besides Waipahu, Pearl Harbor Water District sources in the immediate vicinity of the proposed project also serve areas within the Ewa-Waianae Water District. Most of the water for the Ewa-Waianae Water District has been supplied by the Pearl Harbor Water District, because fresh water resources in the Ewa-Waianae District were formerly considered economically unfeasible for development. Refer to

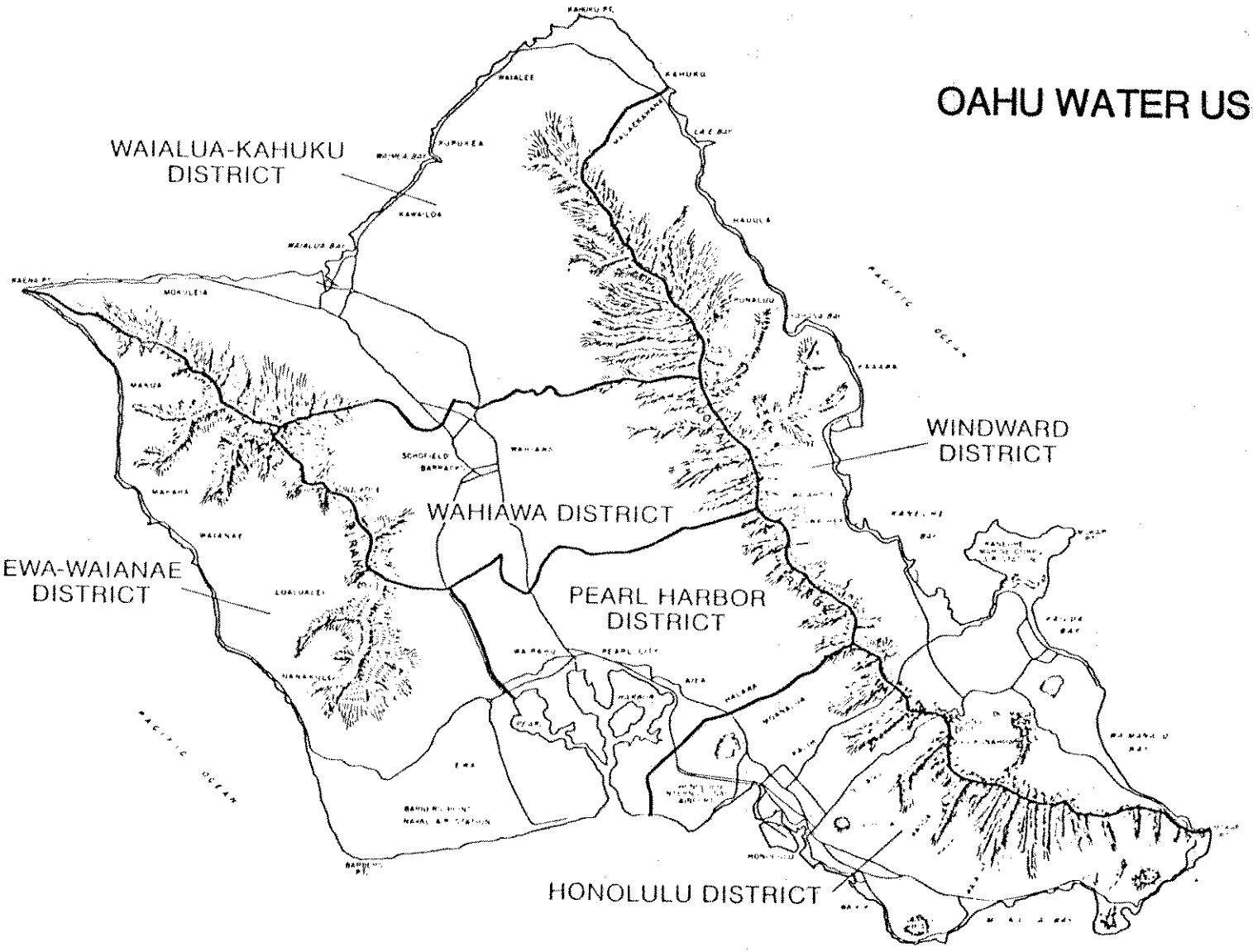
Figure 1-4. The Pearl Harbor Water District encompasses 69-square miles in south central Oahu, extending from the crest of the Koolau Range and Red Hill at its east boundary to Kunia Road at the west. Its southern boundary is the shoreline area of Pearl Harbor estuary and its northern boundary generally falls below the Waiahole Ditch and tunnel system. The resident population as of January 1979 was estimated at 110,884.

The Ewa-Waianae Water District covers 120-square miles in western Oahu. It includes the region west of the Waianae Ridge Crest from Kaena Point to Nanakuli, Ewa and part of Honouliuli up to Kunia Road on the east. The resident population as of April 1, 1970 was 47,545, which had increased to an estimated 60,368 as of January, 1979.

Present maximum capacity of existing BWS sources serving the Ewa-Waianae District plus Waipahu is 41.62 mgd. However, since sources within the Pearl Harbor District also fall within the PHGWCA, the State has certified pumpage rates which the BWS must not exceed. This has resulted in an actual pumpage limit of 16.30 mgd. Table 1-1 presents a breakdown of maximum capacities by water district and source, with State pumpage limits for the Pearl Harbor sources also shown.

OAHU WATER USE DISTRICTS

FIGURE 1-4



SOURCE: OAHU WATER PLAN, 1975.

TABLE 1-1

DESIGN CAPACITIES OF WATER SOURCES SERVING THE LEEWARD REGION VERSUS STATE PUMPAGE LIMITS

Ewa-Waianae Water District Sources	Maximum Capacity	Operational Capacity
Waianae Tunnel	2.00 mgd	
Kamaile Wells	1.00	
Waianae Plantation System	0.70	
Makaha Shaft	1.44	
Makaha Well	1.00	
Subtotal:	6.14 mgd	4.20 mgd
Pearl Harbor Water District Sources Serving Ewa-Waianae Water District	**Maximum Capacity**	**Average Pumpage ***
Hoaeae Wells	14.44 mgd	6.61 mgd
Kunia Wells I	10.08	4.81
Waipahu Wells	10.96	4.88
Subtotal:	35.48 mgd	16.30 mgd
TOTAL:	41.62 mgd	20.50 mgd

* These figures are the State average allowed pumpages per day; however, they are below the operational capacity of these wells.

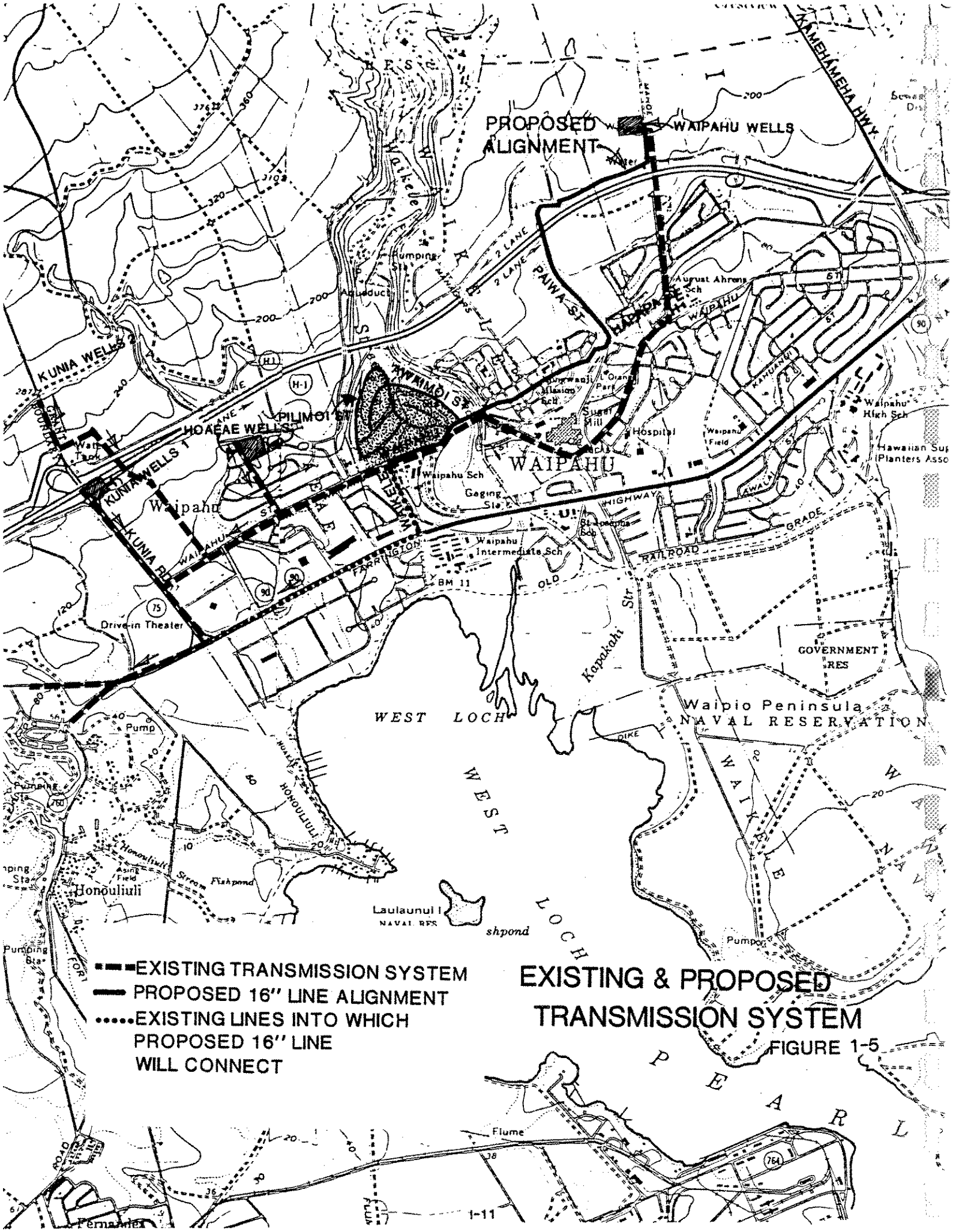
Source: [1.1], [1.2]

B. Existing Transmission System

The existing transmission system in the Waipahu and Ewa areas consists of the following lines and line boosters [1.1]:

Water is transported from Hoaeae Wells to Barbers Point 215 Reservoir through a 30-inch main along Farrington Highway. Refer to Figure 1-5. Water from Kunia Wells I is pumped through a 20-inch main along Kunia Road, which connects to the 30-inch main at Waipahu Street. Between Fort Weaver Road and Campbell Industrial Park, three transmission mains branch off the 30-inch main: (1) a 16-inch main running down Fort Weaver road to feed Ewa; (2) a 16-inch main going up Makakilo Drive to feed Makakilo via booster pumps; and (3) a 20-inch main running down Kalaeloa Boulevard to Campbell Industrial Park. Beyond Campbell Industrial Park, water is boosted from the Barbers Point reservoir to a 24-inch main along Farrington Highway to Lualualei 242 Reservoir. From Lualualei Reservoir, the transmission main connects to a line serving the Waianae area.

Kunia Wells II serve homes above the 128-foot elevation contour and will serve Village Park subdivision in the future. Waipahu Wells, Hoaeae Wells, and Kunia Wells I serve Waipahu and Ewa-Waianae Water District.



EXISTING TRANSMISSION SYSTEM

PROPOSED 16" LINE ALIGNMENT

EXISTING LINES INTO WHICH PROPOSED 16" LINE WILL CONNECT

EXISTING & PROPOSED TRANSMISSION SYSTEM

FIGURE 1-5

Heavy demands on the existing system necessitated installation of line boosters to increase carrying capacity and to maintain line pressures. The Honouliuli, Lualualei and Barbers Point line boosters help to move water westward, while the Ewa Beach booster increases flow to Ewa.

C. Existing Water Demand

Average water pumpage rates (demand) of BWS sources within the Pearl Harbor Water District over the last five years are presented in Table 1-2. Sources serving the Ewa-Waianae Water District plus Waipahu total 16.82 mgd.

IV. PROPOSED PROJECT

The proposed project involves installation of approximately 9,600 linear feet of 16-inch pipe from Waikele Road to Waipahu Wells along Waipahu Street across Waikele Stream gulch, Kalaiku Street (a private road), Paiwa Street, and a cane haul road. Improving the transmission flexibility from Waipahu Wells to the Ewa-Waianae System would improve service to existing developments and land uses in the Waipahu and Ewa areas.

Waipahu Wells are within the Pearl Harbor Ground Water Control Area (PHGWCA), which encompasses the Ewa and Wahiawa judicial districts. Refer to Figure 1-6. Pursuant to the recent adoption of Department of Land

TABLE 1-2

BWS SOURCES WITHIN THE PEARL HARBOR DISTRICT

A. SERVING THE EWA-WAIANAE DISTRICT PLUS WAIPAHU

Mean Pumpage 1975-1979 (mgd)				DLNR Average Capacity (mgd)
5.55		Kunia Wells I		4.81
6.83		Hoaeae Wells		6.61
4.44		Waipahu Wells		4.88
16.82	ST		ST	16.30

B. SERVING HONOLULU DISTRICT

0.85		Kaahumanu Wells		1.11
12.82		Punanani Wells		11.97
.27		Waimalu Wells II		0.30
1.17		Kaonohi Wells II		1.10
10.93		Kalauao Wells		11.75
1.97		Kaamilo Wells		1.99
12.48		Halawa Shaft		14.28
40.49	ST		ST	42.50

C. SERVING THE PEARL HARBOR DISTRICT MINUS WAIPAHU

.29		Kunia Wells II		0.96
.59		Waipio Heights Wells		0.63
1.23		Pearl City Shaft		1.32
.38		Pearl City Wells I		0.31
2.12		Pearl City Wells II		2.19
0.93		Waiau Wells		1.44
.39		Newtown Wells		1.05
.08		Waimalu Wells I		0.08
1.19		Kaonohi Wells I		1.10
1.01		Aiea Wells		1.03
.68		Aiea Gulch Wells		0.79
1.07		Halawa Wells		1.00
9.96	ST		ST	11.90
70.35	TOTAL		TOTAL	70.70

SOURCE: [1.2]

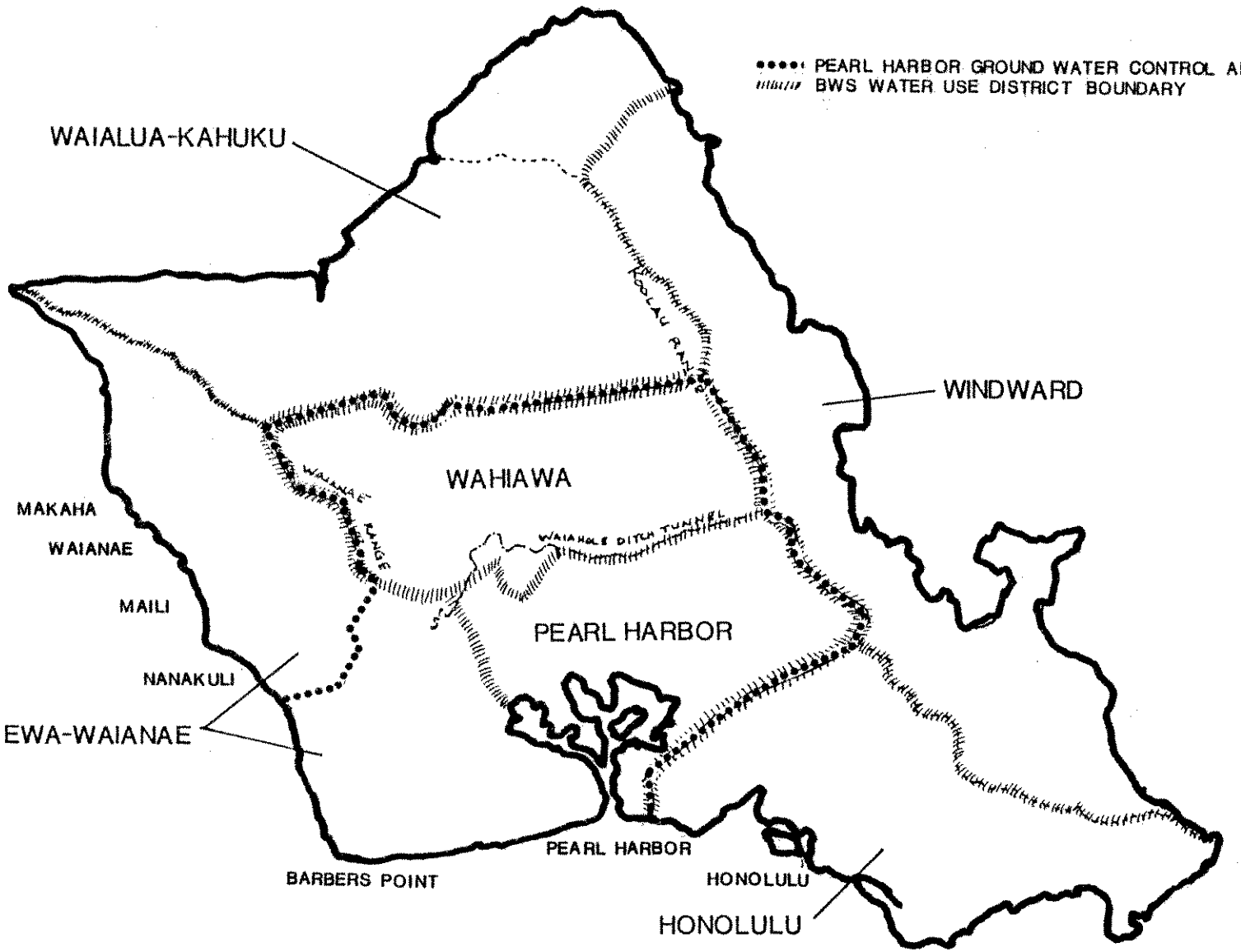


FIGURE 1-6
PHGWCA IN RELATION TO
BWS WATER USE DISTRICTS

and Natural Resources' (DLNR) Regulation No. 9, all existing major water users within this area were required to register with the State and declare their existing pumpage. Existing pumpage at Waipahu Wells is 4.89 mgd and DLNR has certified pumpage at 4.88 mgd.

BWS is finalizing their water use plan to be submitted to DLNR in September 1980 for approval. One of the important aspects of this plan involves a proposal to allow BWS the authority to regulate pumpage within the PHGWCA according to demands which should arise in specific areas. Although this may involve increased pumpage at one well field, this would be accompanied by a simultaneous decrease in pumpage at another within the PHGWCA so that the total allowable BWS upper limit of 76.95 mgd is not exceeded. In the case of the Pearl Harbor Water District, the limit of 70.7 mgd would not be exceeded. If this proposal is approved by DLNR, then the proposed 16-inch line would enable utilization of Waipahu Wells at its design capacity, thus enabling BWS the flexibility of alternating pumpage between well fields, should the need arise.

New wells or ground water sources, or an increase in pumping from existing sources, must be approved by DLNR according to Regulation No. 9. The design capacity of Waipahu Wells will not be increased, and the new pipeline is not planned for an increase in the existing draw

from these wells. However, should BWS decide to apply to DLNR in the future for an increase in pumpage, the new line could facilitate the use of Waipahu Wells at their design capacity.

Construction of the transmission line will be confined within both existing public and private rights-of-way. The transmission line will be of ductile iron, concrete cylinder, asbestos cement line, or any combination of these, and will be buried at an average depth of five feet, with a trench width of 30 inches.

V. PHASING AND FUNDING

Construction is anticipated to begin after November, 1980. Construction will require about 4-5 months and will be completed in one phase. Construction costs are estimated at $1,000,000 and will be funded by the Board of Water Supply, City and County of Honolulu. Close coordination will be maintained between BWS and its contractor and the City Department of Public Works, MTL for bus routes and schedules, State Department of Education, and utility companies to assure that potential conflicts have been considered and equitable solutions achieved prior to and during construction.

REFERENCES

[1.1] Board of Water Supply. 1977. Leeward Oahu Water Supply Study. Prepared by Long-Range Planning Section, Planning and Engineering Division, Board of Water Supply, City and County of Honolulu.

SECTION 2

DESCRIPTION OF THE ENVIRONMENTAL SETTING

I. PHYSICAL CHARACTERISTICS

A. Climate

1. Island of Oahu [2.1]

Oahu is the third largest of the Hawaiian Islands, and is marked by two important mountain systems. The Koolau Range, at an average elevation of 2,000 feet, parallels the northeast coast. The Waianae Mountains, somewhat higher in elevation, parallel the west coast.

The prevailing wind throughout the year is the northeasterly trade wind, although its average frequency varies from more than 90 percent during the summer to only 50 percent in January.

Annual rainfall in the Honolulu area averages 24 inches along the coast but averages about 35 inches one mile inland and about 60 to 70 inches 2 miles inland. Parts of the Koolau Range average 300 inches or more a year. This heavy mountain rainfall sustains extensive irrigation of cane fields and the water supply for Honolulu. East (windward) of the Koolaus, coastal areas receive 30 to 50 inches annually; cane and pineapple fields in central Oahu receive

about 35 to 40 inches. Oahu is driest along the coast west of the Waianae Range where rainfall averages about 20 inches a year. However, rainfall variations from month-to-month and year-to-year are considerable. More rain occurs during the winter months than in the summer.

Hawaii's equable temperatures are associated with the small seasonal variation in the amount of energy received from the sun and the tempering effect of the surrounding ocean. The range in temperature averages only 7 degrees between day and night. Daily maximums run from the high 70's in winter to the mid-80's in summer, and daily minimums from the mid-60's to the low 70's.

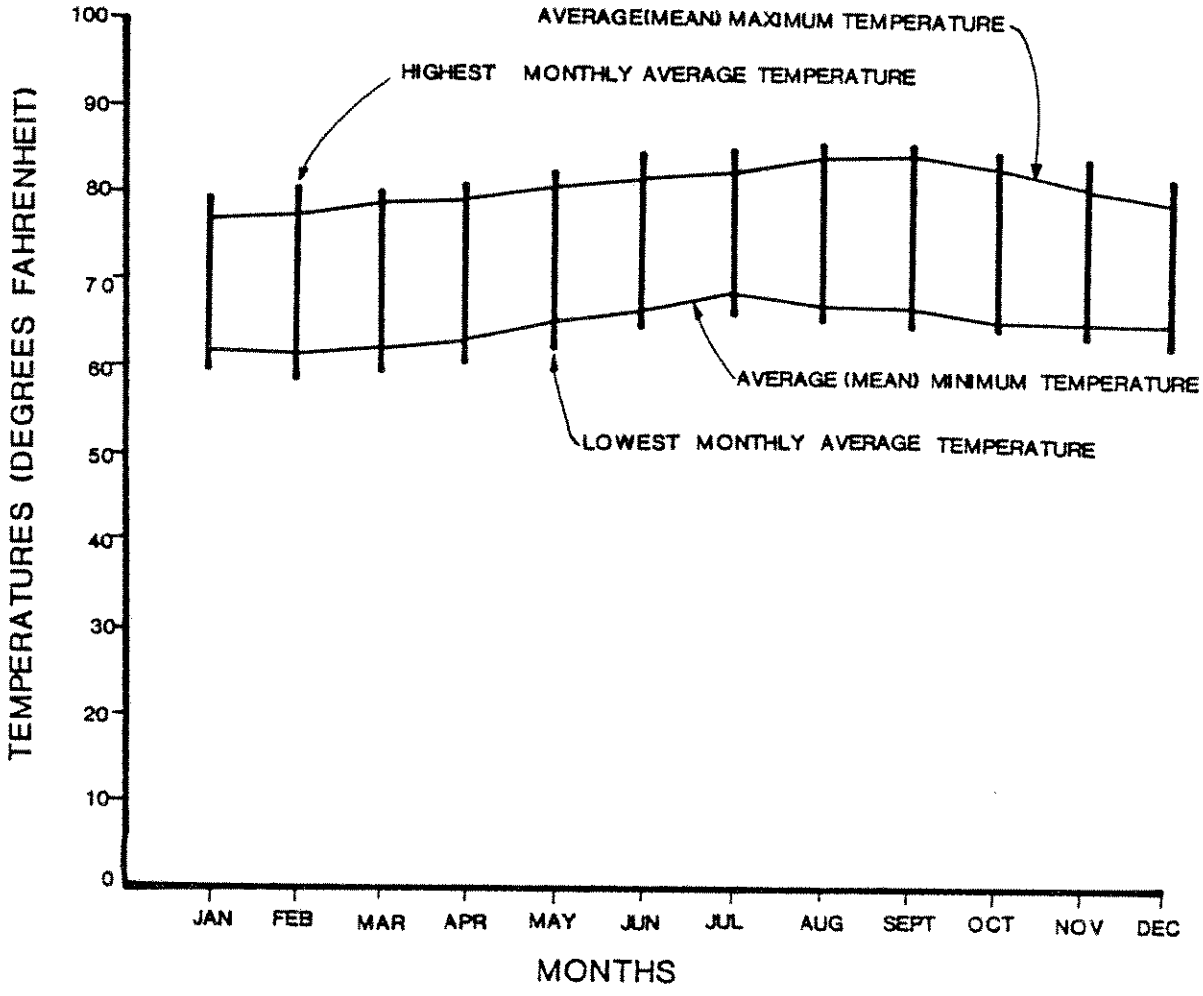
Weather severe enough to interfere with shipping or travel is uncommon. Intense rains of the October to April "winter" season sometimes cause localized flash flooding. Thunderstorms are infrequent and usually mild, as compared with those of the midwestern United States. Only a few tropical cyclones have struck Hawaii since 1950.

2. Waipahu Area

The climate in the vicinity of the project site is generally hot and dry. The temperature climate for Kunia Substation 740.4 (elevation 285 feet) is depicted in Figure 2-1 [2.2]. Data from this station can be considered characteristic of the proposed project site. Winter temperatures range from the low 60's to the low 80's. Summer temperatures range from the mid 60's to the mid 80's. All-time temperature extremes range from about 86° to about 57°. The coldest months are January and February, with a mean maximum temperature of 77°F and a mean minimum temperature of 61°F. The warmest month is September, with a mean maximum temperature of 85°F and a mean minimum temperature of 67°F.

During the winter months, tropical storms occasionally buffet the area, bringing with them heavy showers. These showers account for much of the rain which falls in the Waiphau area. The wind rose for nearby Barbers Point Naval Air Station is shown in Figure 2-2.

Waipahu receives approximately 20 to 25 inches of rain per year, primarily from November

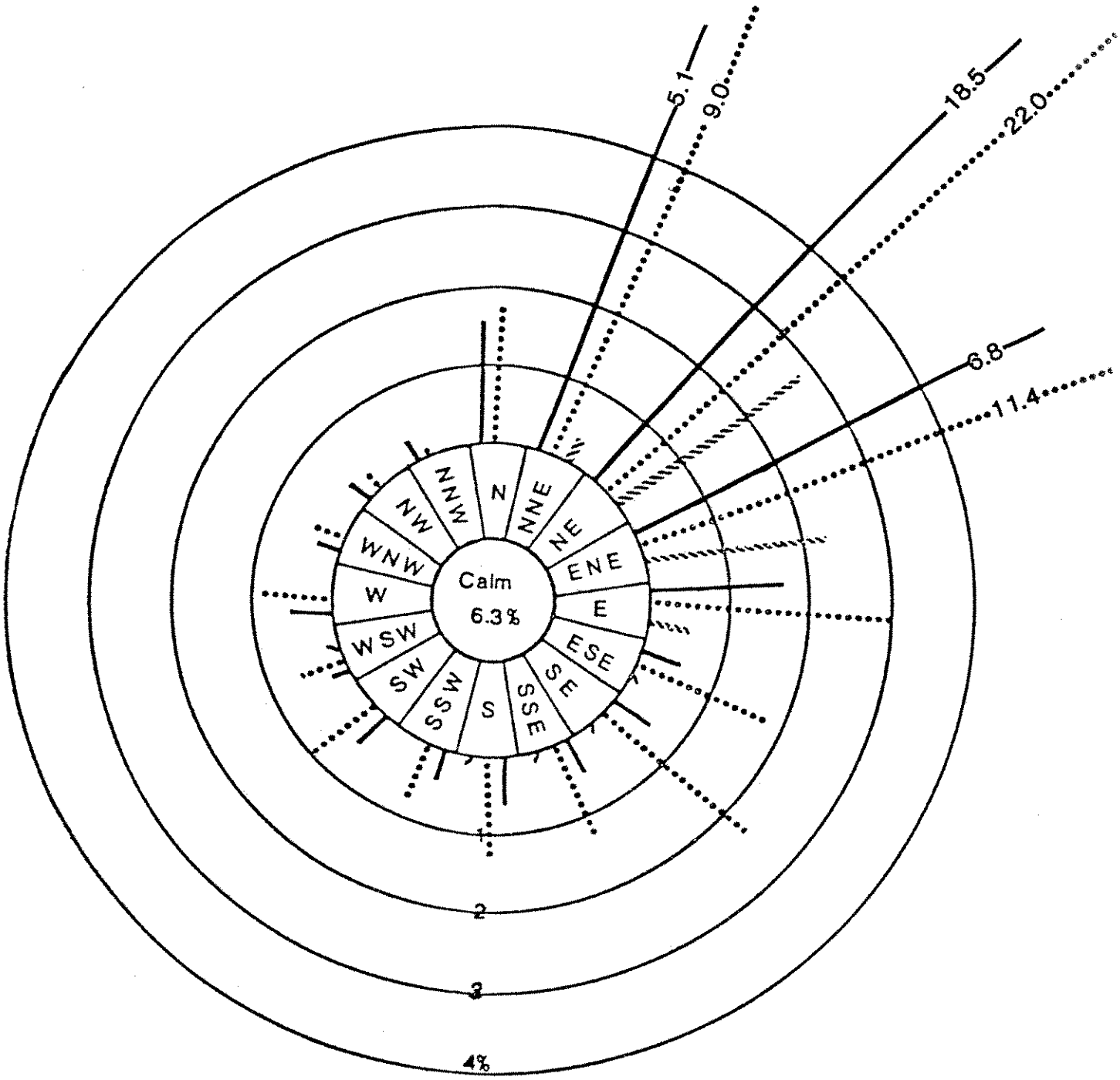


TEMPERATURE

KUNIA SUBSTATION 740.4

FIGURE 2-1

Source: Hawaii State Department of Land and Natural Resources, Water and Land Development Division Print Out, statistical summary of minimum and maximum monthly temperatures.



LEGEND: KNOTS

1-6

7-16

MORE THAN 16

WIND ROSE

BARBERS POINT NAS

FIGURE 2-2

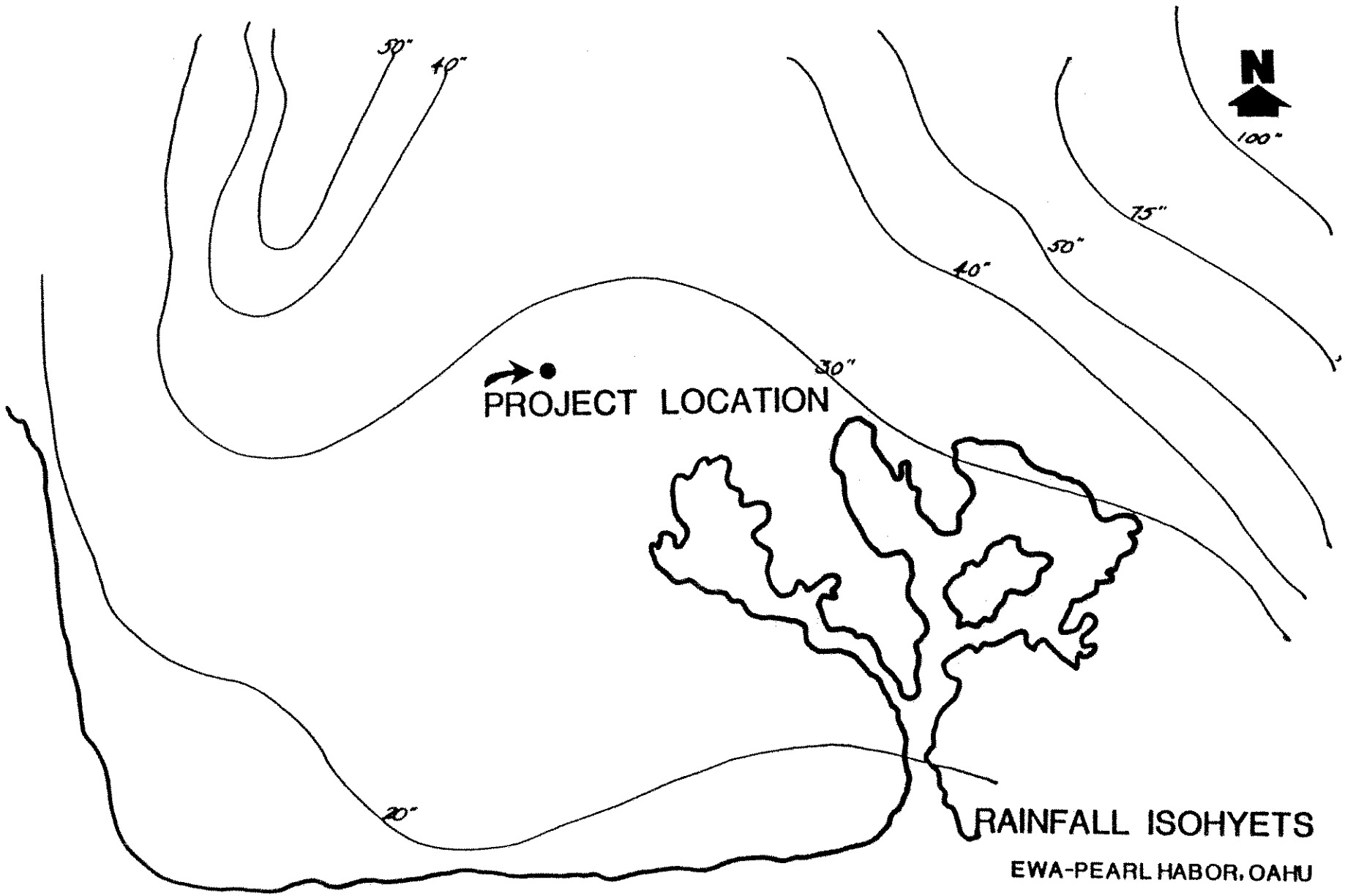
through April. The Ewa Plain normally receives less than 20 inches per year. Note Figure 2-3.

B. Topography

The project site is located to the north of Pearl Harbor at elevations approximately 80-400 feet above sea level. Situated on a gentle slope (4%), the Waipahu Wells site is surrounded by cultivated sugar cane fields and numerous cane haul roads. It is approximately 0.7 mile east of Kipapa Stream, a tributary to Waikele Stream, and 1 mile west of Panakauahi Gulch. The proposed 16-inch main is to be lain along existing roadways, as discussed in Section 1.

C. Geology [2.3]

The remnants of two shield volcanoes form the island of Oahu. The western part of the island is the eroded Waianae Volcano and the eastern part consists of the eroded Koolau Volcano. The Waianae shield was greatly eroded before the lavas of the Koolau dome piled up against the lower slopes of the Waianae dome to produce the Schofield plateau. These events were followed by a long quiet period during which deposition of sediments and changes in sea level (with the resulting reefs) contributed to the building of a flat coastal plain.



RAINFALL ISOHYETS

EWA-PEARL HABOR, OAHU

FIGURE 2-3

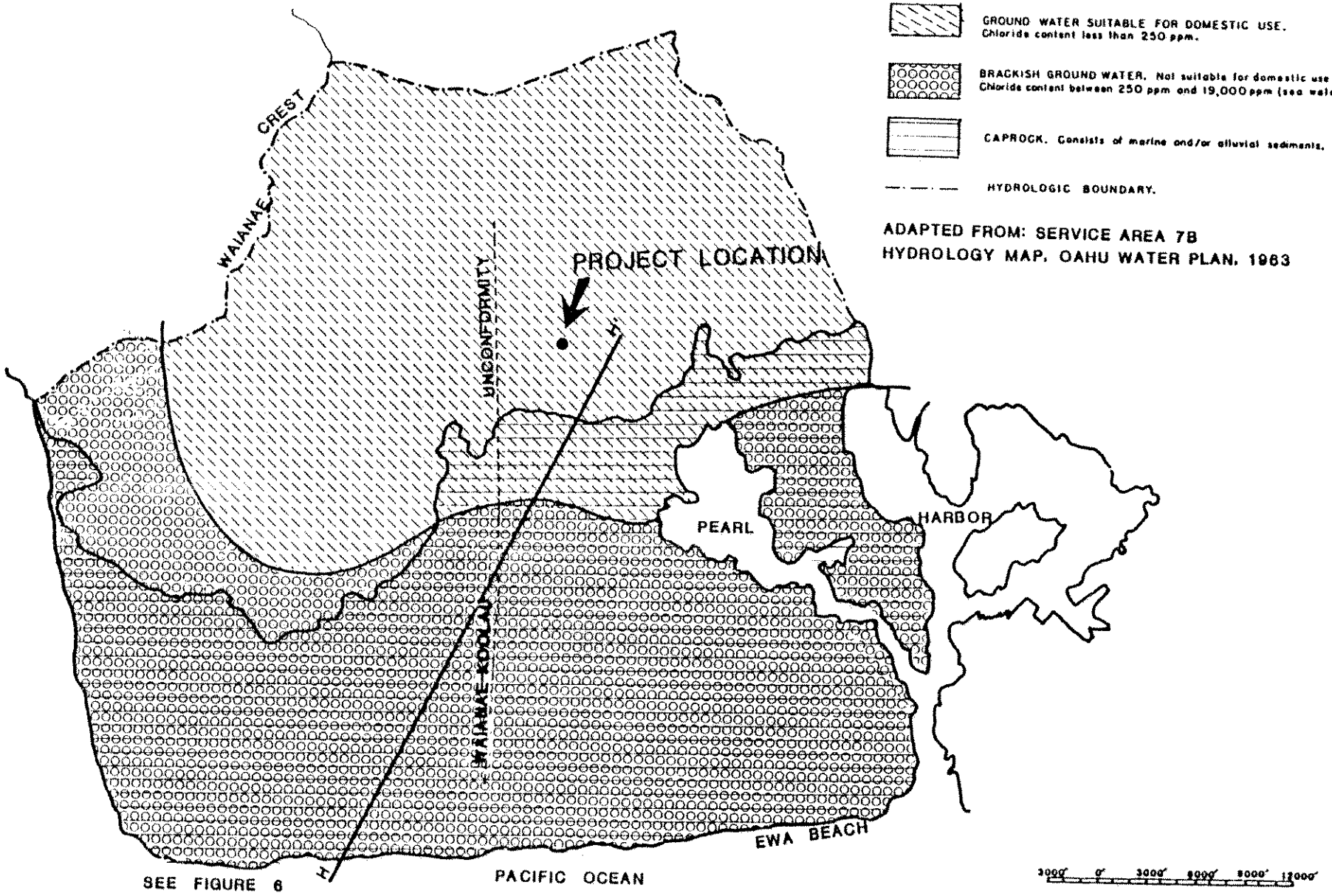
SOURCE: OAHU WATER PLAN, 1963.

The project site is underlain by caprock composed of marine sediments and alluvium and by the Koolau Volcanic Series to a depth of approximately 1,000 feet. The Koolau Series is primarily composed of tholeiitic basalts. Below this is the Waianae Volcanic Series, also primarily composed of tholeiitic basalts with some andesitic basalts in the upper layers.

The Waianae series is the older of the two. Where the two series of lavas meet, an unconformity exists, marked by the presence of a buried soil bed that had formed on Waianae rocks and was later covered by the Koolau lavas. The project site lies to the east of the surface boundary of this unconformity. Note Figures 2-4 and 2-5. An important characteristic of these lava flow formations is their high permeability. The caprock formation constitutes the Ewa plain and is less permeable than the basaltic lavas.

To the west of the project site, along the lower southeastern slope of the Waianae Range, is a row of five very late cones: Puu Kuua, Puu Kapuai, Puu Makakilo, Puu Palailai, and Puu Kapolei. They are composed of a mixture of cinder, spatter and lava flows.

FIGURE 2-4 HYDROLOGIC MAP



SECTION HH' ON FIGURE 2-4

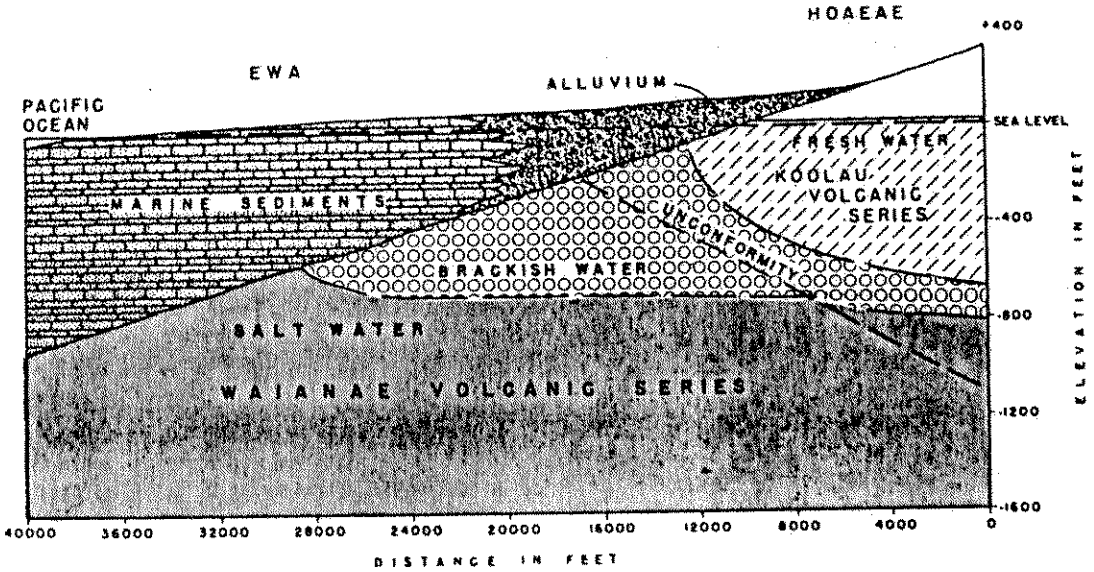


FIGURE 2-5

GEOHYROLOGIC CROSS SECTION

GROUND WATER SUITABLE FOR DOMESTIC USE. Chloride content less than 250 ppm.

BRACKISH GROUND WATER. Not suitable for domestic use Chloride content between 250 ppm and 19,000 ppm (sea water).

SALINE GROUND WATER. Chloride content about the same as that of sea water (19,000 ppm).

CAPROCK. Consists of marine and/or alluvial sediments.

SOURCE: OAHU WATER PLAN 1963

D. Hydrology

1. Surface Water [2.4]

Two major streams drain the vicinity of the project area: Waikele Stream and Waiawa Stream. Waikele Stream, located approximately 0.9 mile west of the Waipahu Wells, is a perennial stream which flows into Pearl Harbor's West Loch. The U. S. Geological Survey (USGS) maintains a gaging and water quality station on the stream, 300 feet upstream from a bridge on Highway 90 and 0.3 mile southwest of the sugar refinery at Waipahu. It measures flow from 45.7 square miles of drainage area.

The annual average daily flow for a 24-year period (water years 1953 to 1959 and 1961 to 1977) was 38.5 cfs. For water year 1977 (from October 1976 to September 1977), the daily flow was considerably less, averaging 20.2 cfs.

Waiawa Stream is a perennial stream, located approximately 1.4 miles east of the Waipahu Wells, which flows into Pearl Harbor's Middle Loch. The USGS maintains a gaging and water quality station on the stream, 99 feet upstream from a bridge on Highway 90 and 2 miles northeast of Waipahu. It measures flow from 26.4 square miles of drainage area.

The annual average daily flow for a 24-year period was 33.0 cfs. For water year 1977, the daily flow averaged 18.4 cfs.

2. Ground Water

Basal ground water exists below Waipahu Wells. The upper layer is return irrigation water, up to 200 feet thick, which is suitable for domestic use. The upper limit of this layer, known as the basal water table, stands about 15 feet above sea level in the project vicinity. A layer of fresh water extends to a depth in excess of 400 feet below sea level and is contained within the Koolau Volcanic Series. As shown in Figure 2-5, the caprock of the Ewa plain retards the natural seaward movement of the ground water, causing the water to stand at a higher level in the aquifer than it would if the caprock were absent [2.5].

Below the fresh water basal aquifer is a transition zone of brackish water. Brackish water is also found within the caprock.

Generally, caprock stores and transmits little water compared to the volcanic series. In the Ewa region, however, furrow irrigation returns large quantities of water into the caprock aquifer. Because of its generally poor quality, the brackish caprock water is used only for

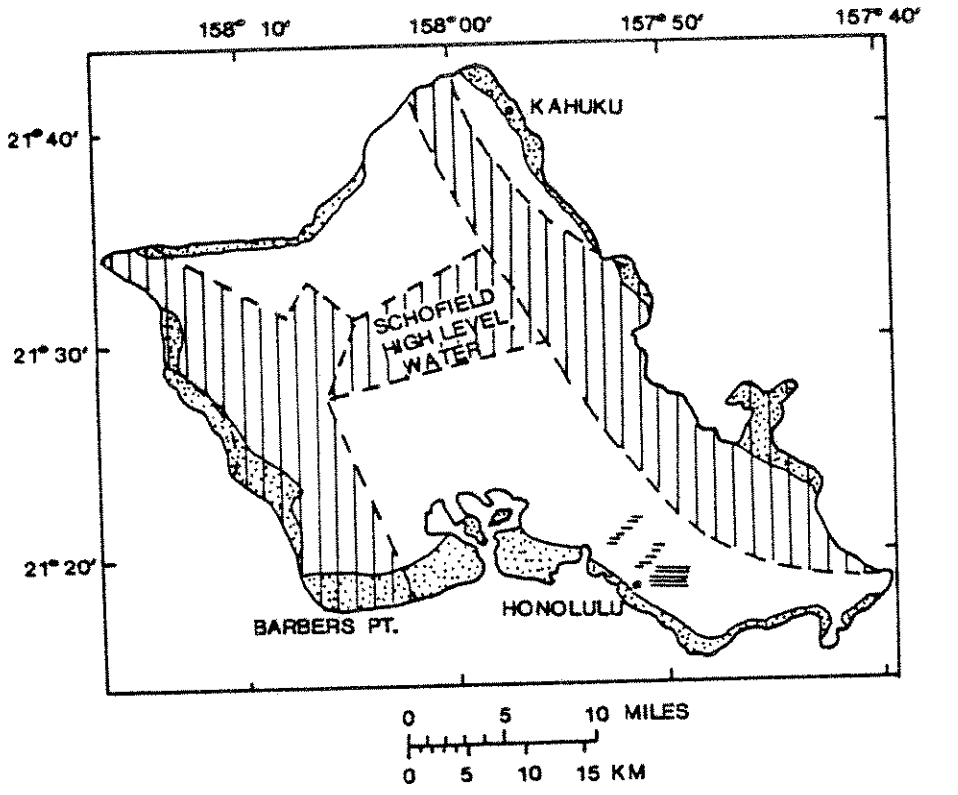
agricultural and industrial purposes. In Honolulu small quantities of caprock water have been developed for air conditioning use [2.6].

Below the transition zone brackish water is a salt water aquifer, which extends to an unknown depth below sea level [2.7]. See Figures 2-4 and 2-5.

The fresh basal ground water floats on the salt water as a lens-shaped body, because the specific gravity of fresh water is slightly less than that of sea water. The fresh basal ground water essentially occurs as a continuous lens throughout southern Oahu, with local "isopiestic areas" [2.8]. See Figure 2-6.

Rainfall is the principal source of fresh basal water on Oahu, supplemented by return irrigation water. In the Pearl Harbor aquifer the head, or elevation of the basal water table, currently ranges from 25 feet above sea level inland to about 14 feet near the coast.

The lens is a dynamic system through which fresh water moves from areas of recharge to points or zones of discharge (usually along the shore). In an aquifer of a given uniform permeability, the thickness of the fresh water



GROUND WATER AREAS
OAHU

FIGURE 2-6

SOURCE: USGS.1977.ELEMENTS NEEDED IN DESIGN OF A GROUND-WATER-QUALITY MONITORING NETWORK IN THE HAWAIIAN ISLANDS. PAPER 2041.

lens varies with the amount of water moving through it; that is, the thickness increases as the rate of recharge increases.

Seasonal changes in the thickness of the lens caused by fluctuations in recharge, pumping and the action of the tides keeps the fresh water-salt water interface constantly in motion.

Water can be obtained from the basal lens by sinking wells into it. Examples of this method within the vicinity of the project site are the Waipahu Wells, Hoaeae Wells, Kunia Wells I and Kunia Wells II. The amount and rate of water pumped from the wells are regulated so that withdrawal does not exceed fresh water recharge of the basal lens, for if it does, brackish and salt water will intrude into the lens, lowering its quality for domestic use.

Artificial discharge from the lens, such as pumping from a well, reduces the amount of water that moves to the shore. This results in a thinning of the lens between the well and the shore with a thickening of the transition zone towards the coast, if the rate of withdrawal is constant. If withdrawal is intermittent, the resulting alternate thickening and thinning

of the lens will increase mixing and cause the transition zone to thicken throughout the area influenced by the well. Withdrawal of fresh water by a well may cause subsequent increases in salinity of water from other wells seaward of that well.

There is an additional effect on the salinity of the basal water in the Pearl Harbor aquifer because of recharge from irrigation water drawn from wells penetrating into the transition zone. Where this brackish irrigation water is applied to sugar cane fields overlying the basal water table, a large part of it seeps down to the water table, adding water of relatively high salinity into the fresh water lens [2.9].

Recharge of excess irrigation water to the basal water body, however, is important in maintaining a high head throughout the area. To date, sugar cane, which covers much of the tillable portion of the region, has been heavily irrigated because the soils are highly permeable. Approximately half of the irrigation water returns to the aquifers through seepage below the root zone of the plants [2.10].

Agricultural pumpage in the Pearl Harbor aquifer is heavy from about April to October

each year during the sugar cane irrigation period. The draft decreases by about 75% during the wet months of October to March, when sugar cane is not irrigated [2.11]. Pumpage for domestic use also undergoes an annual fluctuation.

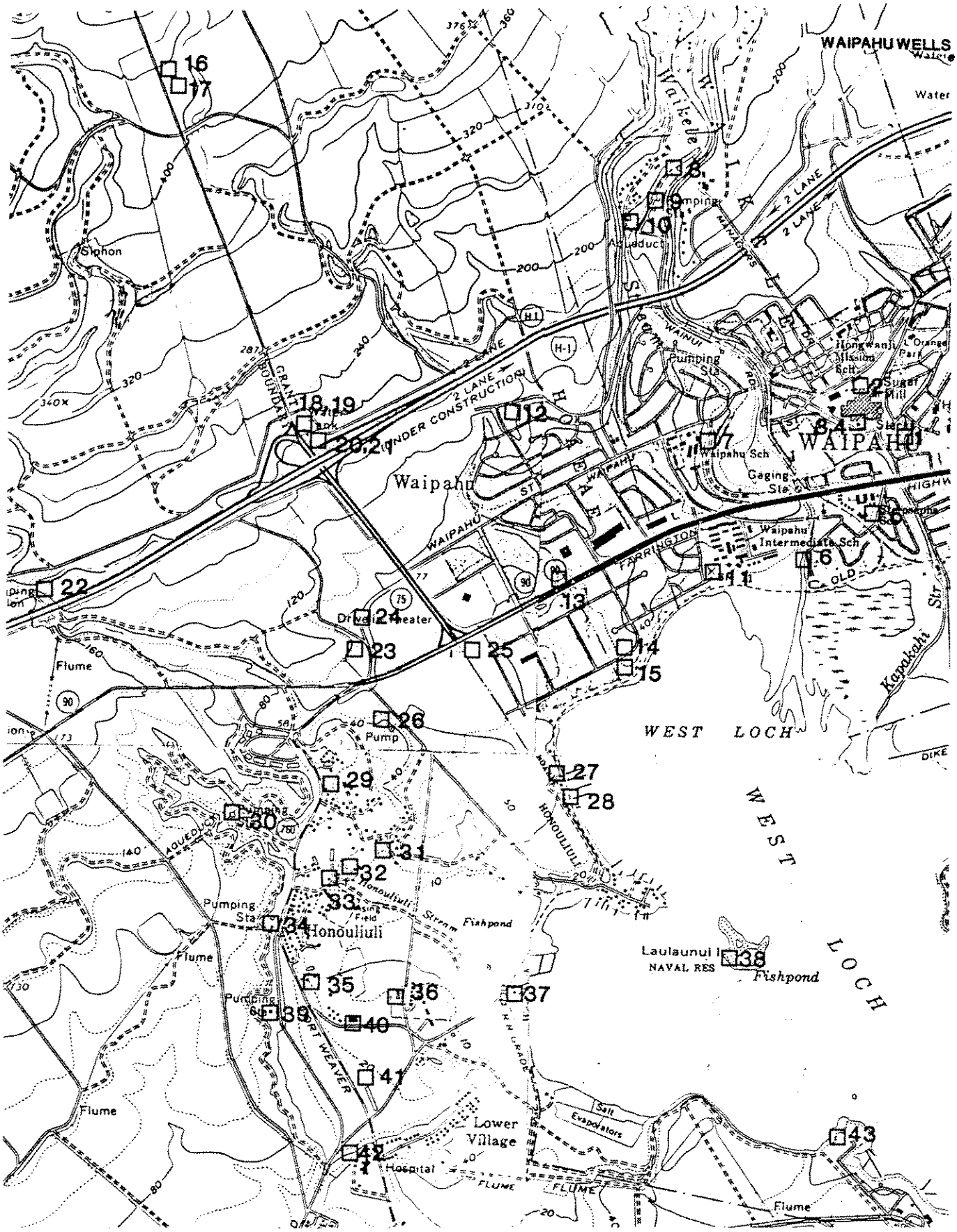
Many of the biggest wells in Hawaii are so-called Maui-type wells (first used on the Island of Maui), consisting of a shaft leading from the ground surface to a narrow horizontal tunnel in the upper part of the basal lens. The present trend, however, is to drill several vertical wells penetrating only to the uppermost part of the water body, instead of the more costly shaft and tunnel of the Maui-type wells [2.12]. Waipahu Wells are vertical wells.

From about 1919 to 1960, pumpage in the Pearl Harbor aquifer averaged about 160 mgd, most of which was used to irrigate sugar cane fields. The lowering of the head and shrinking of the fresh water lens resulting from this heavy withdrawal, relative to undeveloped conditions, were accompanied by an inland movement and a thickening of the transition zone near the coast. Most of this change occurred before 1925.

Thereafter, equilibrium was attained, with total discharge (natural and artificial) averaging 280-290 mgd [2.13]. Because the water level in the basal aquifer did not decline progressively, recharge from both return irrigation water (approximately 45 mgd) and rainfall must have been approximately equal to the discharge [2.7]. Although pumping for agricultural use has decreased since 1931, net ground water discharge has increased because of a large increase in urban use.

Artificial pumpage from the Pearl Harbor aquifer is estimated at 240 mgd [2.13]. BWS sources account for approximately 70± mgd of this total [2.14]. Natural Pearl Harbor springs discharge is approximately 50 mgd. A recent State Water Commission Report estimates the sustainable yield of the Pearl Harbor aquifer at 200-245 mgd [2.15]. Figure 2-7 shows developed water sources in the vicinity of the proposed project and Table 2-1 provides data for these sources.

Further increase in ground water discharge may cause an increase in chloride content of the water pumped from the wells near the shore of Pearl Harbor unless such increased discharge



SOURCE: DLNR DIV. OF WATER AND LAND DEVELOPMENT.

WELLS &SHAFTS
WAIPAHU, KUNIA, HONOULIULI
FIGURE 2-7

TABLE 2-1

WATER SOURCES IN
VICINITY OF WAIPAHU WELLS

Reference Number	DLNR Well No.	Head (ft.)	Chloride (ppm)	Owner	Use[1]	Pumpage MGD
1	2300-05	16.2	140	S. Kato	D	NA
2	2300-21 to 23	NA	NA			
3	2300-07 to 09	NA	259			
4	2300-12 to 14	20.3	259			
5	2300-19	20.6	138	St. Joseph Church	D	0.27
6	2300-06	18.3	116-300	M. Robinson	NA	NA
7	2301-33	17.7	910			
8	2301-01 to 10	19.8	186	Oahu Sugar Co.	D	1.86[2]
9	2301-11 to 20	23.3	775			
10	2301-21 to 32	25.2	285			
11	2201-08	16.3	312			
12	2301-34 to 39	17.0	147	BWS	D	5.84
13	2201-06	18.0	250-350			
14	2201-01	18.9	116	M. Foster	-	sealed in 1966
15	2201-14	20.0	94	Harris Rug & Carpet Cleaners	NA	NA
16	2402-01	20.6	103	BWS	D	
17	2402-02	24.8	97	BWS	D	.30
18	2302-01	23.8	141	BWS	D	
19	2302-02	22.3	150	BWS	D	
20	2302-03	15.0	104	BWS	D	6.96
21	2302-04	15.0	103	BWS	D	
22	2202-21	24.1	184	Oahu Sugar Co.	I	6.97[3] 10.97[3]
23	2201-09	NA	NA	BWS	O	-
24	2201-10	18.4	170	BWS	O	-
25	2201-12	NA	NA			
26	2201-03,04,07	17.6	318			
27	2201-13					
28	2201-11					
29	2202-01	17.0	280			
30	2202-03 to 14	19.0	383	Oahu Sugar Co.	I	6.21[4] 6.55[4]
31	2201-02	16.8	340			
32	2202-02	21.3	183	B. Dumlao	NA	NA
33	2202-22	20.2	190	C. Hokama	D[5]	NA
34	2202-15 to 20	12.0	400			
35	2102-01	NA	NA			

TABLE 2-1, cont'd.

WATER SOURCES IN
VICINITY OF WAIPAHU WELLS

Reference Number	DLNR Well No.	Head (ft.)	Chloride (ppm)	Owner	Use[1/]	Pumpage MGD
36	2101-03	14.3	302			
37	2101-13	19.8	185	T. Matsuda	D	0.04
38	2200-04					
39	2102-02, 04 to 22	17.3	549			
40	2101-01	19.8	340			
41	2101-04	19.0	NA			
42	2101-05 to 12	16.0	NA			
43	2100-01					

1. D = Domestic
   I = Irrigation
   O = Observation well

2. Ave. 1973-1977.

3. Ave. 1973-1977.

4. Ave. 1973-1977.

5. Also used for piggery.

is balanced by an increased recharge to the basal aquifer. One solution suggested to accomplish this is to divert surface flow from streams in the Pearl Harbor area into recharge areas. This scheme is discussed in Appendix A.

Another possibility, recently adopted as policy by the Board of Water Supply, requires conversion of sugarcane irrigation water to domestic use whenever sugarcane lands are urbanized, resulting in no net increase in ground water discharge.

E. Water Quality

Selected water quality data for Waikele Stream and Waiawa Stream for the years 1975-1977 are presented in Tables 2-2 and 2-3.

Waikele and Waiawa streams are considered to be Class 2 waters. The new water quality standards are given in Appendix B. It can be seen that, in general, the waters of Waikele Stream exceed the standards for nitrate, phosphorus, turbidity and specific conductance. Generally, the waters of Waiawa Stream do not consistently meet the standards for nitrate, phosphorus or turbidity.

TABLE 2-2

WATER QUALITY DATA, WAIKELE STREAM,

OAHU, HAWAII: WATER YEARS 1975-1977

Parameter	Annual Average (mean) 1975	1976	1977
Dissolved sodium (Na) (mg/l)	47.	45.	60.
Dissolved chloride (Cl) (mg/l)	62.	57.	83.
Dissolved fluoride (F) (mg/l)	.2	.2	.2
Total nitrate & nitrite (N) (mg/l)	2.1	2.4	2.1
Total phosphorus (P) (mg/l)	1.1	1.1	1.8
Dissolved solids (sum of constituents) (mg/l)	223.	206.	280.
Specific conductance (micromhos)	384.	301.	452.
pH (units)	6.9	6.5	6.6
Turbidity (JTU)	25.1/	174.2/	10.3/
Carbon Dioxide (CO_2)(mg/l)	12.	34.	36.
Discharge (cfs)	38.6	40.0	20.2
Fecal coliform (col. per 100 ml)	1623.	3443.4/	4235.

1/ Range: 2-100 JTU; mode: 18 JTU.
2/ Range: 3-2100 JTU; mode: 7 JTU.
3/ Range: 3-55 JTU; mode: 6 JTU.
4/ Results based on some colony counts outside the acceptable range.

Source: [2.4], [2.16]

TABLE 2-3

WATER QUALITY DATA, WAIAWA STREAM,

OAHU, HAWAII: WATER YEARS 1975-1977

Parameter	Annual Average (mean) 1975	1976	1977
Dissolved sodium (Na) (mg/l)	41.	60.	45.
Dissolved chloride (Cl) (mg/l)	68.	104.	86.
Dissolved fluoride (F) (mg/l)	.1	.1	.1
Total nitrate & nitrite (N) (mg/l)	1.1	.21[4/]	1.4
Total phosphorus (P) (mg/l)	0.9	.26[4/]	0.7
Dissolved solids (sum of constituents) (mg/l)	213.	298.	225.5
Specific conductance (micromhos)	365.	704.	664.4
pH (units)	7.0	6.6	6.6
Turbidity (JTU)	30.[1/]	78.3.[2/]	14.5[3/]
Carbon Dioxide (CO_2)(mg/l)	8.2	29.5	21.5
Discharge (cfs)	30.5	34.1	18.4

1/ Not a mean value (only one datum).
2/ Range: 1-230 JTU; mode: 3 JTU.
3/ Range: 4-25 JTU.
4/ Not a mean value (only one datum).

Source: [2.4], [2.16]

Water quality data for the BWS well systems near the proposed site are presented in Tables 2-4 and 2-5. Chloride content is an important index of the chemical quality of Hawaiian ground waters since most or all of the chloride and dissolved solids in fresh water are derived from sea water. The State Safe Drinking Water Regulations require a limit for chloride of 250 parts per million (ppm) for potable water. Tables 2-4 and 2-5 show that the chloride content of water from these wells is presently about one-half, or less, of the required limit. The Safe Drinking Water Act and DOH Chapter 49, Potable Water Systems are further discussed in Appendix C.

Another index of potable water quality is the amount of total dissolved solids (TDS). Proposed EPA secondary standards require a limit of 500 TDS. Table 2-5 illustrates that total dissolved solids in water from these wells is presently close to but within this limit.

The Waiahole Ditch System transports about 25 mgd from the Waiahole Tunnel on the eastern side of the Koolau Range for irrigation of sugar cane in southwest Oahu. The quality of this water, some of which recharges the basal ground water, is very good.

TABLE 2-4

WATER QUALTIY DATA
KUNIA AND HOAEAE WELLS

OAHU, HAWAII: FY 1976-77

Source		pH	Parts per million Alkalinity	Hardness	Chloride
Waipahu Wells	(2400-01)	7.25	67	37	60
	(2400-02)	7.25	70	37	60
	(2400-03)	7.20	66	38	53
	(2400-04)	7.30	65	37	52
Hoaeae Wells	(2301-34)	6.90	77	108	122
	(2301-35)	6.95	77	96	122
	(2301-36)	7.05	80	106	136
	(2301-37)	7.00	78	100	137
	(2301-38)	6.95	70	96	101
	(2301-39)	7.00	72	104	113
Kunia Wells I	(2302-01)	7.00	88	104	135
	(2302-02)	7.00	85	100	119
	(2302-03)	7.00	81	104	108
	(2302-04)	a	a	a	a
Kunia Wells II	(2402-01)	7.10	82	100	97
	(2402-02)	7.20	85	98	92

a Pumps down for maintenance

Source: [2.17]

TABLE 2-5

WATER QUALITY DATA, SELECTED B.W.S. WELLS, OAHU, HAWAII, 1968

LOCATION	Waipahu Well 241-1A	Hoaeae Well 256-3A	Kunia Well 256-2A
Year	1968	1968	1968
Date collected	Feb. 28	Feb. 28	Feb. 28
Time collected	1015	0855	0950
Laboratory number	102924	102923	102922
Regional head, feet	23.79	23.35	23.35
Specific conductance micromhos @ 25°C	485	665	622
pH value	7.35	7.05	7.10
Turbidity (Nephelomtric turbidity units)	0	0	0
Color (parts per million)	0	0.5	0
IN PARTS PER MILLION:			
Dissolved oxygen	8.00	7.70	7.80
Free carbon dioxide	5	15	13
Silica	57	71	73
Calcium	8.4	14.4	14
Magnesium	7.9	15.7	16.2
Sodium	73.3	85.9	80
Potassium	2.6	3.8	3.6
Bicarbonate	89	89	107
Sulfate	21	39.3	36.9
Chloride	80	120	103
Fluoride	0.35	0.20	0.25
Nitrate (NO_3)	7.6	9.2	8.4
Phosphate	1.05	0.75	0.95
Iron)	0.02	.02	.02
Manganese)	.02	.02	.02
Copper)	.02	.02	.02
Lead) ..... less than	.02	.02	.02
Arsenic)	.02	.02	.02
Selenium)	.01	.01	.01
Chromium[a])	.01	.01	.01
Total dissolved solids	348	449	443
Alkalinity	72	72	88
Total hardness	53	100	101
IN EQUIVALENTS PER MILLION:			
Calcium (Ca)	0.419	0.719	0.699
Magnesium (Mg)	.650	1.291	1.332
Sodium (Na)	3.190	3.737	3.482
Potassium (K)	.067	.097	.092
Bicarbonate (HCO_3)	1.459	1.459	1.754
Sulfate (SO_4)	.437	.818	.768
Chloride (Cl)[b]	2.307	3.419	2.948
Nitrate (NO_3)	.123	.148	.135
TOTALS	8.652	11.688	11.210

a/ Hexavalent only.
b/ Includes fluoride and phosphate as PO_4.

As previously noted, irrigation with brackish water is a minor source of basal lens contamination. However, the magnitude of contamination is much less than that caused by intrusion of saline water, and has not proven sufficiently detrimental to the quality of the basal water quality to prevent domestic, agricultural or industrial uses [2.18].

Another minor source of contamination is from fertilizers used on sugar cane. Agriculturalists estimate that about 50% of the nitrogen in fertilizers is consumed by the sugar cane, with most of the remainder leaching into the water table. Sulfate is also carried to the water table, but there is no evidence of phosphate enrichment in the water of southern Oahu [2.19]. Although return irrigation water has about 50% more silica, 2 times the sulfate and 1.5 times the nitrate of unaffected water, this water is still potable.

Although local increases in salinity have occurred near the coast, generally, no overall deterioration of ground water quality has occurred in southern Oahu under the conditions of equilibrium established by long-term patterns of development, use and pumpage of basal water [2.20].

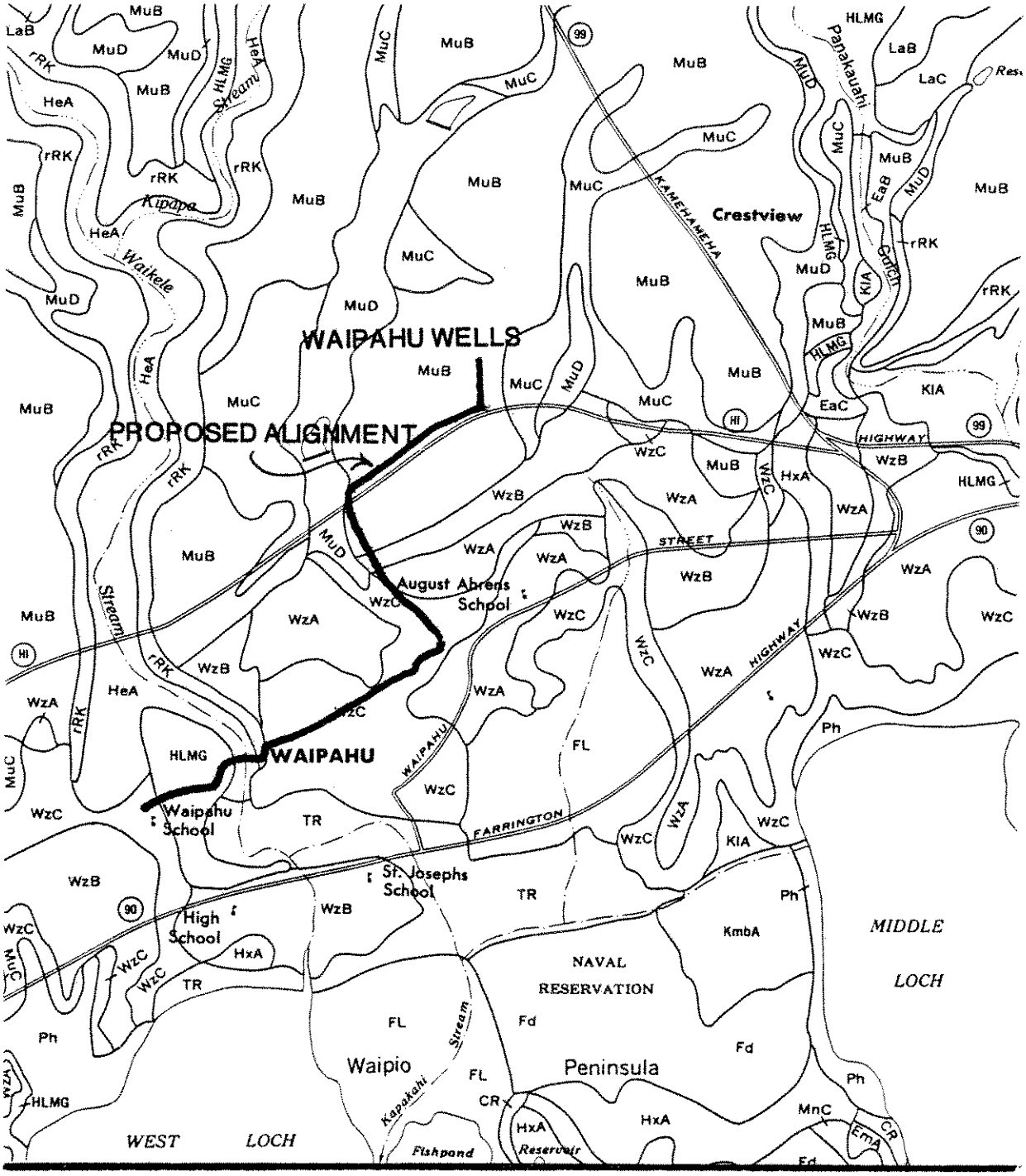
F. Soils [2.21]

Soils in the vicinity of the project site are primarily of the Molokai and Waipahu series, with localized areas of Helemano silty clay, rock land, and Haleiwa silty clay along the streams. Note Figure 2-8.

The soil at Waipahu Wells is Molokai silty clay loam (MuB), 3-7% slopes. A typical surface layer consists of dark reddish-brown silty clay loam about 15 inches thick. The subsoil is 57 inches thick with a similar profile. The substratum is soft, weathered rock. Permeability is moderate, runoff is slow to moderate and the erosion hazard is slight to moderate.

Adjacent soils include Molokai silty clay loam (MuC), 7-15% slopes and Molokai silty clay loam (MuD), 15-25% slopes. They are very similar to the soil on-site, with the following exceptions: MuC - runoff medium to rapid and erosion hazard severe; MuD - runoff medium and erosion hazard severe. Molokai soils are used for sugar cane, pineapple, pasture, wildlife habitat and homesites.

Essentially, these soils readily absorb and transmit water, which permits a large part of the rainfall and irrigation water to move down to the water table.



MuB MOLOKAI SILTY CLAY LOAM
WzA WAIPAHU SILTY CLAY 0-2% SLOPES
WzB WAIPAHU SILTY CLAY 2-6% SLOPES
WzC WAIPAHU SILTY CLAY 6-12% SLOPES
rRK ROCK LAND
HeA HALEIWA SILTY CLAY
HLMG HELEMANO SILTY CLAY

SOILS
FIGURE 2-8

Small areas along the sides of the gulch east of the site consist of Helemano silty clay (HLMG), 30-90% slopes. Permeability is moderately rapid, runoff is medium to very rapid, and the erosion hazard is severe to very severe. There are also small areas of Haleiwa silty clay (HeA), 0-2% slopes within the gulch. Permeability is moderate, runoff is very slow and the erosion hazard is no more than slight.

The water main line will be placed in areas composed primarily of Waiphau silty clay (W2B), 2-6% slopes and Waipahu silty clay (W2C), 6-12% slopes. For the former, permeability is moderately slow, runoff is slow and the erosion hazard is slight. For the latter, permeability is moderately slow, runoff is medium and the erosion hazard is moderate. Waipahu soils are used for sugar cane and homesites.

G. Noise

Ambient noise levels were recorded at various locations along the pipeline alignment using a Brüel and Kjaer sound level noise meter (slow response).

The existing ambient noise levels along Waipahu Street are dominated by traffic sounds and readings of 68 to 75 dBA were measured. During peak traffic hours the levels may be higher.

The noise levels along Kalaiku Street, between Wainui Road and Paiwa Street, were significantly lower; readings were between 46 and 50 dBA. The lower noise level is because Kalaiku Street, not a major access road, is a private road only used by residents of the area.

Noise levels along Paiwa Street were similar to those on Kalaiku Street, with readings of 47 dBA to 51 dBA. Noise levels along the cane haul road and at Waipahu Wells ranged from 45 dBA to 50 dBA. Ambient noise levels of these areas were dominated by wind sounds and can be higher during cane haul activities.

Chapter 44-B, Public Health Regulations, Community Noise Control for Oahu, allows maximum noise levels for different zoning districts. Table 2-6 shows allowable noise levels. The ambient noise levels of the different zoning districts through which the pipeline alignment will pass will not be exceeded as a result of the project once construction has been completed.

II. BIOLOGICAL CHARACTERISTICS

A. Flora

A field reconnaissance was conducted along the entire route of the alignment from Waipahu Wells to

TABLE 2-6

ALLOWABLE NOISE LEVELS IN dBA AT THE PROPERTY LINE

Zoning Districts	Daytime 7AM to 10PM	Nighttime 10PM to 7AM
Residential (R-1 through current R-7)	55	45
Preservation (P-1)	55	45
Apartment (A-1 through current A-5)	60	50
Hotel (H-1 through H-2)	60	50
Business (B-1 through current B-5)	60	50
Agricultural (AG-1 and AG-2)	70	70
Industrial (I-1 through current I-3)	70	70

Source: Public Health Regulations, Chapter 44-B, Community Noise Control for Oahu, Department of Health, State of Hawaii.

the intersection of Waipahu Street and Waikele Road. The flora from Waipahu Wells along the cane haul road to the north end of Paiwa Street was characteristic of common road-side vegetation. No endangered species of plants were found along the cane haul road (Station 5). Refer to Figure 2-9 for the location of each station. Please also refer to Appendix D for additional information.

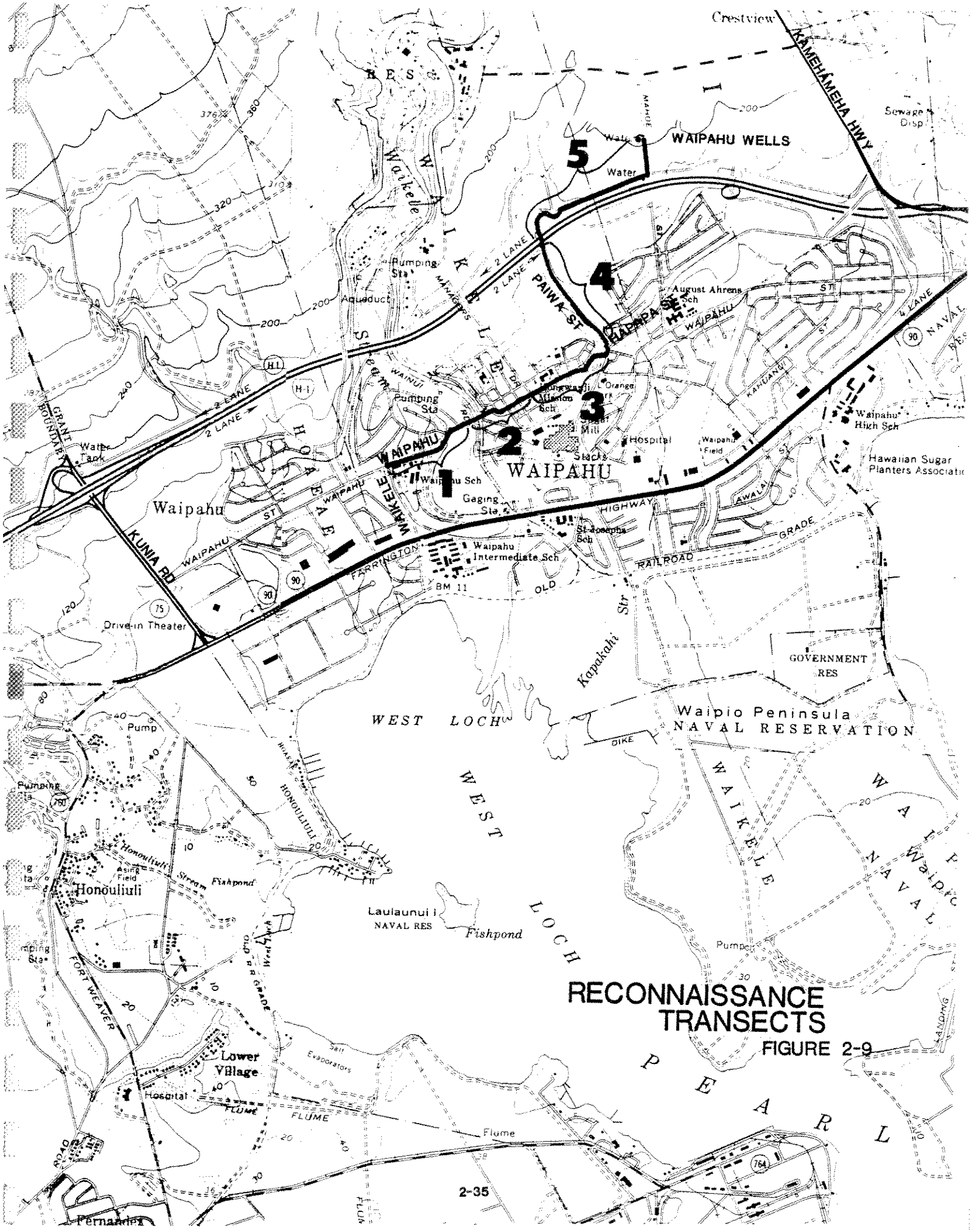
The flora along Paiwa Street, Kalaiku Street, and along Waipahu Street (Stations 1, 2, 3, and 4) is characterized by common road-side weeds and exotic (introduced) plants and trees planted by residents. Refer to Appendix D.

No endangered species of plants were found nor will the proposed alignment have an adverse impact on the road-side floral community. The pipeline alignment will not require disturbance to the sugar cane fields adjacent to it.

B. Fauna

A field reconnaissance along the entire pipeline alignment was conducted to determine if any sensitive wildlife habitat will be impacted by the proposed action.

Birds observed along the alignment include lace-necked dove, barred dove, common mynah, Japanese


Crestview
KAMEHAMEHA HWY
WAIPAHU WELLS
Water
5
4
3
2
1
Waikele Stream
WAIKELE
Pumping Sta
Aqueduct
PAIWA ST
HAPAPA ST
August Ahrens Sch
WAIPAHU
Waipahu High Sch
Hawaiian Sugar Planters Associatic
Water Tank
Waipahu Sch
Gaging Sta
Mill
Hospital
Stacks
Waipahu Field
WAIPAHU
Waipahu
KUNIA RD
FARRINGTON HIGHWAY
Waipahu Intermediate Sch
St Joseph Sch
RAILROAD GRADE
BM 11
Drive-in Theater
GOVERNMENT RES
Kapakahi Str
WEST LOCH
Waipio Peninsula
NAVAL RESERVATION
DIKE
Pump
Pumping Sta
Honouliuli
Honouliuli Stream
Fishpond
Laulaunui I
NAVAL RES
Fishpond
WAIKELE
Pumping Sta
FORT WEAVER
Lower Village
Hospital
Salt Evaporators
FLUME
Flume
PEARL
Fernandez
RECONNAISSANCE TRANSECTS
FIGURE 2-9

white-eye, house sparrow and cardinal. (Refer to Appendix D for additional information.) Other animals observed included mongoose, dogs, cats and mice near the residential areas.

The alignment does not pass through any sensitive wildlife habitats, nor were there any endangered species of birds or animals observed during the reconnaissance.

III. SOCIO-ECONOMIC CHARACTERISTICS

A. Population

The population of the immediate project area (census tracts 87 and 88) was estimated at 16,872 in 1979 [2.22], with an average density of 5.8 to 13.4 persons per acre.

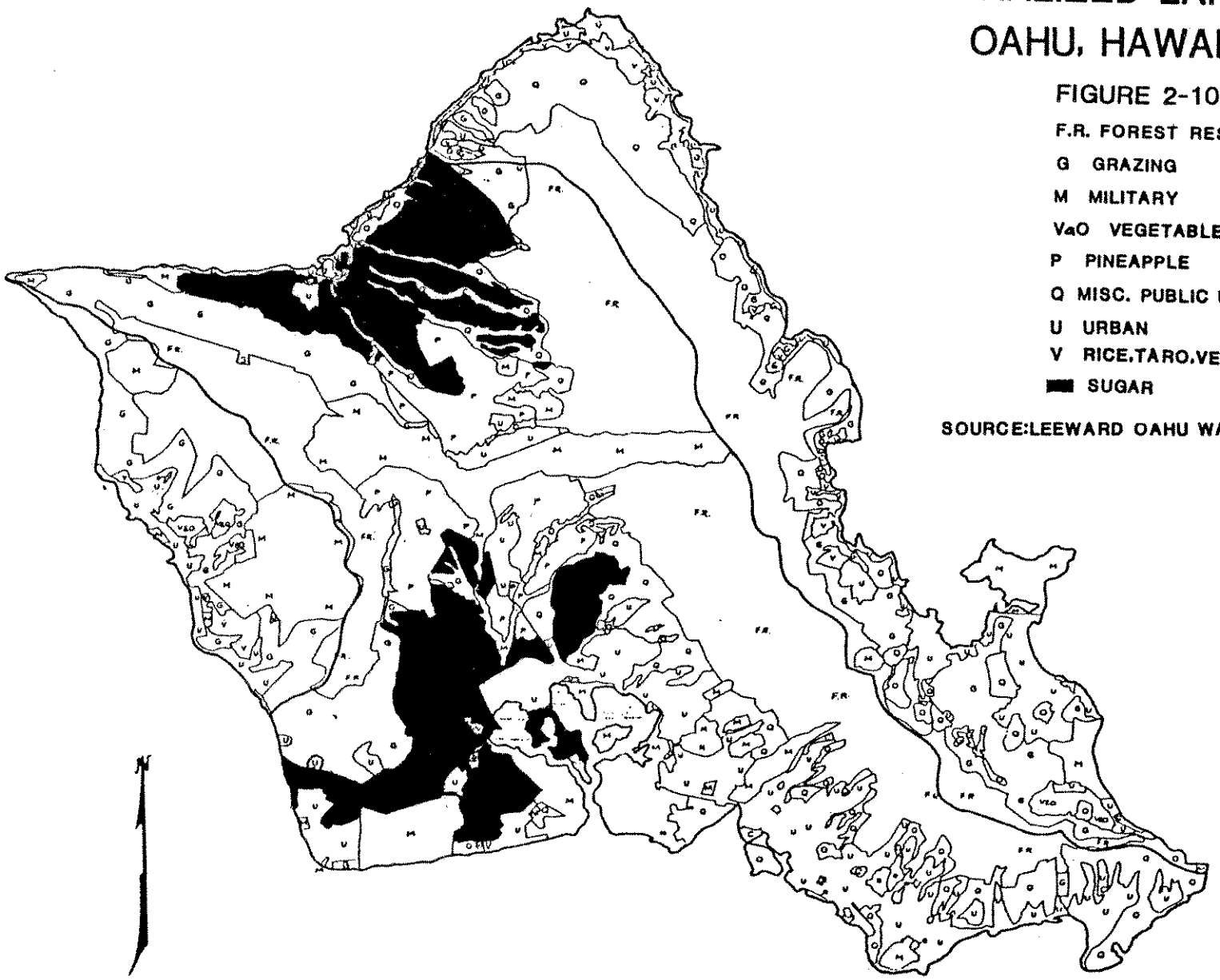
The population of the service area (Waipahu and Ewa) was 55,600 in 1979, with an estimated population of 128,000 for the year 2000 [2.23].

B. Land Use

The project site is located in the town of Waipahu. Activities along the alignment reflect various land use patterns, mainly urban in nature. There are industrial uses, businesses, apartment and other residences, and a school. Waipahu Wells and the alignment mauka of the H-1 Freeway are surrounded by sugar cane fields. Figure 2-10 is a

GENERALIZED LAND USE MAP
OAHU, HAWAII

FIGURE 2-10



SOURCE:LEEWARD OAHU WATER SUPPLY STUDY, 1977

Generalized Land Use map of the island, showing sugar cane acreage as well as other uses. The map was developed for the Hawaii Water Resources Regional Study in 1970.

The acreage of existing urban and agricultural land use in the Ewa and Waipahu areas is shown in Table 2-7. As can be seen, agricultural and industrial uses predominate in Ewa.

There are several development projects planned for the Ewa and Waipahu areas at this time, such as a resort-residential community at West Beach, Barbers Point Deep Draft Harobr, Honouliuli Wastewater Treatment System, West Oahu College, and expansion of James Campbell Industrial Park. However, the water to be distributed as a result of this project will serve the existing developments, not those planned.

C. Economic Aspects

1. General [2.24]

"The economy of Hawaii, especially Oahu, and its development and growth can, to a large extent, be attributed to its location and climate. Eighty (80) percent of the State's commerce, as well as the population, and nearly all military bases and activities are located on Oahu. The economy is basically service oriented. Manufacturing is modest. Agriculture has been declining."

TABLE 2-7

1976 EXISTING LAND USES (ACRES)
WAIPAHU AND EWA, OAHU

WAIPAHU SUBTOTAL[1/]

Urban		Agricultural	Vacant Usable	Other	Total Land
Residential	506.6	501.2	168.8	347.1	1,781.8
Multi-family	60.5				
Industrial	87.4				
Commercial	108.3				
Hotel	1.9				
	764.7				

EWA SUBTOTAL[2/]

Urban		Agricultural	Vacant Usable	Other	Total Land
Residental	467.4	10,129.2	1,862.5	6,847.2	20,587.1
Multi-family	24.6				
Industrial	1,130.2				
Commercial	126.0				
Hotel	-0-				
	1,748.2				

WAIPAHU-EWA TOTAL

Urban		Agricultural	Vacant Usable	Other	Total Land
Residental	974.0	10,630.4	2,031.3	7,194.3	22,368.9
Multi-family	85.1				
Industrial	1,217.6				
Commercial	234.3				
Hotel	1.9				
	2,512.9				

1/ Census tracts: 87.01, 87.02, 87.03, 88.00, 89.01

2/ Census tracts: 83.00, 84.00, 85.00, 86.02

"Tourism, defense, sugar and pineapple, in that order of importance, represent the four major export industries. Sugar and pineapple dominated the economy up to World War II. Beginning in World War II up to 1970, defense activities prevailed. Tourism is now the major 'industry' and is made of many services from hotel to scenic and travel services, gift shops, resturants, and entertainment."

"Other industries of non-export category, including the construction industry, provide goods and services to local residents from monies earned through sale of labor, products and other services to the export industry sector. The long-term growth of these industries depends upon the performance of the export industries."

2. Construction

Construction has been on a decline over the past few years. This is demonstrated, in part, by the data presented for residental construction in Table 2-8, which shows private residential construction authorized by permit from 1970-1977. This table also gives the housing vacancy rate for these years.

TABLE 2-8

PRIVATE RESIDENTIAL CONSTRUCTION AUTHORIZED BY PERMIT AND VACANCY RATES, OAHU: 1970 to 1978

YEAR	DWELLING UNITS[1]	TOTAL NUMBER OF BUILDING PERMITS	VACANCY RATE
1970	7,978	16,792	1.7
1971	7,958	17,239	2.3
1972	10,417	17,706	1.7
1973	13,065	22,767	1.5
1974	13,160	19,169	2.0
1975	5,430	16,514	2.3
1976	4,524	15,937	3.0
1977	4,683	15,793	1.6
1978	-	-	1.5

(1) Includes single-family dwellings, duplexes and apartments.

Source: Hawaii State Data Book, 1977 & 1978.

An upturn in construction was registered in 1978 [2.25] and was expected to accelerate in 1979. Leading the list of construction activities expected to expand that year were multi-family residences, hotels on Maui and government projects.

3. Employment [2.26]

Employment on Oahu during 1978 averaged 313,900 according to information published by the State Department of Labor and Industrial Relations. Employment opportunities reflected a negligible growth rate of 0.2% during the first quarter of 1979. Unemployment showed some improvement, decreasing from 7.6% in 1978 to 6.9% in the first quarter of 1979. "Unemployment in the construction industry and related activities was the hardest hit as construction deteriorated in 1975 and 1976. The recovery of the national economy did not help local construction, and the industry continued in a depressed state. A recent uptrend in construction activity and employment may be the turning point in a long-awaited revival."

"The sugar industry, the third largest export industry, is faced with a dilemma as a result

of America's abandonment in 1974 of its 40-year-old Sugar Act, which had insulated the domestic sugar industry from competition of surplus world sugar entering into the American market. The market has been chaotic since. Pineapple, the second largest agricultural industry, continues to contribute to the economic health of the local economy. Sales have declined due to intensive price competition from abroad, but the growth prospects for pineapple appear good, especially for fresh pineapple."

The number of people employed in the State declined slightly to 373,000 in March, 1979 from 374,700 in February. The number of unemployed declined to 25,400, or 6.4% of the labor force, in March.

Jobs in the private sector were up by 8,100 over March, 1978, to a total of 291,800. About 47% of the increase occurred in the service industries, including hotels. The construction industry accounted for another 26% of the increase, though it should be noted that employment in construction was at a relatively low level in early 1978 [2.27].

Employment in the Ewa and Waiphu areas (census tracts 83 to 89) averaged 20,650 during

1978. Unemployment averaged 10.6% in 1978, but had dropped to 9.7% in the first quarter of 1979.

IV. INFRASTRUCTURE

A. Roads and Traffic

The proposed alignment would be placed along Waipahu Street, Kalaiku Street (a private road), Paiwa Street, and a cane haul road and Mahoe Street mauka of the H-1 Freeway. Waipahu Street and Paiwa Street are 2-lane local streets within the town of Waipahu. Traffic counts for these streets taken in February, 1975 are presented in Table 2-9.

Kalaiku Street does not have a substantial traffic load. It is an oil-topped road in poor condition. The cane haul road north of the H-1 Freeway and Mahoe Street north of the H-1 Freeway are also little used, primarily by cane haul trucks during harvesting.

B. Water

The existing water system is described in Section 1, Part III.

C. Liquid Waste and Solid Waste

1. Liquid Waste [2.28]

Liquid waste at the Waipahu Wells is disposed of in a water-tight, closed container which is periodically pumped out. The sewage is then

TABLE 2-9

TRAFFIC COUNTS
February, 1975

A. 24-HOUR COUNT

Location	Northbound	Southbound
Waipahu Street at Paiwa Street	5,553	4,871
Paiwa Street at Waipahu Street	2,449	446

B. PEAK HOURS' COUNT

Location	Northbound	Southbound
Waipahu Street at Paiwa Street		
6:00-9:00 AM	736	1,007
3:00-6:00 PM	1,656	1,280
Paiwa Street at Waipahu Street		
6:00-9:00 AM	405	56
3:00-6:00 PM	613	100

Source: [2.29]

taken to a City and County sewage treatment plant.

Liquid waste from developments in the area to be served by the project is treated at the Waipahu Sewage Treatment Plant (STP). The Waipahu STP has a maximum capacity of 3.6 mgd equivalent flow of sewage. This capacity is based on total suspended solids and biochemical oxygen demand (BOD) in its discharge to Pearl Harbor's Middle Loch. The State Department of Health has limited future sewer connections to the sewage plant to this maximum equivalent sewage flow.

Construction of the 25 mgd capacity Honouliuli Waste Water Treatment Plant (WWTP) will include replacement of the existing 3.6 mgd Waipahu STP with a 7 mgd capacity Waipahu Sewage Pumping Station (SPS) and a new force main to the Honouliuli WWTP. The Makakilo STP would also be phased out. The Honouliuli regional facility is being designed to accommodate all the effluent from the western portion of Mamala Bay (Halawa Valley to Barbers Point).

2. Solid Waste [2.30]

Solid waste from developments in the area served by the proposed project is disposed of

at the Palailai Sanitary Landfill or at the Waipahu Incinerator. The Palailai Landfill is a privately owned and operated disposal site presently operating at 250 tons per day, with a disposal cost of $5.98 per ton. It has a future capacity of 600 tons per day, or approximately 20% of the total refuse of Oahu and has a 10 to 15 year landfill life, depending on usage.

Waipahu Incinerator was built in 1970 and has a design capacity of 600 tons per day. It is presently being operated at full capacity and is operated by the City and County of Honolulu.

D. Electricity

Power lines are located along the cane haul road. The Waipahu Wells Pump Station is served by Hawaiian Electric Company.

E. Gas

There are no gas lines along the proposed transmission alignment on Waipahu Street or Paiwa Street [2.31], nor on the other roads.

F. Telephone

Telephone service is available in the general vicinity of the project by Hawaiian Telephone. The Waiphau Wells Pump Station utilizes this service.

G. Schools

There is one school adjacent to the proposed alignment for the 16-inch main line. It is Waipahu Elementary on Waipahu Street and Waikele Road. An overhead pedestrian walkway crosses Waipahu Street in the vicinity of this school. Other public schools within the service area of the project include August Ahrens and Honowai Elementary, Waipahu Intermediate and Waiphau High School.

H. Public Services

1. Police

The City and County Police Department substation in Pearl City serves the vicinity of the project site. The project site is located within the Waipahu Police "beat" and could expect a 4± minutes response time to calls [2.32].

The average response time within the entire Waipahu District is 6.09 minutes. The existing crime rate in the immediate area is very low, consisting mainly of nuisance calls for dumping solid waste materials and related refuse, motorcycle noise, children and pet problems.

2. Fire

The City and County Fire Department serves the vicinity of the project site. The project

would be served by the fire station located in Waipahu Industrial Park on Leonui Street. This station houses an engine company of 18 personnel, an aerial ladder company of 18 firefighting personnel and headquarters for a battalion chief and his aide [2.33].

3. Medical

Medical services are available at the Waipahu Clinic and the Punawai Clinic (a Kaiser Foundation Clinic). The Waipahu Clinic has a staff of about 50 and serves the basic health needs of residents from Waipahu to Waianae.

I. Parks and Recreation

The Waipahu Cultural Garden Park is located on Waipahu Street east of Waipahu Elementary School. It is 46.593 acres in size.

V. ARCHAEOLOGICAL/HISTORICAL CHARACTERISTICS

No archaeological or historical sites are known to exist on the project site, which will follow the alignment of existing roads and streets. The closest site listed in the State Register of Historic Places is Waikele petroglyphs (TMK 9-4-02:5), north of the proposed alignment.

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[2.11] Swain, Lindsay A. 1973. Chemical Water Quality of Ground Water in Hawaii. Report R48. USGS. Prepared in cooperation with the Division of Water and Land Development, Department of Land and Natural Resources, Honolulu, Hawaii.

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[2.18] Op. Cit [2.6]

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[2.22] State of Hawaii Census Statistical Areas Committee. May 6, 1980. Report CTC-44. Population and Housing Unit Estimates for Oahu Census Tracts, 1970-1979.

[2.23] City and County of Honolulu Board of Water Supply. Estimates as of September, 1980.

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[2.29] Transportation Service Department, City and County of Honolulu. December, 1979. Personal communication.

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SECTION 3

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

I. CITY AND COUNTY OF HONOLULU

The Statement of Objectives and policies of the Honolulu General Plan designates the land in the vicinity of the project site as being in the Urban Fringe [3.1]. The areas to be served by the additional water are designated as follows:

Waipahu - Urban Fringe

Ewa - Secondary Urban Center

Due to its utility nature the proposed project is a permitted use according to the County Zoning Controls.

II. STATE OF HAWAII

A. State Land Use District

The transmission line will be within both Urban and Agricultural State land use districts. However, a Special Use Permit (SUP) will not be required because "public, private, and quasi-public utility lines" are a permitted use within an Agricultural District.

B. Designated Ground Water Control Areas

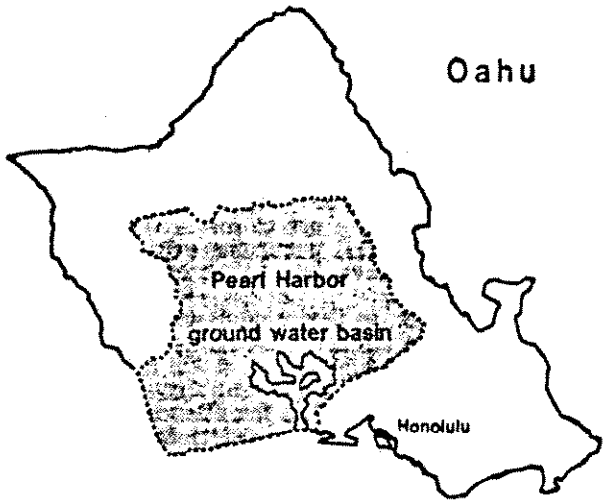
The BWS is the primary water management agency on Oahu with the authority to limit the amount of water drawn from any well covered under the BWS Rules

and Regulations, Section 3-313 (see Appendix E). These rules apply to all areas except designated "ground water control areas" established by the State of Hawaii, Department of Land and Natural Resources (DLNR).

Pursuant to Chapter 177, Hawaii Revised Statutes, as amended, DLNR has authority to designate critical areas and become the primary agency with regard to control of these areas. Regulation No. 9, which implements this Act, has been adopted and the first designated "ground water control area" was declared on September 28, 1979 (effective date June 30, 1979). Please refer to Figure 3-1. This is discussed further in Section 1, Part IV.

C. State Water Commission Report

The State Water Commission was appointed by the Governor in mid-1977 to review the availability of water supplies and recommend appropriate administrative and legislative actions. After reviewing available reports and receiving testimony from major water purveyors, the Commission focused on major problems and issues. The resulting findings and recommendations are contained in a report titled "Hawaii's Water Resources: Directions for the Future." The priority recommendations from this report are reproduced in Appendx F.



GROUND WATER CONTROL AREA

FIGURE 3-1

SOURCE: HONOLULU ADVERTISER 9/29/79

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SECTION 4

ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATIVE MEASURES TO MINIMIZE ADVERSE IMPACTS

This section will discuss the probable environmental impacts of the proposed action.

INTRODUCTION

The proposed action may generate primary and secondary environmental impacts. Primary impacts result directly from construction activities for the transmission line and secondary impacts from the operation of the wells.

I. PRIMARY ENVIRONMENTAL IMPACTS

A. Short-term Impacts

Short-term impacts result from construction activities and are limited to the duration of the construction period. The proposed project was evaluated and the following conclusions derived:

1. Air Quality

Construction activities will require trenching (30 inches wide and an average of 5 feet deep) and laying of the 16-inch pipes. During this activity, dust (airborne particulate matter) will be generated and may be troublesome if no precautions are taken to mitigate the dust. However, the construction specifications will

call for dust control by using water sprinkling and this standard method for dust control has proven to be effective. No problems are anticipated from exhaust emissions from construction equipment and no special provisions in the construction specifications will be required.

During construction there may some delay of through traffic. This can potentially cause increased pollutant levels due to increased exhaust emissions, resulting from the idling vehicles. However, the contractor will only be allowed to block one lane at a time and two-way traffic will be maintained whenever possible. All traffic lanes will be open during peak traffic hours. Exhaust emissions and increased pollutant levels should be minor, of short duration, and are not anticipated to be a significant problem.

2. Water Quality

The pipeline alignment does not traverse major impoundments of water, though at one section of the alignment Waikele Stream will be crossed via a bridge structure constructed across the stream. The proposed pipeline will parallel an existing pipeline crossing but will use its own support structure. Concrete columns will

be required for the support structure but their construction will not occur in the stream, rather on either side of the stream banks. Minimal earthwork is expected and very little, if any, soil is expected to enter the stream. The stream crossing will not alter the stream flow nor create a diversion of the stream. Therefore, adverse impacts to the stream water quality are not anticipated.

Another factor considered was whether or not dewatering activities will be required during trenching. Since the trench will only be an average of 5 feet in depth and the water table is considerably lower, no dewatering activities will be required.

The pipeline will be installed and tested in sections. It will be disinfected with a chlorine solution under Board of Water Supply's specifications and discharged according to the appropriate City and County of Honolulu and State Department of Health requirements.

Disposal of waste (chlorinated) water into City storm drains by the contractor will be coordinated with the City's Department of Public Works, Division of Engineering. Chlorine concentrations in the waste water shall be reduced

by dilution or dechlorination to reduce residual chlorine concentration.

3. Water Service

Work involving connection to the existing mains will temporarily disrupt water service for a few hours to residents in the vicinity. To minimize this disruption of water service, pipes and fittings will be preassembled to hasten the required work time.

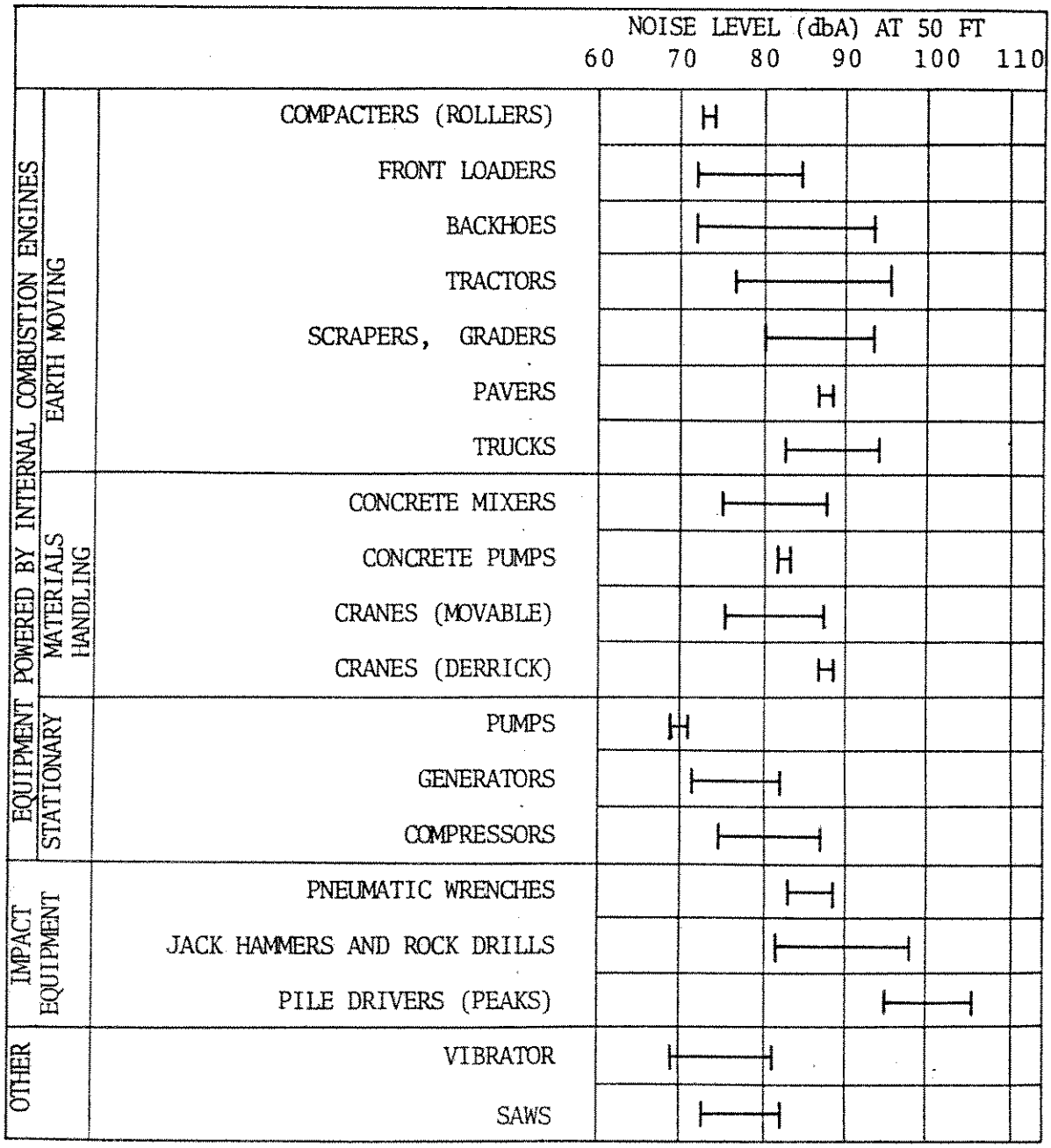
4. Noise

Construction activities will generate noise above ambient noise levels and the noise levels which can be expected are presented in Figure 4-1. The noise impacts will present a problem in the residential areas along Waipahu Street, Paiwa Street and Kalaiku Street, but not along the cane haul road. Waipahu Elementary School will also be temporarily impacted.

Ambient noise readings taken along Waipahu Street ranged from 68 to 75 dBA, indicating that the residential and school areas are already impacted by existing traffic noise. However, the construction specifications will require that the contractor ensure that mufflers on all construction equipment be in proper operating

FIGURE 4-1

CONSTRUCTION EQUIPMENT NOISE RANGES



Note: Based on Limited Available Data Samples

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

condition and the hours of operation be within 8:30 AM to 3:30 PM. The contractor will be required to obtain a noise permit from the Department of Health.

The construction noise in any given area will be temporary, lasting only for the duration of construction in that area along the alignment.

5. Infrastructure

Significant impacts on underground utilities such as water, sewer, storm drains, gas, electric and telephone lines are not anticipated. The transmission line wil be routed under or over existing utility lines to minimally disrupt service. Utility companies will be notified by the contractor prior to excavation so that their respective lines can be located and marked to avoid damage.

6. Biological

A biological reconnaissance of the entire pipeline alignment was conducted and no endangered plant or animal species were found, nor will the alignment pass through or near any sensitive wildlife habitat. The alignment also has been selected to prevent any removal of existing trees along Waipahu Street. Since no major

impacts are anticipated, no mitigative measures will be required.

As previously stated, the line will span Waikele Stream across a support structure. This structure will require concrete columns but these will be on either side of the stream banks and no construction is planned within the stream proper. Construction of these columns will require minimal earthwork and very little, if any, soil is expected to enter the stream. Therefore, adverse impacts to the stream biota are not anticipated.

7. Archaeological

No known archaeological sites are present within or adjacent to the pipeline alignment, which is located entirely within existing rights-of-way, and no mitigative measures are required.

8. Land Use

The pipeline alignment has been selected to use existing easement when possible and to acquire easement through private lands only when required. This action will help to reduce the total construction cost. Since the majority of the alignment is through existing public easements, no major impact on land use is anticipated.

9. Economic

The project will create a short-term cash infusion into the local community. This will be a short-term, positive impact and the estimated construction cost will be $1,000,000. The multiplier effect, assuming a 1.6 construction multiplier, will be $1,600,000.

10. Traffic

The alignment will be within an existing cane haul road, public roads (Waipahu Street and Paiwa Street) and a private road (Kalaiku Road). Potential traffic impacts along the cane haul road and Kalaiku Road will be minimal and any problem can be mitigated by coordinating construction activities with the land owner.

Potential traffic problems exist for Waipahu Street and to a limited extent along Paiwa Street since one lane of traffic will have to be marked off during trenching activities, creating minor traffic congestion. The only feasible mitigative measure is to limit the construction area by phasing the trenching activities. A traffic control plan will be formulated and incorporated into the final plans. This will be coordinated with MTL to minimize disruption of bus service

and with the principal of Waipahu Elementary School to minimize potential hazard to children and traffic associated with school activities.

Children attending Waipahu Elementary School can use the existing overhead pedestrian walkway which crosses Waipahu Street. This will mitigate potential safety problems in crossing Waipahu Street while construction activities are in progress.

The contractor shall comply with traffic control requirements of the Manual On Uniform Traffic Control Devices for Streets and Highways. All traffic lanes will be open during peak traffic hours. Two-way traffic shall be maintained whenever possible. All open trenches will be covered with steel plates or properly barricaded at the end of each working day and on weekends.

In addition, construction material and equipment will not be stockpiled along the highway. The contractor will be responsible for finding a suitable location for stocked material or, if a site is unavailable, arranging to have material delivered to the construction site as needed.

11. Erosion

Most of the line will be constructed in areas primarily composed of Waipahu silty clay which has only a slight erosion hazard. There is a small area where it will pass through Helemano silty clay, which has a severe to very severe erosion hazard. This soil type is mainly along the gulch walls and edges where very little construction is planned, with most of the pipeline passing over it via the bridge crossing of the line. Very little potential erosion is expected either during construction or after because of the soil type.

B. Long-term Impacts

Primary long-term impacts are those anticipated to result directly from the project. These are impacts that can be expected for the duration of the project's use.

1. Air Quality

No long-term impacts are anticipated.

2. Water Quality

No long-term impacts are anticipated.

3. Noise

No long-term impacts are anticipated. The electrical pumps are quiet and the absence of

residences and/or public facilities next to the Waipahu Wells preclude any adverse noise impacts. Ambient noise readings next to the well field were only 45-49 dBA.

4. Biological

No long-term impacts are anticipated.

5. Archaeological

No long-term impacts are anticipated.

6. Land Use

No long-term impacts are anticipated. The alignment is through existing dedicated rights-of-way and/or easements to be acquired through private land.

7. Economics

Upon completion of the pipeline construction, the only cost will be the operation and maintenance of the pumps and pipeline.

8. Traffic

No major traffic problems are anticipated after completion of the construction phase.

9. Water Supply

The major positive impacts resulting from the proposed action will be to:

a. provide greater flexibility in the distribution system to the Waipahu area and the Ewa-Waianae system; and

b. provide adequate fire protection for the residential area mauka of the Waipahu Sugar Mill, via the distribution system.

As stated in Section 1, the existing 16-inch line runs along Waipahu Street and connects to a larger line at Kunia Road. However, before reaching Kunia Road, this line intersects with the line originating from Hoaeae Wells. The high water pressure in the line from Hoaeae Wells often interrupts the westward flow of water in the existing 16-inch line, therefore, leaving parts of the Ewa-Waianae area without sufficient water at times. The proposed project will result in the positive impact of uninterrupted westward flow of water and would also provide an important backup to a line already 10 years old.

II. SECONDARY ENVIRONMENTAL IMPACTS

No adverse secondary environmental impacts are anticipated. The major positive impact will be to permit the flexibility in the utilization of the design capacity of the Waipahu Well field at some time in the future, if allowed by DLNR.

SECTION 5

PROBABLE ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED

This section will briefly discuss probable adverse environmental impacts and mitigative measures, when applicable, and the rationale for proceeding with the proposed action, notwithstanding unavoidable effects.

I. PRIMARY SHORT-TERM IMPACTS

A. Probable Impacts and Mitigative Measures

During construction of the transmission line, there will be an increase in existing noise. This will be of short duration, lasting only for the construction period, and can be mitigated by the contractor ensuring proper functioning of mufflers on equipment and by limiting the hours of construction. Also refer to pages 12-14 and 12-18 in Section 12 of this document.

Construction will also result in short-term increases in fugitive dust. If dust should be a serious problem, it will be mitigated by water sprinkling.

Exhaust emissions from traffic and construction vehicles are inevitable; however, the level of emissions should be insignificant and is not anticipated to result in adverse environmental impacts.

During transmission line construction there may also be disruption of the traffic patterns on Waipahu Street and Paiwa Street. This disruption would be of a minor nature and would last only for the duration of these phases of construction. It should not result in significant adverse impacts with proper direction of traffic and scheduling of construction. Close coordination will also be maintained with MTL to minimize disruption of bus routes and schedules and with the principal of Waipahu Elementary School to assure that precautions are taken to maximize safety for the school children and for school-related traffic.

Work involving connection to the existing water mains will temporarily disrupt water service for a few hours to residents in the vicinity.

B. Reasons for Proceeding

The probable short-term adverse impacts encountered during the construction phase of the proposed project are minor and can be controlled by using acceptable mitigative measures.

II. PRIMARY LONG-TERM IMPACTS

A. Probable Impacts and Mitigative Measures

The primary long-term impacts associated with the project are economic. Upon completion of the

pipeline, the cost of operation and maintenance of Waipahu Wells and the transmission line will continue to be a public expense.

B. Reasons for Proceeding

The cost of operating and maintaining the proposed improvements to the Ewa-Waianae system are felt to be justified by the increased benefits to be derived from the improvements. The major positive impacts will be to:

1. provide greater flexibility in the distribution system to the Waipahu area and the Ewa-Waianae system; and

2. provide adequate fire protection for the residential area mauka of the Waipahu Sugar Mill, via the distribution system.

As previously stated in Sections 1 and 4, the proposed line will enable uninterrupted westward flow of water already being pumped to the Ewa-Waianae area, flow which is periodically blocked by flow from Hoaeae Wells. Besides this, the proposed line would provide a needed backup to the existing 16-inch line which is over 10 years old.

III. SECONDARY IMPACTS

A. Probable Impacts and Mitigative Measures

No adverse environmental impacts are anticipated. The major positive impact would be to permit the

flexibility associated with future utilization of the Waipahu Well field at design capacity, if allowed by DLNR.

B. Reasons for Proceeding

The 16-inch transmission line is required to improve flexibility in the water distribution system.

SECTION 6

ALTERNATIVES TO THE PROPOSED ACTION

I. NO ACTION

A no action alternative would mean continuing operation of a water system that impedes some flow from Waipahu Wells to the Ewa-Waianae system, thereby preventing optimum water distribution to the Ewa area. The present system also lacks flexibility in delivery to certain areas of Waipahu. Other options to the proposed project are presented later.

II. RESCHEDULING THE ACTION

Postponement of construction to a later date was considered. However, this action may result in increased construction costs and would delay delivery of water to areas where there is existing demand.

III. ALTERNATIVE ALIGNMENTS

Five alignments were considered. Please refer to Figures 1-2 and 6-1 through 6-4. However, based on economic and time constraints, four of these were deemed unsatisfactory.

A. Alignment 1

This was the alignment chosen for the proposed transmission line. Refer to Figure 1-2. This alternative was chosen because: (1) it is somewhat shorter

than most of the other alignments and will require less pipe; (2) it can be placed within existing public or private rights-of-way; and (3) it is less expensive than the other alternatives.

B. Alignment 2

Alignment 2 is shown in Figure 6-1. This alternative, while approximately the same length as Alignment 1, would involve a more indirect route and would thus be more expensive.

C. Alignment 3

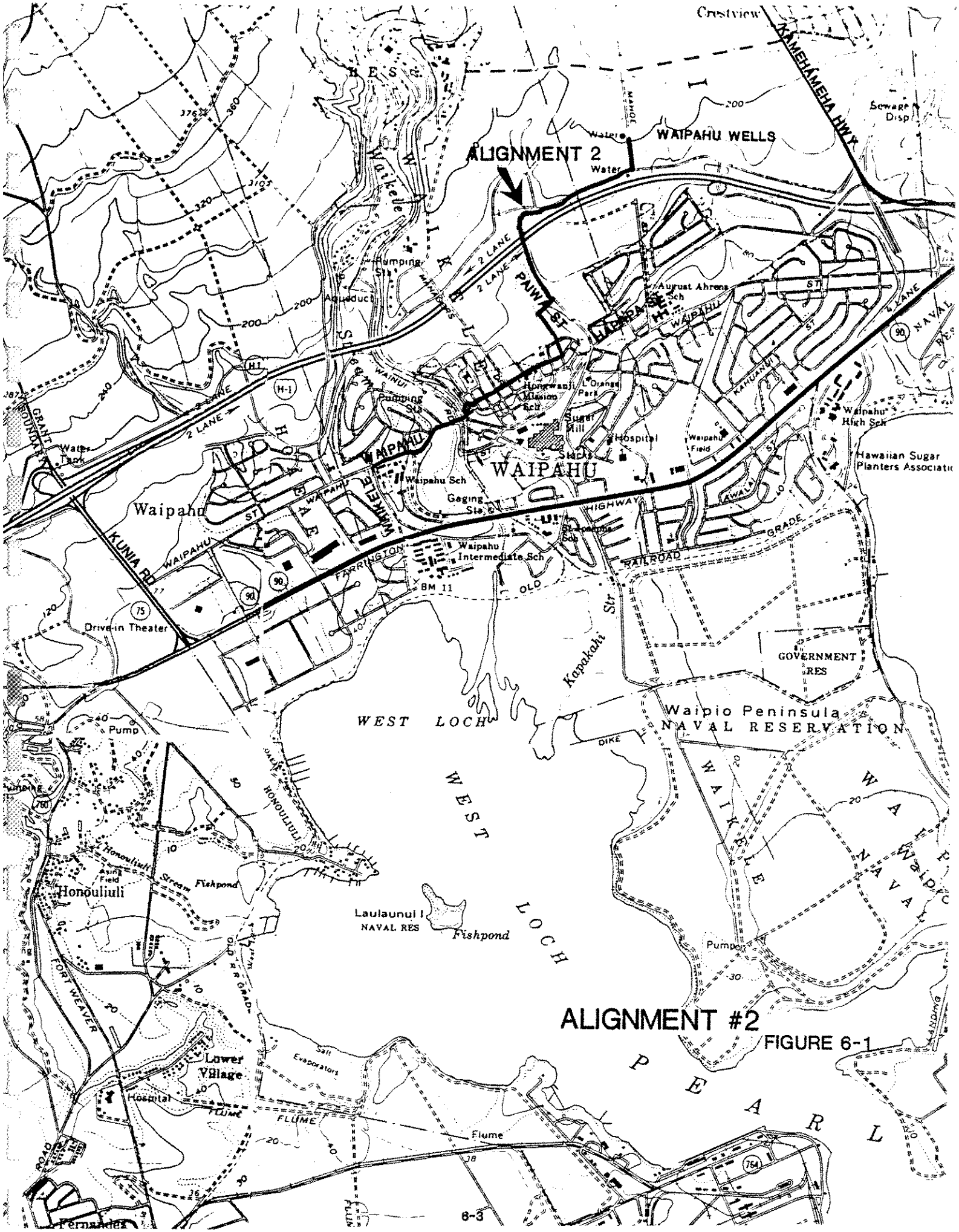
Alignment 3 is shown in Figure 6-2. This alternative is approximately 200 feet longer than Alignment 1 and would also involve a more indirect route. Hence, it is also more expensive.

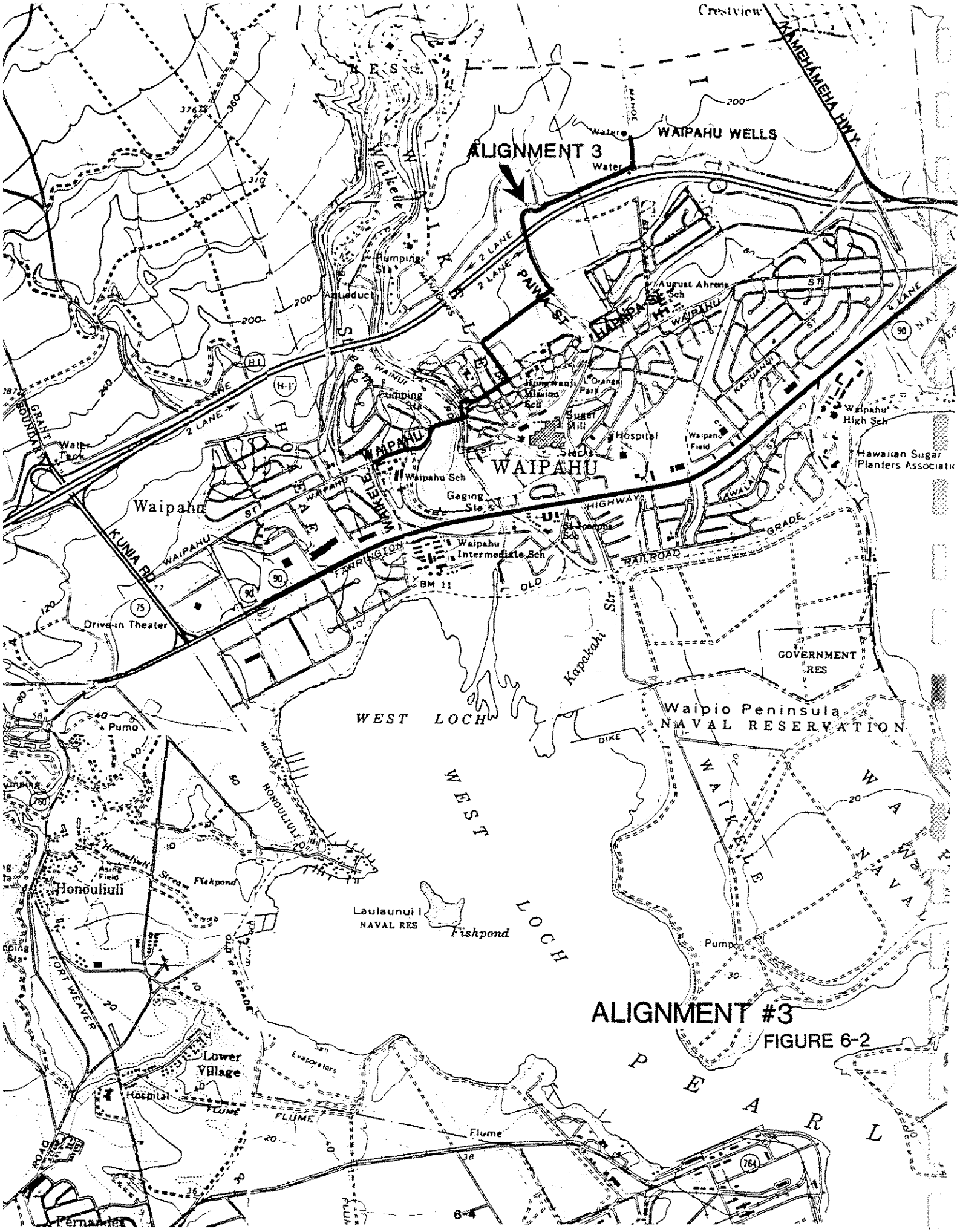
D. Alignment 4

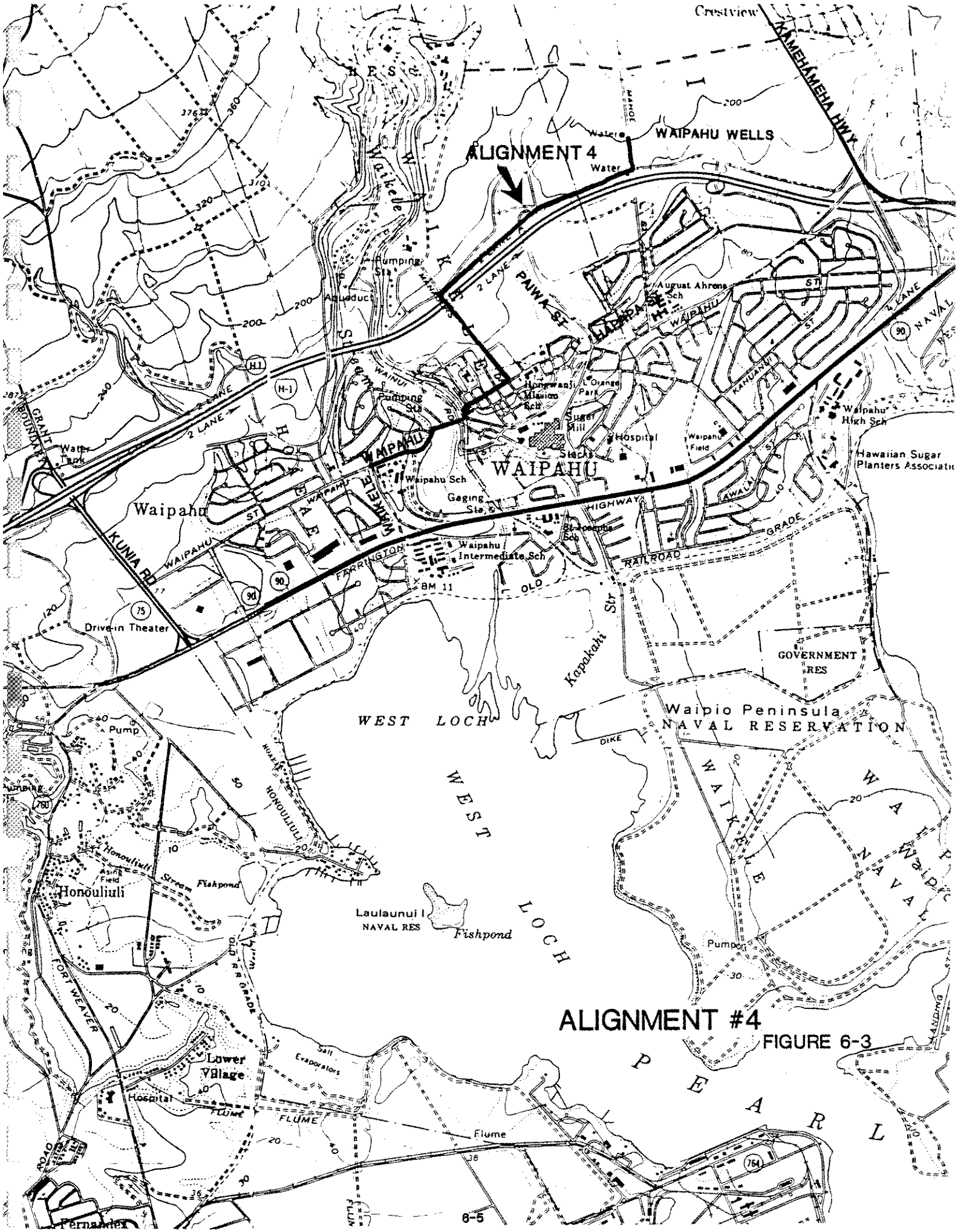
Alignment 4 is shown in Figure 6-3. This alternative would be about 200 feet longer than Alignment 1. In addition, this route would involve crossing over the H-1 Freeway on Manager's Drive Overpass, which would require approval of the Federal Highway Administration. This extra governmental step would mean further time delays for the project. This alternative is also more expensive than Alignment 1.

E. Alignment 5

Alignment 5 is shown in Figure 6-4. The transmission line would be placed on Wainui Road, adjacent


ALIGNMENT 2
WAIPAHU WELLS
WAIPAHU
Waipahu
WEST LOCH
Waipio Peninsula
NAVAL RESERVATION
Honouliuli
Laulaunui I
NAVAL RES
Fishpond
Lower Village
Hospital
Drive-in Theater
Waipahu Sch
Waipahu Intermediate Sch
Hongwanji Mission Sch
Waipahu High Sch
Hawaiian Sugar Planters Association
Sugar Mill
Stacks
Gaging Sta
Pumping Sta
Aqueduct
Water Tank
Water
Sewage Disp
Crestview
KAMEHAMEHA HWY
KUNIA RD
FARRINGTON HIGHWAY
WAIPAHU ST
PAIWA ST
WAIKELE
Kapakahi Str
RAILROAD GRADE
OLD RR GRADE
FORT WEAVER ROAD
HONOULIULI RD
DIKE
Salt Evaporators
Flume
Pumping Sta
GOVERNMENT RES
PEARL HARBOR
NAVAL RES
2 LANE
3 LANE
4 LANE
ALIGNMENT #2
FIGURE 6-1


ALIGNMENT 3
WAIPAHU WELLS
KAMEHAMEHA HWY
WAIPAHU
Waipahu
KUNIA RD
Waipahu Sch
Waipahu Intermediate Sch
Drive-in Theater
Hospital
Sugar Mill
Waipahu High Sch
Hawaiian Sugar Planters Association
WEST LOCH
Waipio Peninsula
NAVAL RESERVATION
GOVERNMENT RES
Kapakahi Str
Honouliuli
Laulaunui I
NAVAL RES
Fishpond
Lower Village
Hospital
Flume
Evaporators
Pumps
PEARL
ALIGNMENT #3
FIGURE 6-2


ALIGNMENT 4
WAIPAHU WELLS
WAIPAHU
Waipahu
Waipio Peninsula
NAVAL RESERVATION
WEST LOCH
Honouliuli
Laulaunui I
NAVAL RES
Fishpond
Lower Village
Drive-in Theater
Waipahu Sch
Waipahu Intermediate Sch
Hospital
Sugar Mill
Stacks
Gaging Sta
Pumping Sta
Aqueduct
Water Tank
Water
Pump
Flume
Salt Evaporators
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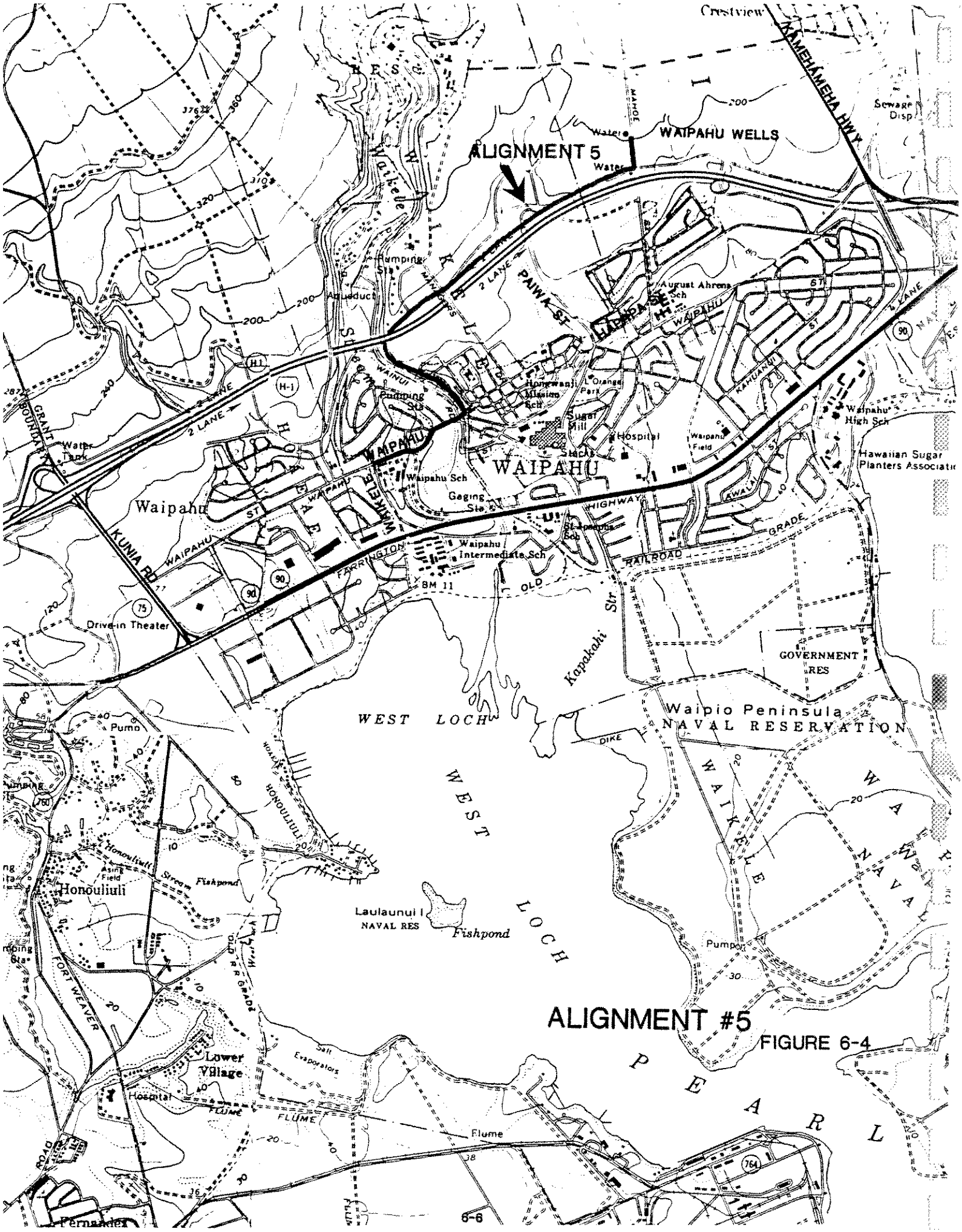
Waipahu High Sch
August Ahrens Sch
Honpwanji Mission Sch
Orange Park
Waipahu Field
St Joseph's Sch
Fernandez
KUNIA RD
FARRINGTON HIGHWAY
KAMEHAMEHA HWY
PAIWA ST
KAHUANUI ST
AWALA ST
RAILROAD GRADE
OLD RR GRADE
FORT WEAVER ROAD
DIKE
Kapakahi Str
WAIKELE STREAM
WAIAWA STREAM
HONOULIULI STREAM
Honouliuli Stream
Flume
BM 11
ALIGNMENT #4
FIGURE 6-3


ALIGNMENT 5
WAIPAHU WELLS
WAIPAHU
Waipahu
Waipio Peninsula
NAVAL RESERVATION
WEST LOCH
Laulaunui I
NAVAL RES
Fishpond
Honouliuli
Lower Village
Drive-in Theater
KUNIA RD
FARRINGTON HIGHWAY
KAMEHAMEHA HWY
PAIWA ST
WAIPAHU ST
WAIKELE
Waipahu Sch
Waipahu Intermediate Sch
Hospital
Sugar Mill
Gaging Sta
Pumping Sta
Aqueduct
Flume
Salt Evaporators
Pumps
GOVERNMENT RES
RAILROAD GRADE
OLD RR GRADE
Kapakahi Str
DIKE
Waipahu High Sch
Hawaiian Sugar Planters Association
Crestview
Sewage Disp
ALIGNMENT #5
FIGURE 6-4

to Waikele Stream, and would have to go down and up a gully in order to cross under the H-1 Freeway. This alternative would be approximately 700 feet longer than Alignment 1, and would be more expensive.

IV. ALTERNATIVES TO CONTINUITY OF FLOW

Some of the water from the PHGWCA is currently being exported to the Waianae Coast and to the Honolulu Water District. Sources are currently being studied and plans prepared for development of water sources in the Waianae Coast and in the windward area to supply Waianae Coast and Honolulu Water District needs. Such development will help reduce that amount of export from the Pearl Harbor aquifer so that water now being exported could be routed to the Ewa rea, which has been planned by the City and County of Honolulu as a second urban core for Oahu.

To support this plan, BWS must have the necessary flexibility in its transmission system to provide water in those areas where there is demand. The proposed 16-inch line not only is necessary to rectify existing transmission contraints but would enable the BWS to optimize the potential for Waipahu Wells, thus increasing its flexibility in utilizing this water source.

Development outside the PHGWCA is, therefore, primarily to enable those areas to become less dependent on the Pearl Harbor aquifer. This will enable BWS to provide Pearl Harbor aquifer water to areas currently planned

by the City and County for future growth, areas which are within the PHGWCA. Therefore, such water development outside of the PHGWCA are not reasonable alternatives to what is possible with the proposed project.

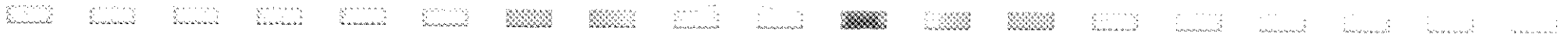
Currently, the only other reasonable alternative to providing adequate fire flow to the residential area which would be served by the proposed 16-inch line is diversion of water from Hoaeae Wells. Current pumpage from Hoaeae Wells primarily supplies the Ewa area so diversion of this water would result in a decrease of existing supply to this area. Besides this, such diversion would not be as efficient as the proposed 16-inch main, since the proposed line is required regardless of the fire flow situation.

SECTION 7

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

This section considers the commitment of resources that is made once the project is implemented.

City and County and private funds, labor, construction and building materials, and fuel will be committed to the project. Additional maintenance and operation, manpower, and funds will be required.



SECTION 8

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

> This section will include a brief discussion of the extent to which the proposed action involves trade-offs between short-term environmental gains at the expense of long-term losses, or vice versa, and a discussion of the extent to which the proposed action forecloses future options, narrows the range of beneficial uses of the environment, of poses long-term risks to health or safety.

Development of the 16-inch transmission line would not result in short-term gains at the expense of long-term losses, or vice versa. The proposed action will not foreclose future options. Rather, the proposed project will enable greater flexibility in delivery to areas of Waipahu and the Ewa-Waianae system. It will also allow full utilization of the design capacity of the Waipahu Wells at some future date, if desired by BWS and if approved by DLNR.

The project will not narrow the range of beneficial uses of the environment or pose a long-term risk to health and safety.

SECTION 9

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

As indicated in Section 4, Anticipated Environmental Impacts and Mitigative Measures to Minimize Adverse Impacts, all of the adverse impacts are short-term and related to construction activities.

SECTION 10

LIST OF NECESSARY APPROVALS

State

1. If construction noise levels exceed the allowable noise levels designated in Chapter 44-B, "Community Noise Control for Oahu," a permit from the Director of the Department of Public Health will be required.

2. Approval from the Department of Transportation for the portion of the alignment which will cross under the H-1 Freeway.

County

1. Permit from the Department of Transportation Services prior to work on any portion of a public street or highway.

SECTION 11

ORGANIZATIONS AND PERSONS CONSULTED

Note: An Environmental Impact Statement (EIS) Notice of Preparation for the Waipahu 16-inch Water Main from Waikele Road to Waipahu Wells was filed with the Environmental Quality Commission (EQC) on December 28, 1979. A filing notice was published in the EQC Bulletins dated January 8, 1980 and Jaunary 23, 1980. During the 30-day filing period, there were no requests from persons or organizations desiring to be consulted parties during the EIS preparation.

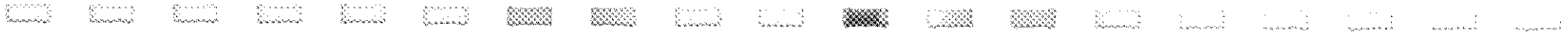
Organizations which were informally consulted during preparation of the EIS include the following:

Department of Land and Natural Resources,
Division of Water and Land Development,
State of Hawaii.

Department of Transportation Services,
City and County of Honolulu.

Honolulu Gas Company, Maps and Records.

Stan Shimabukuro and Associates.



SECTION 12

AGENCIES, ORGANIZATIONS AND PERSONS CONSULTED IN EIS REVIEW PROCESS

The following list includes agencies and organizations to whom the EIS was sent during the review period. EISs were also sent to various libraries to be available for public review.

Those with an asterisk are those from whom comments were received. Each comment with its corresponding response follows this list on the designated pages.

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FEDERAL GOVERNMENT		
	U. S. Air Force, 15th Air Base Wing	
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	U. S. Department of the Interior, Geological Survey, Water Resources Division	
*	U. S. Navy, Headquarters Fourteenth Naval District	12-11

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	Ewa Neighborhood Board	
OTHERS		
	Oahu Sugar Company	
*	Waipahu Community Association	12-37

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

PODED-PV

3 April 1980

Honorable Frank F. Fasi
Mayor of Honolulu
Honolulu, Hawaii 96813

Dear Mayor Fasi:

We have reviewed the "Environmental Impact Statement for the Waipahu 16-inch Water Main for Waikele Road to Waipahu Wells," dated 5 March 1980, which was forwarded to us by the State of Hawaii, Environmental Quality Commission on 7 March 1980. We offer the following comments for your consideration.

The proposed action does not affect any U.S. Army Corps of Engineers project; however, the project does involve a crossing of Waikele Stream which may require a Department of the Army (DA) permit under Section 404 of the Clean Water Act and Section 10 of the River and Harbor Act of 1899. We recommend that the applicant submit details of the proposed stream crossing so that we can determine DA permit requirements.

According to the flood insurance study for the island of Oahu, a portion of the proposed waterline will lie in a special flood hazard area (Zone A designation-areas of 100-year riverine flood) of Waikele Stream (Incl 1). The 100-year flood refers to a flood having a one percent chance of being equalled or exceeded in any given year. Public utilities, such as the proposed water system, should be constructed so as to minimize or eliminate flood damage within the flood-prone area, and to minimize or eliminate infiltration of flood waters into the system.

Since a portion of the proposed action involves construction in Waikele Stream, we recommend that the affected stream environment be described in Chapter 2 (Existing Environment), and that a checklist of aquatic fauna for Stream be added to Appendix D (Flora and Fauna Checklists). Furthermore, we recommend that the discussions of project impacts to water quality

(Chapter 4, page 4-2) and biology (page 4-6) be expanded to include specific construction and operational impacts such as turbidity, temporary blockage of stream flow, and disruption of habitat. Thank you for the opportunity to comment.

Sincerely,

B. R. Schlapak

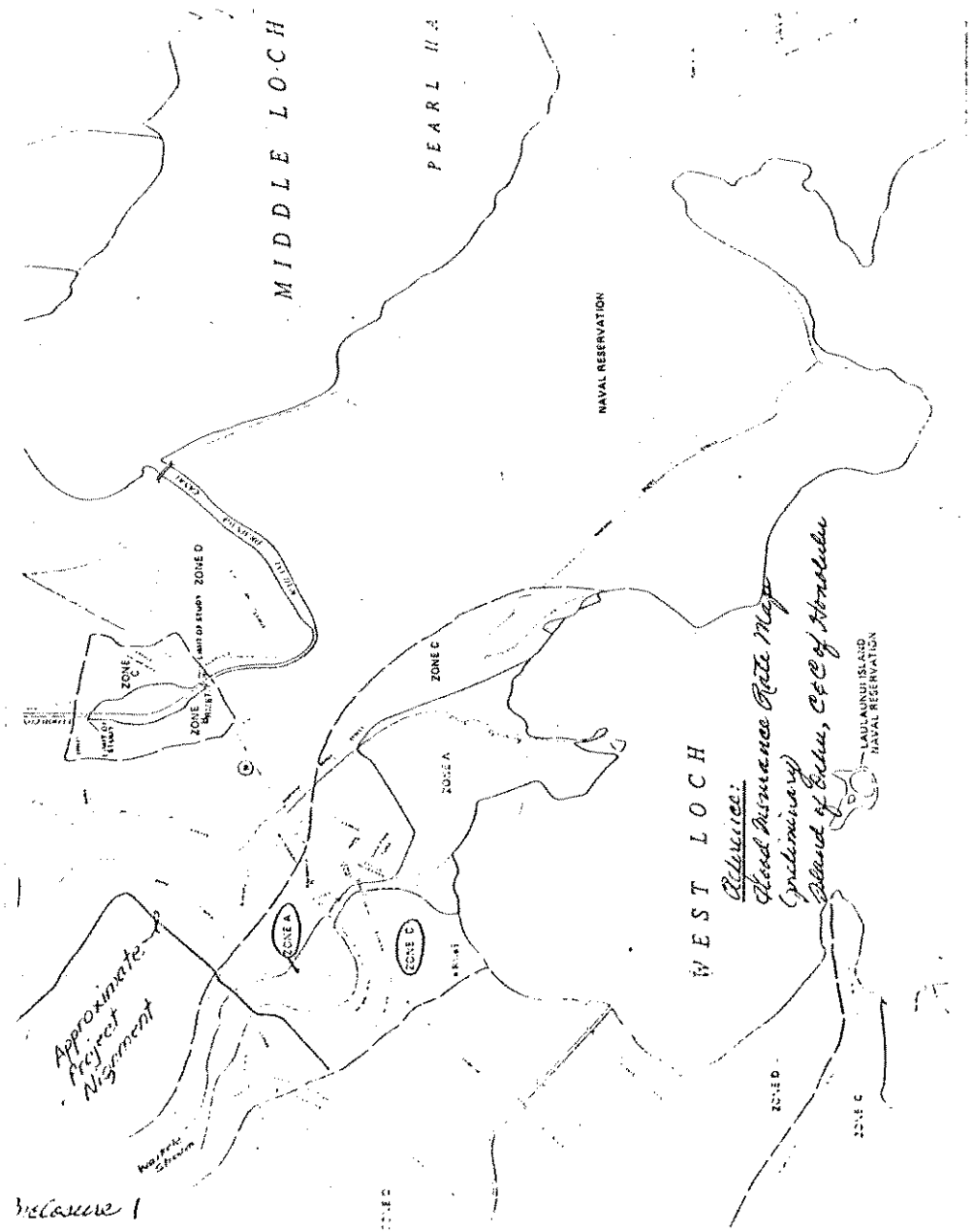
B. R. SCHLAPAK
Colonel, Corps of Engineer
District Engineer

1 Incl
As stated

Copy Furnished: w/incl
Mr. Kazu Hayashida
Manager and Chief Engineer
Board of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu, Hawaii 96843

EXPLANATION OF ZONE DESIGNATIONS

ZONE	EXPLANATION
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
AO	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined.
AH	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined.
A1-A30*	Areas of 100-year flood, base flood elevations and flood hazard factors determined.
A99	Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined.
B	Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Medium shading)
C	Areas of minimal flooding. (No shading)
D	Areas of undetermined, but possible, flood hazards.
V	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.
V1-V30*	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.
*	The numerals indicate the magnitude of difference between the 100-year and 10-year flood elevations. For numerals between 1-10, the difference is one half of the value; for values greater than 10, the difference is 10 less than the numerals shown. This information is used in establishing insurance rates.
—13—	100-year tsunami or riverine elevation line, with elevation in feet above mean sea level.
———	Zone boundary line



BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA
HONOLULU, HAWAII 96843

COPY

FRANK F. FASI, Mayor
YOSHIE H. FUJINAKA, Chairman
WAI QUON PANG, Vice Chairman
YOKICHI HIGASHIONNA
TERESITA R. JUBINSKY
WALLACE S. MIYAHIRA
ROBERT A. SOUZA
CLAUDE T. YAMAMOTO

April 10, 1980

KAZU HAYASHIDA
Manager and Chief Engineer

Colonel B. R. Schlapak
District Engineer
U. S. Army Engineer
District, Honolulu
Building 230
Ft. Shafter, Hawaii 96858

Dear Colonel Schlapak:

Subject: Your Letter of April 3, 1980 Commenting on the Environmental Impact Statement for Waipahu 16-Inch Water Main from Waikele Road to Waipahu Wells

Thank you for your comments on the EIS for our proposed waterline project.

We have the following replies to your letter:

1. *"The proposed action does not affect any U. S. Army Corps of Engineers project; however, the project does involve a crossing of Waikele Stream which may require a Department of the Army (DA) permit under Section 404 of the Clean Water Act and Section 10 of the River and Harbor Act of 1899. We recommend that the applicant submit details of the proposed stream crossing so that we can determine DA permit requirements."*

   We will submit construction plans of the proposed stream crossing for your determination of DA permit requirements. If permits are required, we will submit applications for them.

2. *"According to the flood insurance study for the island of Oahu, a portion of the proposed waterline will lie in a special flood hazard area (Zone A designation-areas of 100-year riverine flood) of Waikele Stream (Incl 1). The 100-year flood refers to a flood having a one percent chance of being equalled or exceeded in any given year. Public utilities, such as the proposed water system, should be constructed so as to minimize or eliminate flood damage within the flood-prone area, and to minimize or eliminate infiltration of flood waters into the system."*

   The proposed waterline will be designed and constructed to minimize or eliminate flood damage and infiltration of flood waters within the flood-prone area.

3. *"Since a portion of the proposed action involves construction in Waikele Stream, we recommend that the affected stream environment be described in Chapter 2 (Existing Environment), and that a checklist of aquatic fauna for Stream be added to Appendix D (Flora and Fauna Checklists). Furthermore, we recommend that the discussions of project impacts to water quality (Chapter 4, page 4-2) and biology (page 4-8) be expanded to include specific construction and operational impacts such as turbidity, temporary blockage of stream flow, and disruption of habitat."*

   The affected stream environment will be described in Chapter 2 (Existing Environment) and a checklist of aquatic fauna will be added to Appendix D (Flora and Fauna Checklists).

   Also, the discussions of project impacts to water quality (Chapter 4, page 4-2) and biology (page 4-6) will be expanded to include turbidity, temporary blockage of stream flow and disruption of habitat.

Should you have questions or require additional information, please call Lawrence Whang at 548-5221.

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

cc: Environment Impact Study Corp.

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

APZV-EHE-E

13 MAR 1980

Honorable Frank F. Fasi
Mayor of City and County of Honolulu
Honolulu Hale
Honolulu, Hawaii 96813

Dear Mayor Fasi:

The Environmental Impact Statement (EIS) for the Waipahu 16-Inch Water Main from Waikele Road to Waipahu Wells, Waipahu, Oahu, Hawaii has been reviewed and we have no comments to offer. No Army installations or activities will be adversely affected by the proposed project.

The EIS is returned in accordance with your request.

Sincerely,

Original signed by

PETER D. STEARNS
COL, EN
Director of Engineering and Housing

1 Incl
As stated

CF:
Board of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu, Hawaii 96843

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA
HONOLULU, HAWAII 96843

COPY

FRANK F. FASI, Mayor
YOSHIE H. FUJINAKA, Chairman
DAT QUON PANG, Vice Chairman
RYOKICHI HIGASHIONNA
TERESITA B. JUBINSKY
WALLACE S. MIYAHIRA
ROBERT A. SOUZA
CLAUDE T. YAMAMOTO

KAZU HAYASHIDA
Manager and Chief Engineer

March 24, 1980

Colonel Peter D. Stearns
Director of Engineering and Housing
Headquarters U. S. Army Support
Command Hawaii
Department of the Army
Fort Shafter, Hawaii 96858

Dear Colonel Stearns:

Subject: Your Letter of March 17, 1980, on the Environmental Impact Statement for the Waipahu 16-Inch Water Main from Waikele Road to Waipahu Wells

Thank you for your comments on our proposed waterline project. Your comments will be appended to the revised environmental document.

Should you have questions or require additional information, please call Lawrence Whang at 548-5221.

Very truly yours,

Kazu Hayashida

KAZU HAYASHIDA
Manager and Chief Engineer

cc: Mayor Frank F. Fasi
Stanley Shimabukuro & Assoc.

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

APRIL 1980

FRANK F. FASI, MAYOR
CITY & COUNTY OF HONOLULU
HONOLULU HALE
HONOLULU, HAWAII 96813

SUBJECT: WAIPAHU 16-INCH WATER MAIN

DEAR SIRS:
THANK YOU FOR LETTING US REVIEW THE ABOVE MENTIONED E.I.S.
WE HAVE NO COMMENT AT THIS TIME.
THIS REVIEW WAS DONE IN COORDINATION WITH THE SOUTH OAHU SOIL AND WATER CONSERVATION DISTRICT

SINCERELY

H. M. Gryde
DIST. CONSERVATIONIST
C.C. BOARD OF WATER SUPPLY

April 17, 1980

Mr. Otis M. Gryde
District Conservationist
Soil Conservation Service
U. S. Department of Agriculture
P. O. Box 50006
Honolulu, Hawaii 96850

Dear Mr. Gryde:

Subject: Your Letter of April 7, 1980, on the Environmental Impact Statement for the Waipahu 16-Inch Water Main from Waikele Road to Waipahu Wells

Thank you for your comments on our proposed waterline project. Your letter will be appended to the revised environmental document.

Should you have questions or require additional information, please call Lawrence Whang at 548-5221.

Very truly yours,

Kazu Hayashida

KAZU HAYASHIDA
Manager and Chief Engineer

cc: Stanley Shimabukuro & Associates

MHS:am
cc: K. Hayashida
L. Whang
80-1148B

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

April 4, 1980

Frank F. Fasi, Mayor
City and County of Honolulu
Honolulu Hale
Honolulu, Hawaii 96813

Re: EIS Review, Waipahu
16-Inch Water Main From
Waikele Road to Waipahu
Wells, Waipahu, Ewa, Oahu

Dear Sir:

We have reviewed the referenced Environmental Impact Statement to install 9,600 feet of 16-inch pipe, linking the existing Waipahu Wells to the existing 16-inch water main on Waipahu Street.

It appears that the proposed action will have little, if any, adverse impact on fish and wildlife resources for most of the pipeline alignment. We are concerned however, about potential habitat disruption by erosion for the entire project, and are more so where the pipeline crosses Waikele Stream.

We suggest that you carefully consider the methodology to be employed for the stream crossing, and address in the EIS aquatic resources that may be impacted by the project. If the U.S. Army Corps of Engineers determines that a Section 404 permit is needed for the crossing, we will evaluate that individual action during our normal review process. In any case, care should be exercised to minimize disturbances to the stream bottom and to control turbidity. We further recommend that all appropriate forms of erosion control be taken. For example, measures such as immediate revegetation after backfilling should curb silt loads in runoff waters.

Sincerely yours,

Original Signed by
Maurice H. Taylor

Maurice H. Taylor
Field Supervisor
Division of Ecological Services

CONSERVE AMERICA'S ENERGY

cc: Board of Water Supply

Save Energy and You Serve America!

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

April 14, 1980

Mr. Maurice H. Taylor
Division of Ecological Services
Fish and Wildlife Service
U. S. Department of the Interior
P. O. Box 50167
Honolulu, Hawaii 96850

Dear Mr. Taylor:

Subject: Your Letter of April 4, 1980, Commenting on the Environmental Impact Statement (EIS) for the 16-Inch Water Main From Waikele Road to Waipahu Wells

Thank you for your comments on the EIS for our proposed waterline project. Your letter will be appended to the revised EIS.

We will address the impacts that our project will have on aquatic resources and soil erosion. The project's impact on water quality and biology will also be expanded to include turbidity, temporary blockage of stream flow, and disruption of habitat.

Our construction plans will be submitted to the Corps of Engineers to determine if a Section 404 permit would be needed. We will apply for a permit if required.

Should you have questions or require additional information, please call Lawrence Whang at 548-5221.

Very truly yours,

Kazu Hayashida

KAZU HAYASHIDA
Manager and Chief Engineer

cc: Stanley Shimabukuro & Assoc.

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

IN REPLY REFER TO:
002A:ccm
Ser 623

17 MAR 1980

The Honorable Frank F. Fasi
Mayor of Honolulu
Honolulu Hale
Honolulu, Hawaii 96813

Dear Mayor Fasi:

Environmental Impact Statement for
Waipahu 16-inch Water Main
from Waikele Road to Waipahu Wells

The Environmental Impact Statement for the Waipahu 16-inch Water Main from Waikele Road to Waipahu Wells, forwarded by the State Environmental Quality Commission letter of 7 March 1980, has been reviewed and the Navy has no comments to offer. As requested by the Commission, the EIS is returned by copy of this letter.

The opportunity to review the EIS is appreciated.

Sincerely,

J. W. CARL
LIEUTENANT COMMANDER, CEC, USN
DEPUTY FACILITIES ENGINEER
BY DIRECTION OF THE COMMANDER

Copy to:
Board of Water Supply

Environmental Quality Commission
(w/EIS)

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA
HONOLULU, HAWAII 96843

COPY

FRANK F. FASI, Mayor
YOSHIE H. FUJINAKA, Chairman
DAT QUON PANG, Vice Chairman
RYOKICHI HIGASHIONNA
TERESITA R. JUBINSKY
WALLACE S. MIYAHIRA
ROBERT A. SOUZA
CLAUDE T. YAMAMOTO

KAZU HAYASHIDA
Manager and Chief Engineer

March 24, 1980

Lieutenant Commander J. W. Carl
Deputy Facilities Engineer
Headquarters, Naval Base
Pearl Harbor
Box 110
Pearl Harbor, Hawaii 96860

Dear Commander Carl:

Subject: Your Letter of March 17, 1980, on the Environmental Impact Statement for the Waipahu 16-Inch Water Main from Waikele Road to Waipahu Wells

Thank you for your comments on our proposed waterline project. Your comments will be appended to the revised environmental document.

Should you have questions or require additional information, please call Lawrence Whang at 548-5221.

Very truly yours,

Kazu Hayashida

KAZU HAYASHIDA
Manager and Chief Engineer

cc: Mayor Frank F. Fasi
Stanley Shimabukuro & Assoc.

GEORGE R. ARIYOSHI
GOVERNOR

RICHARD O'CONNELL
DIRECTOR

TELEPHONE NO
548-6915

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

April 3, 1980

Mr. Kazu Hayashida
Manager and Chief Engineer
Board of Water Supply
City and County of Honolulu
630 South Beretania Street
Honolulu, Hawaii 96843

Dear Mr. Hayashida,

SUBJECT: Environmental Impact Statement for Waipahu 16-Inch Water Main From Waikele Road to Waipahu Wells

We have reviewed the subject EIS and offer the following comments for your consideration:

PAGE 1-6

In addition to supplying Waipahu and Ewa-Waianae it should be noted that Pearl Harbor District water is also exported to the Honolulu Water District.

Population of the Pearl Harbor Water District has greatly increased since 1970. More recent population estimates for this area should be given.

PAGE 1-12

Do the consumption figures for the Pearl Harbor Water District include water that is transported out of the district to Honolulu, or do they represent demands only within the Pearl Harbor district? The 1970 population and consumption data given show the per capita consumption in the Pearl Harbor District was just 65 gallons per capita per day, an unrealistically low figure. What is the correct figure?

PAGE 1-13

How long will construction take? How many phases?

PAGE 4-2

How will 2-way traffic be maintained during construction when all of the affected roads have one lane of traffic in each direction? Does sufficient room exist for 2-way traffic to continue even with ongoing construction?

PAGE 4-4

How often will allowable noise levels be exceeded during construction? Hours of construction coincide with school hours. How long will construction of this section take? Will additional mitigation measures be taken to reduce distuption of school activities?

PAGE 4-10

A secondary impact that may occur as a result of this project is an increase of development in the Ewa, Waianae and Waipahu areas as a result of a more stable and flexible water system. The possibility of increasing withdrawls from the Waipahu Wells up to design capacity may also encourage growth to occur. Will the Pearl Harbor Water System be able to withstand withdrawals at the Waipahu Wells up to design capacity and still be able to supply high quality water to existing and proposed developments? These issues should be discussed in the EIS.

We thank you for the opportunity to review the subject EIS and look forward tothe revised statement.

Sincerely,

Richard L. O'Connell
Director

cc: Frank F. Fasi, Mayor
City & County of Honolulu

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA
HONOLULU, HAWAII 96843

COPY

FRANK F. FASI, Mayor
YOSHIE H. FUJINAKA, Chairman
DAT QUON PANG, Vice Chairman
RYOKICHI HIGASHIONNA
TERESITA R. JUBINSKY
WALLACE S. MIYAHIRA
ROBERT A. SOUZA
CLAUDE T. YAMAMOTO

KAZU HAYASHIDA
Manager and Chief Engineer

April 14, 1980

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

Dear Mr. O'Connell:

Subject: Your Letter of April 3, 1980
Commenting on the Environmental
Impact Statement (EIS) for
Waipahu 16-Inch Water Main From
Waikele Road to Waipahu Wells

Thank you for your comments on the EIS for our proposed waterline project.

We have the following replies to them:

PAGE 1-6

"In addition to supplying Waipahu and Ewa-Waianae it should be noted that Pearl Harbor District water is also exported to the Honolulu Water District."

The EIS will note that Pearl Harbor water is also exported to the Honolulu Water District.

"Population of the Pearl Harbor Water District has greatly increased since 1970. More recent population estimates for this area should be given."

The EIS will be revised to provide current population estimates.

PAGE 1-12

"Do the consumption figures for the Pearl Harbor Water District include water that is transported out of the district to Honolulu, or do they represent demands only within the Pearl Harbor district?"

The consumption figures for the Pearl Harbor Water District represent demands only within the Pearl Harbor district.

"The 1970 population and consumption data given show the per capita consumption in the Pearl Harbor District was just 65 gallons per capita per day, an unrealistically low figure. What is the correct figure?"

We do not serve the entire resident population within the Pearl Harbor District. Many of the military bases within the district have their own water system.

Also, in Table 1-2, the production rate for the Waipahu district is included with the Ewa-Waianae District figure. Therefore, during 1970, about 41,755 residents were served by us. The correct figure is 158 gallons per capita per day.

PAGE 1-13

"How long will construction take? How many phases?"

Construction will take approximately 4 to 5 months and be completed in one phase.

PAGE 4-2

"How will 2-way traffic be maintained during construction when all of the affected roads have one lane of traffic in each direction? Does sufficient room exist for 2-way traffic to continue even with ongoing construction?

Potential traffic problems exist for Waipahu Street and to a limited extent along Paiwa Street since one lane of traffic will be marked off during trenching activities.

COPY

However, to maintain two-way traffic as much as possible and minimize traffic problems, the contractor will: use "flag" men or policemen to direct traffic, limit the construction area by phasing the trenching activities, cover open trenches at the end of the workday and weekends, and stockpile material and equipment away from the construction site.

In addition, a traffic control plan will be formulated and incorporated into the final plans.

PAGE 4-4

"How often will allowable noise levels be exceeded during construction? Hours of construction coincide with school hours. How long will construction of this section take? Will additional mitigation measures be taken to reduce disruption of school activities?"

During construction, average noise levels will be increased when construction equipment is in use.

To reduce disruption of school activities, the contractor will try to schedule construction activity next to Waipahu Elementary School when classes are not in session and will keep his equipment in good working condition to minimize noise levels.

PAGE 4-10

"A secondary impact that may occur as a result of this project is an increase of development in the Ewa, Waianae, and Waipahu areas as a result of a more stable and flexible water system. The possibility of increasing withdrawals from the Waipahu Wells up to design capacity may also encourage growth to occur. Will the Pearl Harbor Water System be able to withstand withdrawals at the Waipahu Wells up to design capacity and still be able to supply high quality water to existing and proposed developments? These issues should be discussed in the EIS."

The State's designation of the Pearl Harbor Basin as a water control area will prevent any degradation of water quality to existing and proposed developments.

COPY

The EIS will be rewritten to address your concern about increased development in the Ewa, Waianae and Waipahu areas.

Should you have questions or require additional information, please call Lawrence Whang at 548-5221.

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

cc: Stanley S. Shimabukuro
and Associates

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA
HONOLULU, HAWAII 96843

COPY

FRANK F. FASI, Mayor
YOSHIE N. FUJINAKA, Chairman
DAT QUON PANG, Vice Chairman
RYOKICHI HIGASHIONNA
TERESITA R. JUBINSKY
WALLACE S. MIYAHIRA
ROBERT A. SOUZA
CLAUDE T. YAMAMOTO

KAZU HAYASHIDA
Manager and Chief Engineer

(P)1551.6

MAR 31 1980

Honorable Frank F. Fasi
Mayor
City and County of Honolulu
Honolulu Hale
Honolulu, Hawaii 96813

Dear Mayor Fasi:

Subject: Environmental Impact Statement for the 16-Inch Water Main from Waikele Road to Waipahu Wells

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

The project will not have any adverse environmental effect on any existing or planned facilities serviced by our department.

Respectfully,

HIDEO MURAKAMI
State Comptroller

MI:kew

June 2, 1980

Mr. Hideo Murakami
State Comptroller
Department of Accounting
and General Services
State of Hawaii
P. O. Box 119
Honolulu, Hawaii 96810

Dear Mr. Murakami:

Subject: Your Letter of March 31, 1980, on the Environmental Impact Statement (EIS) for the 16-Inch Water Main from Waikele Road to Waipahu Wells

Thank you for reviewing the EIS for our proposed project. Your letter will be appended to the revised environmental document.

Should you have questions or require additional information, please call Lawrence Whang at 548-5221.

Very truly yours,

Kazu Hayashida

KAZU HAYASHIDA
Manager and Chief Engineer

cc: Stanley Shimabukuro & Associates

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 14, 1980

MEMORANDUM

To: Mayor Frank F. Fasi
City and County of Honolulu

Subject: EIS for Waipahu 16-Inch Water Main from Waikele Road to Waipanu Wells

The Department of Agriculture has reviewed the subject environmental impact statement and has no comments to offer.

We appreciate the opportunity to comment.

for JOHN FARIAS, JR.
Chairman, Board of Agriculture

cc: Board of Water Supply

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

March 20, 1980

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

Dear Mr. Farias:

Subject: Your Letter of March 14, 1980
Commenting on the EIS for
Waipahu 16-Inch Water Main
From Waikele Road to
Waipahu Wells

Thank you for your comment on our proposed waterline project.

Should you have questions or require additional information, please call Lawrence Whang at 548-5221.

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

cc: Mayor Frank F. Fasi
Stanley Shimabukuro & Assoc.

State of Hawaii
DEPARTMENT OF DEFENSE
OFFICE OF THE ADJUTANT GENERAL
3949 Diamond Head Road
Honolulu, Hawaii 96816

18 MAR 1980

HIENG

Frank F. Fasi, Mayor
City and County of Honolulu
Honolulu Hale
Honolulu, Hawaii 96813

Dear Meyor Fasi:

Waipahu 16-Inch Water Main From
Waikele Road to Waipahu Wells

We have received a copy of the "Waipahu 16-Inch Water Main from Waikele Road to Waipahu Wells" Environmental Impact Statement from the State of Hawaii, Environmental Quality Commission and have no comments to offer at this time. The document is being forwarded to the Commission.

Yours truly,

signed

Wayne R. Tomoyasu
Major, CE, HARNG
Contr & Engr Officer

cc:
Board of Water Supply
City and County of Honolulu

CITY AND COUNTY OF HONOLULU

COPY

March 24, 1980

Major Wayne R. Tomoyasu
Contract and Engineering Officer
Department of Defense
State of Hawaii
3949 Diamond Head Road
Honolulu, Hawaii 96816

Dear Major Tomoyasu:

Subject: Your Letter of March 18, 1980, on the Environmental Impact Statement for the Waipahu 16-Inch Water Main from Waikele Road to Waipahu Wells

Thank you for your comments on our proposed waterline project. Your comments will be appended to the revised environmental document.

Should you have questions or require additional information, please call Lawrence Whang at 548-5221.

Very truly yours,

Kazu Hayashida

KAZU HAYASHIDA
Manager and Chief Engineer

cc: Mayor Frank F. Fasi
Stanley Shimabukuro & Assoc.

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

March 17, 1980

Mr. Frank F. Fasi, Mayor
City and County of Honolulu
Honolulu Hale
530 S. King Street
Honolulu, HI 96813

Dear Mr. Fasi:

SUBJECT: Environmental Impact Statement
Waipahu 16-inch Water Main from Waikele Road
to Waipahu Wells

This is in response to the subject EIS sent to us for review. Since the proposed alignment of the 16-inch water main runs in front of Waipahu Elementary School (Waipahu Street) and along its western boundary (Waikele Street), the following comments are suggested to minimize the hazards to the elementary age students and the interruption to classroom instructional activities.

1. If at all possible, schedule the construction to occur in the vicinity of the school during the summer months.

2. Coordinate the construction schedule with the principal of the school so that students walking to school, parents dropping off students in the morning and bus contractors can be alerted and advised to minimize potential hazards.

Any assistance rendered would be appreciated. Thank you for your cooperation in this matter.

Sincerely,

CHARLES G. CLARK
Superintendent

CGC:HL:jl

cc: Leeward District Office

AN EQUAL OPPORTUNITY EMPLOYER

COPY

March 31, 1980

Mr. Charles G. Clark
Superintendent
Department of Education
P. O. Box 2360
Honolulu, Hawaii 96804

Dear Mr. Clark:

Subject: Your Letter of March 17, 1980, on the Environmental Impact Statement for the Waipahu 16-Inch Water Main from Waikele Road to Waipahu Wells

Thank you for your comments on our proposed waterline project.

We will make every effort to confine construction near the school areas to the summer months, and the construction schedule will be coordinated with the school's principal.

Should you have questions or require additional information, please call Lawrence Whang at 548-5221.

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

cc: Environment Impact Study Corp.

GEORGE R. ARIYOSHI
GOVERNOR OF HAWAII

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

April 2, 1980

GEORGE A. L. YUEN
DIRECTOR OF HEALTH

VERNE C. WAITE, M.D.
DEPUTY DIRECTOR OF HEALTH

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

JAMES S. KUMAGAI, PH.D., P.E.
DEPUTY DIRECTOR OF HEALTH

TADAO BEPPU
DEPUTY DIRECTOR OF HEALTH

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

MEMORANDUM

To: Mr. Kazu Hayashida, Manager & Chief Engineer
Board of Water Supply

From: Deputy Director for Environmental Health

Subject: Environmental Impact Statement (EIS) for Waipahu 16-Inch Water Main from Waikele Road to Waipahu Wells, Waipahu, Ewa, Oahu

Thank you for the opportunity of reviewing the subject document as this proposal may have an impact on water quality. It is our understanding that the primary purpose of the project will be "to insure continuity of flow by having parallel mains between Waipahu Wells and the Ewa-Waianae System." The improvements will accomplish the following:

"1. Provide greater flexibility in the distribution system to the Waipahu area and the Ewa-Waianae system;

"2. Provide fire protection for some properties in Waipahu via the distribution system; and

"3. Permit utilization of the design capacity of the Waipahu Well field (if allowed by the State Board of Land and Natural Resources in the future)."

The completed transmission system will enable westward movement of water from the Waipahu Wells to the Ewa-Waianae system. In addition, the project includes an interconnection with the Crestview 395 system allowing water from that system to enter the Waipahu-Ewa-Waianae systems.

We find the westward movement of water from the Waipahu Wells in the Pearl Harbor area to the Ewa-Waianae system to be in possible conflict with written assurances by the Board of Water Supply to the Department that water export from the Pearl Harbor Basin would be relieved through development of water in the Makaha-Waianae area. Additionally, this project would provide the capability of actually increasing the export of water from the Pearl Harbor Aquifer bringing it into direct opposition to Priority Recommendation No. 2 of the State Water Commission. This recommendation was made by the Commission in its report, Hawaii's Water Resources: Directions for the Future, completed in 1979 and which called for a moratorium on the increase of water export from the Pearl Harbor area.

In view of the recent designation of the Pearl Harbor area as a ground water control area, all proposals to further expedite the export of water from the Pearl Harbor Basin should be based on a substantial or critical need to meet existing demands. A substantial or critical need for additional flexibility in the Waipahu-Ewa-Waianae system was clearly not established in the environmental impact statement.

We recommend that the Board of Water Supply review alternative means of meeting the objectives set down in the subject environmental impact statement. We note that one alternative not addressed in the impact statement was the development of water outside the Pearl Harbor Basin to fulfill the "continuity of flow" objective. An alternative to meet the fire protection objective could be developed separately. Finally, we believe the question of maximum utilization of the Waipahu Well field should not be addressed until the Board of Land and Natural Resources has approved a proposal to allow increased pumpages from the field.

We believe the critical situation in the Pearl Harbor Basin and its impact on water quality dictates the utmost caution in protecting the quality of domestic water in that area.

Thank you again for this opportunity to present our views.

Melvin K. Kozumi
MELVIN K. KOIZUMI

cc: Office of Environmental Quality Control
Mayor Fasi

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA
HONOLULU, HAWAII 96843

COPY

FRANK F. FASI, Mayor
YOSHIE H. FUJINAKA, Chairman
DAT QUON PANG, Vice Chairman
HYOKICHI HIGASHIONNA
TERESITA B. JUBINSKY
WALLACE S. MIYAHIRA
ROBERT A. SOUZA
CLAUDE T. YAMAMOTO

KAZU HAYASHIDA
Manager and Chief Engineer

April 21, 1980

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

Dear Mr. Koizumi:

Subject: Your Letter of April 2, 1980, Commenting on the Environmental Impact Statement (EIS) for Waipahu 16-Inch Water Main From Waikele Road to Waipahu Wells

Thank you for your comments on the EIS for our proposed waterline project:

We have the following replies to your letter:

1. "We find the westward movement of water from Waipahu Wells in the Pearl Harbor area to the Ewa-Waianae system to be in possible conflict with written assurances by the Board of Water Supply to the Department that water export from the Pearl Harbor Basin would be relieved through development of water in the Makaha-Waianae area. Additionally, this project would provide the capability of actually increasing the export of water from the Pearl Harbor Aquifer bringing it into direct opposition to Priority Recommendation No. 2 of the State Water Commission. This recommendation was made by the Commission in its report, Hawaii's Water Resources: Direction for the Future, completed in 1979 and which called for a moratorium on the increase of water export from the Pearl Harbor area."

The Board of Water Supply is developing sources in the Makaha-Waianae area to serve the Ewa-Waianae system. However, it will take between three to five years before the sources can become productive. The new sources will stabilize export into the area from the Pearl Harbor Basin.

The proposed 16-inch waterline will insure that the Ewa-Waianae area will have an adequate supply of water. Though the proposed project will allow an increase in pumpage from the Waipahu Wells, we will comply with the overall pumpage allocation specified by the Department of Land and Natural Resources (DLNR).

2. "In view of the recent designation of the Pearl Harbor area as a ground water control area, all proposals to further expedite the export of water from the Pearl Harbor Basin should be based on a substantial or critical need to meet existing demands. A substantial or critical need or additional flexibility in the Waipahu-Ewa-Waianae system was clearly not established in the environmental impact statement."

Section III B. Existing Transmission System of the EIS will be rewritten to include a description of the existing major transmission mains from Waipahu Wells to Kunia Wells I which will show the critical need for a parallel main.

3. "We recommend that the Board of Water Supply review alternative means of meeting the objectives set down in the subject environmental impact statement. We note that one alternative not addressed in the impact statement was the development of water outside the Pearl Harbor Basin to fulfill the 'continuity of flow' objective. An alternative to meet the fire protection objective could be developed separately."

The alternative of developing sources outside of the Pearl Harbor Basin to fulfill the 'continuity of flow' objective will be addressed in the EIS.

An alternative to meet the fire protection objective will also be included in the EIS.

4. "Finally, we believe the question of maximum utilization of the Waipahu Well field should not be addressed until the Board of Land and Natural Resources has approved a proposal to allow increased pumpage from the field."

Before DLNR's designation of the Pearl Harbor Basin, the objective of the project was to fully utilize the pumping capacity of Waipahu Wells to meet increasing demands.

Because the Pearl Harbor Basin is now a water control area, the pumpage from the well field will be restricted. However, should an emergency arise where an increase in pumpage westward would be permitted, the transmission main would be available.

Should you have questions or require additional information, please call Lawrence Whang at 548-5221.

Very truly yours,

Kazu Hayashida

KAZU HAYASHIDA
Manager and Chief Engineer

cc: Office of Environmental
Quality Control
Stanley S. Shimabukuro & Assoc.

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

April 1, 1980

REF. NO.: APO-1490

Honorable Frank F. Fasi
City and County of Honolulu
Honolulu, Hawaii 96813

Dear Sir:

We have reviewed the Environmental Impact Statement for a 16 inch water main from Waikele Road to Waipahu Wells. We have no comments to offer on this project.

Very truly yours,

SUSUMU ONO, Chairman
Board of Land and Natural Resources

cc: Board of Water Supply
Environmental Quality Comm.

April 10, 1980

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

Dear Mr. Ono:

Subject: Your Letter of April 1, 1980 on the Environmental Impact Statement for the Waipahu 16-Inch Water Main from Waikele Road to Waipahu Wells

Thank you for your comments on our proposed waterline project. Your letter will be appended to the revised environmental document.

Should you have questions or require additional information, please call Lawrence Whang at 548-5221.

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

cc: Honorable Frank F. Fasi, Mayor
Stanley Shimabukuro & Associates

MHS:pvk
cc: K. Hayashida
L. Whang

80-1099

STATE OF HAWAII
DEPARTMENT OF PLANNING
ECONOMIC DEVELOPMENT
P. O. Box 2359
Honolulu, Hawaii 96804

April 7, 1980

Ref. No. 0977

The Honorable Frank F. Fasi
Mayor
City and County of Honolulu
Honolulu Hale
Honolulu, Hawaii 96813

Dear Mayor Fasi:

SUBJECT: Waipahu 16-Inch Water Main from Waikele Road to Waipahu Wells EIS - Waipahu, Ewa, Oahu

We have reviewed the environmental impact statement for the subject project and have the following comments for your consideration.

One of the three project objectives, as stated on pages 1-1 and 1-6 is to "permit utilization of the design capacity of the Waipahu Well field (if allowed by the State Board of Land and Natural Resources in the future)." In view of the increasing demands placed on water resources in the Pearl Harbor and Ewa Districts, we believe that the EIS document should address whether the project can still be justified if the Board of Land and Natural Resources decides not to certify pumpage at the design capacity in the future. We note that the DLNR Regulation No. 9 was adopted because of serious concerns regarding the sustainable capacity of existing water sources.

Thank you for the opportunity to review this statement.

Sincerely,

Hideto Kono

cc: Board of Water Supply
City and County of Honolulu

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA
HONOLULU, HAWAII 96843

COPY

FRANK F. FASI, Mayor
YOSHIE H. FUJINAKA, Chairman
DAT QUON PANG, Vice Chairman
RYOKICHI HIGASHIONNA
TERESITA R. JUBINSKY
WALLACE S. MIYAHIRA
ROBERT A. SOUZA
CLAUDE T. YAMAMOTO

KAZU HAYASHIDA
Manager and Chief Engineer

April 21, 1980

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

Dear Mr. Kono:

Subject: Your Letter of April 7, 1980, Commenting on the Environmental Impact Statement (EIS) for Waipahu 16-Inch Water Main From Waikele Road to Waipahu Wells

Thank you for your comments on the EIS for our proposed waterline project.

The project is justified because the proposed waterline would serve as a "back-up" main for Waipahu town and would provide us with the capability to serve the Ewa-Waianae area. Despite the State action, we still have to maintain the flexibility to shift pumpage from one well station to another. This waterline will give us that flexibility.

Should you have questions or require additional information, please call Lawrence Whang at 548-5221.

Very truly yours,

Kazu Hayashida

KAZU HAYASHIDA
Manager and Chief Engineer

cc: Office of Environmental Quality Control
Stanley S. Shimabukuro & Assoc., Inc.

Pure Water...man's greatest need – use it wisely

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
DEPUTY EXECUTIVE DIRECTOR

IN REPLY REFER

April 2, 1980

TO: 4-105/737

The Honorable Frank F. Fasi
Mayor, City & County of Honolulu
Honolulu Hale
Honolulu, Hawaii 96813

Dear Mayor Fasi:

SUBJECT: Environmental Impact Statement (EIS) Review

Title: Waipahu 16-inch Water Main from Waikele Road to Waipahu Wells

Location: Waipahu, Ewa, Oahu

Classification: Agency Action

The Hawaii Housing Authority has reviewed the subject EIS and has no comments relative to the proposed action.

Thank you for allowing us to comment on this matter.

Sincerely,

FRANKLIN Y. K. SUNN
Executive Director

cc: Department of Social Services and Housing
Board of Water Supply

April 10, 1980

Mr. Franklin Y. K. Sunn
Executive Director
Hawaii Housing Authority
P. O. Box 17907
Honolulu, Hawaii 96817

Dear Mr. Sunn:

Subject: Your Letter of April 2, 1980, on the Environmental Impact Statement for the Waipahu 16-Inch Water Main From Waikele Road to Waipahu Wells

Thank you for your comments on our proposed waterline project. Your letter will be appended to the revised environmental document.

Should you have questions or require additional information, please call Lawrence Whang at 548-5221.

Very truly yours,

KAZU HAYASHIDA
Manager and Chief Engineer

cc: Honorable Frank F. Fasi, Mayor
Stanley Shimabukuro & Assoc.

MHS:vc
cc: K. Hayashida
Engineering
L. Whang

80-1110

April 2, 1980 STP 8.6145

The Honorable Frank F. Fasi
Mayor
City and County of Honolulu
Honolulu Hale
Honolulu, Hawaii 96813

Dear Mayor Fasi:

Subject: Environmental Impact Statement
Waipahu 16-Inch Water Main from
Waikele Road to Waipahu Wells

Thank you for giving us the opportunity to review and comment on the above-captioned statement. We have no substantive comments to offer which could improve the document.

Very truly yours,

/s/ Jonathan K. Shimada

Ryokichi Higashionna
Director of Transportation

ALK:jk

cc: Board of Water Supply
HWY-P

April 17, 1980

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

Dear Dr. Higashionna:

Subject: Your Letter of April 2, 1980, on
the Environmental Impact Statement
for the Waipahu 16-Inch Water Main
From Waikele Road to Waipahu Wells

Thank you for your comments on our proposed waterline project. Your letter will be appended to the revised environmental document.

Should you have questions or require additional information, please call Lawrence Whang at 548-5221.

Very truly yours,

Kazu Hayashida

KAZU HAYASHIDA
Manager and Chief Engineer

cc: Stanley Shimabukuro & Assoc.

MHS:vc
cc: K. Hayashida
L. Whang

80-1204

University of Hawaii at Manoa

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

Office of the Director

March 26, 1980

RE:U304

Mr. Frank F. Fasi, Mayor
City and County of Honolulu
Honolulu Hale
Honolulu, Hawaii 96813

Dear Mr. Fasi:

Draft Environmental Impact Statement
Waipahu 16-Inch Water Main From Waikele
Road to Waipahu Wells
Waipahu, Ewa, Oahu

The Environmental Center has reviewed the above cited document and we feel that it adequately addresses the potential environmental impacts associated with the project.

Thank you for the opportunity to review this document.

Sincerely

Doak C. Cox

Doak C. Cox
Director

DCC/dh

cc: ✓Board of Water Supply
John Sorensen

AN EQUAL OPPORTUNITY EMPLOYER

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

April 7, 1980

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

Dear Dr. Cox:

Subject: Your Letter of March 26, 1980 on the Draft Environmental Impact Statement for Waipahu 16-Inch Water Main from Waikele Road to Waipahu Wells

Thank you for reviewing the EIS for our proposed waterline project.

Your comment will be appended to the revised environmental document.

Should you have questions or require additional information, please call Lawrence Whang at 548-5221.

Very truly yours,

Kazu Hayashida

KAZU HAYASHIDA
Manager and Chief Engineer

cc: Environmental Impact Study Corp.

DEPARTMENT OF GENERAL PLANNING
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

DGP3/80-717(CT)

March 27, 1980

MEMORANDUM

TO : MR. TYRONE T. KUSAO, DIRECTOR
DEPARTMENT OF LAND UTILIZATION

FROM : GEORGE S. MORIGUCHI, CHIEF PLANNING OFFICER

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT - WAIPAHU 16-INCH MAIN FROM WAIKELE ROAD TO WAIPAHU WELLS, MARCH 1980

We have reviewed this impact statement and have the following comments.

Need for the Project - It is indicated that "The primary purpose of the proposed project is to insure continuity of flow by having parallel mains between Waipahu Wells and the Ewa-Waianae system" (p. 1-1).

Since this $1.5 million project is to provide a duplicate or back-up main, the impact statement should indicate what flow problems presently exist, or what residential areas are likely to be affected in the event the existing 16-inch line is broken. The EIS should indicate when flow in the existing line was last interrupted and the expected frequency of such occurrences.

Existing System - The existing transmission system is described in Section 1.B (pp. 1-8 to 1-10). A map of the existing system would permit a reader to get a better understanding of the proposed project in relation to the overall system and, later, enable a reader to evaluate the various alternatives.

Well Field Capacity - It is indicated that the proposed project will "permit utilization of the design capacity of the Waipahu Well field (if allowed by the Board of Land and Natural Resources in the future)" (p. S-1). Later it is indicated that "Each well will now be certified by DLNR to pump a given amount, based on the average of the last five years of pumpage from that well" (p. 1-11).

The EIS should indicate what is presently being pumped, what will be allowed by DLNR, and what additional flow would result if BWS is permitted to pump at design capacity.

Soils - Soil types are indicated and mapped (Section 2.F, pp. 2-29 to 2-31). Several of the soil types are rated as having severe erosion hazards. A portion of the proposed 16-inch main will traverse an area of such soil (HLMG, Helemano silty clay) near Waikele Road.

The EIS does not indicate whether this will present a problem during construction or after.

Fire Protection - It is indicated that the proposed project will "provide fire protection for some properties in Waipahu, via the distribution system" (p. 5-3).

The EIS should indicate what properties in Waipahu presently do not have adequate fire protection and which will benefit from the proposed project.

Alternatives

1. It is indicated that "A no action alternative would mean continuing operation of a water system that impedes some flow from Waipahu Wells to the Ewa-Waianae system, thereby preventing optimum water distribution to the Ewa area. The present system also lacks flexibility in delivery to certain areas of Waipahu" (Section 6.I, p. 6-1).

   The EIS does not indicate what flow from the Waipahu Wells presently goes to the Ewa-Waianae system, and what additional flow is projected under the long-range plan. The EIS should indicate specifically where flexibility in delivery of water is lacking in Waipahu at the present time, and why such flexibility is necessary.

2. The EIS indicates that rescheduling the project "would delay delivery of water to areas where there is existing demand" (Section 6.II, p. 6-1).

   The EIS should indicate specifically where these areas are, and the unmet existing demand from each of the specific areas.

3. Alignments 2 and 3 are rejected because they are "more indirect and would thus be more expensive" (Section 6.B and 6.C, p. 6-2). It is indicated that Alignment 2 is approximately the same length as the preferred alignment, and

Alignment 3 is about 200 feet longer than the 9,600 feet long preferred alignment.

If length is the major criterion in cost, a 200/9,600 or 2 percent differential would amount to about $30,000 for a $1.5 million project. This is less than the usual allowance for contingencies. Topography, soils, and the relationship to the rest of the distribution system or to existing or future service areas are not considered in the EIS. Discussion of these should be included.

GEORGE S. MORIGUCHI
Chief Planning Officer

GSM:fmt

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA
HONOLULU, HAWAII 96843

COPY

FRANK F. FASI, Mayor
YOSHIE H. FUJINAKA, Chairman
DAT QUON PANG, Vice Chairman
RYOKICHI HIGASHIONNA
TERESITA R. JUBINSKY
WALLACE S. MIYAHIRA
ROBERT A. SOUZA
CLAUDE T. YAMAMOTO

KAZU HAYASHIDA
Manager and Chief Engineer

May 6, 1980

TO : MR. GEORGE S. MORIGUCHI
CHIEF PLANNING OFFICER
DEPARTMENT OF GENERAL PLANNING

FROM : KAZU HAYASHIDA
BOARD OF WATER SUPPLY

SUBJECT: YOUR LETTER OF MARCH 27, 1980, COMMENTING ON THE ENVIRONMENTAL IMPACT STATEMENT (EIS) FOR WAIPAHU 16-INCH MAIN FROM WAIKELE ROAD TO WAIPAHU WELLS

Thank you for your comments on the EIS for our proposed waterline project.

We offer the following reply to your comments:

Need for the Project - "It is indicated that 'The primary purpose of the proposed project is to insure continuity of flow by having parallel mains between Waipahu Wells and the Ewa-Waianae system' (p. 1-1).

Since this $1.5 million project is to provide a duplicate or back-up main, the impact statement should indicate what flow problems presently exist, or what residential areas are likely to be affected in the event the existing 16-inch line is broken. The EIS should indicate when flow in the existing line was last interrupted and the expected frequency of such occurrences."

The primary objective is to interconnect Waipahu Wells with Ewa-Waianae system. The secondary objective is to strengthen our distribution system in the area affected.

The residential area mauka of Waipahu Street, between Pilimoi and Awamoi Streets, is connected to the existing 16-inch main and may have its fire protection affected if the 16-inch main breaks. Its domestic service, however, will not be affected because the residential area is looped with the existing 8-inch main on Waipahu Street.

The existing 16-inch main is about ten years old.

Fire Protection - "It is indicated that the proposed project will 'provide fire protection for some properties in Waipahu, via the distribution system' (p. 5-3).

The EIS should indicate what properties in Waipahu presently do not have adequate fire protection and which will benefit from the proposed project."

The EIS will be revised to indicate that the residential area mauka of the Waipahu Sugar Mill presently have inadequate private fire protection and would require adequate fire protection when the proposed Jack Hall Housing development is constructed.

Alternatives

1. "It is indicated that 'A no action alternative would mean continuing operation of a water system that impedes some flow from Waipahu Wells to the Ewa-Waianae system, thereby preventing optimum water distribution to the Ewa area. The present system also lacks flexibility in delivery to certain areas of Waipahu' (Section 6.I, p. 6-1).

   The EIS does not indicate what flow from the Waipahu Wells presently goes to the Ewa-Waianae system, and what additional flow is projected under the long-range plan. The EIS should indicate specifically where flexibility in delivery of water is lacking in Waipahu at the present time, and why such flexibility is necessary."

The EIS will indicate that:

a. approximately 1.0 mgd is presently being transported to Ewa-Waianae from Waipahu Wells.

b. the long-range plan before the State's designation of Pearl Harbor was to transport approximately 3.0 mgd from Waipahu Wells to Ewa-Waianae via the proposed 16-inch main.

c. the proposed 16-inch main will provide the necessary flexibility, that is presently lacking, to continue delivery of water from Waipahu Wells to Waipahu town.

2. "The EIS indicates that rescheduling the project 'would delay delivery of water to areas where there is existing demand' (Section 6.II, p. 6-1).

   The EIS should indicate specifically where these areas are, and the unmet existing demand from each of the specific areas."

   The projected water demands for each of the specific areas are:

Year	*Ewa-Waianae District*	*Pearl Harbor District*
1980	*18.4 mgd*	*15.0 mgd*
1985	*23.9 mgd*	*16.6 mgd*
1990	*29.9 mgd*	*18.0 mgd*
1995	*36.4 mgd*	*19.7 mgd*
2000	*43.9 mgd*	*22.0 mgd*

   This table will be included in the EIS.

3. "Alignments 2 and 3 are rejected because they are 'more indirect and would thus be more expensive' (Section 6.B and 6.C, p. 6-2). It is indicated that Alignment 2 is approximately the same length as the preferred alignment, and Alignment 3 is about 200 feet longer than the 9,600 foot long preferred alignment.

If length is the major criterion in cost, a 200/9,600 or 2 percent differential would amount to about $30,000 for a $1.5 million project. This is less than the usual allowance for contingencies. Topography, soils, and the relationship to the rest of the distribution system or to existing or future service areas are not considered in the EIS. Discussion of these should be included."

Topography, soils, and the relationship to the rest of the distribution system or to existing or future service areas of Alignments 2 and 3 were not considered in the EIS because the data would be identical with the data of the proposed alignment. The EIS, however, will be rewritten to address these areas.

Length of pipe was, therefore, the criteria upon which the proposed alignment was based even if the cost differential was less than that allowed for contingencies.

Existing System - "The existing transmission system is described in Section 1.B (pp. 1-8 to 1-10). A map of the existing system would permit a reader to get a better understanding of the proposed project in relation to the overall system and, later, enable a reader to evaluate the various alternatives."

A map of the existing Waipahu system will be included in the environmental document.

Well Field Capacity - "It is indicated that the proposed project will 'permit utilization of the design capacity of the Waipahu Well field (if allowed by the Board of Land and Natural Resources in the future)' (p. S-1). Later it is indicated that 'Each well will now be certified by DLNR to pump a given amount, based on the average of the last five years of pumpage from that well' (p. 1-11).

The EIS should indicate what is presently being pumped, what will be allowed by DLNR, and what additional flow would result if BWS is permitted to pump at design capacity."

Waipahu Wells presently produces about 4.88 mgd which is slightly less than the DLNR allotted pumpage of 4.89 mgd. An additional 5.92 mgd could be produced if DLNR permits BWS to pump at design capacity (10.8 mgd).

These pumpage figures will be included in the revised EIS.

Soils - "Soil types are indicated and mapped (Section 2.F, pp. 2-29 to 2-31). Several of the soil types are rated as having severe erosion hazards. A portion of the proposed 16-inch main will traverse an area of such soil (HLMG, Helemano silty clay) near Waikele Road.

The EIS does not indicate whether this will present a problem during construction or after."

The EIS will indicate that the proposed 16-inch main will traverse an area of Helemano silty clay. However, we do not anticipate any problems during or after construction.

Should you have questions or require additional information, please call Lawrence Whang at 548-5221.

Kazu Hayashida

KAZU HAYASHIDA
Manager and Chief Engineer

cc: Office of Environmental Quality Control
Stanley S. Shimabukuro & Assoc., Inc.

DEPARTMENT OF HOUSING AND COMMUNITY DEVELOPMENT

CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET
HONOLULU, HAWAII 96813
PHONE 523-4181

FRANK F. FASI
MAYOR

EDWARD Y. HIRATA
MANAGING DIRECTOR

BARRY CHUNG
DIRECTOR

MYRA KASAKI
DEPUTY DIRECTOR

April 7, 1980

Honorable Frank F. Fasi, Mayor
City and County of Honolulu
Honolulu Hale
Honolulu, Hawaii 96813

Dear Mayor Fasi:

Subject: Waipahu 16-Inch Water Main From Waikele Road to Waipahu Wells Environmental Impact Statement

We have reviewed the Environmental Impact Statement for the installation of the 16-inch water main from the Waipahu Wells to Waikele Road and have no comment.

Very truly yours,

Barry Chung

Barry Chung

cc: Board of Water Supply
Environmental Quality Commission

April 9, 1980

TO : MR. BARRY CHUNG
DIRECTOR
DEPT. OF HOUSING AND COMMUNITY DEVELOPMENT

FROM : KAZU HAYASHIDA
BOARD OF WATER SUPPLY

SUBJECT: YOUR LETTER OF APRIL 7, 1980 ON THE ENVIRONMENTAL IMPACT STATEMENT FOR THE WAIPAHU 16-INCH WATER MAIN FROM WAIKELE ROAD TO WAIPAHU WELLS

Thank you for your comments on our proposed waterline project. Your letter will be appended to the revised environmental document.

Should you have questions or require additional information, please call Lawrence Whang at 548-5221.

Kazu Hayashida

KAZU HAYASHIDA
Manager and Chief Engineer

cc: Frank F. Fasi, Mayor
Stanley Shimabukuro & Associates

MHS:pvk
cc: K. Hayashida
L. Whang

80-1078

DEPARTMENT OF LAND UTILIZATION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813 • (808) 523-4411

FRANK F. FASI
MAYOR

TYRONE T. KUSAO
DIRECTOR

80/EC-9(SE)

April 1, 1980

MEMORANDUM

TO : KAZU HAYASHIDA, MANAGER & CHIEF ENGINEER
BOARD OF WATER SUPPLY

FROM : TYRONE T. KUSAO, DIRECTOR

SUBJECT : DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR WAIPAHU 16-INCH WATER MAIN FROM WAIKELE ROAD TO WAIPAHU WELLS

We have reviewed the above draft Environmental Impact Statement, and believe the document is well written. It adequately identifies and discusses the full range of impacts associated with the project.

TYRONE T. KUSAO
Director of Land Utilization

TTK:sl

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

April 3, 1980

TO : MR. TYRONE T. KUSAO
DIRECTOR
DEPARTMENT OF LAND UTILIZATION

FROM : KAZU HAYASHIDA
BOARD OF WATER SUPPLY

SUBJECT: YOUR LETTER OF APRIL 1, 1980 ON THE ENVIRONMENTAL IMPACT STATEMENT FOR WAIPAHU 16-INCH WATER MAIN FROM WAIKELE ROAD TO WAIPAHU WELLS

Thank you for your comments on our proposed water main project.

Should you have questions or require additional information, please call Lawrence Whang at 548-5221.

KAZU HAYASHIDA
Manager and Chief Engineer

cc: Stanley Shimabukuro & Associates

DEPARTMENT OF PARKS AND RECREATION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

RAMON DURAN
DIRECTOR

March 28, 1980

MEMORANDUM

TO : TYRONE T. KUSAO, DIRECTOR
DEPARTMENT OF LAND UTILIZATION

FROM : RAMON DURAN, DIRECTOR

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT
WAIPAHU 16-INCH WATER MAIN FROM
WAIKELE ROAD TO WAIPAHU WELLS

We have no comments on the EIS for improvements to the Waipahu water main.

Warm regards.

Ramon Duran

RAMON DURAN, Director

RD:sn

cc: Board of Water Supply

April 17, 1980

TO : MR. RAMON DURAN
DIRECTOR
DEPARTMENT OF PARKS AND RECREATION

FROM : KAZU HAYASHIDA
BOARD OF WATER SUPPLY

SUBJECT: YOUR LETTER OF MARCH 28, 1980, ON THE ENVIRONMENTAL IMPACT STATEMENT FOR THE WAIPAHU 16-INCH WATER MAIN FROM WAIKELE ROAD TO WAIPAHU WELLS

Thank you for your comments on our proposed waterline project. Your letter will be appended to the revised environmental document.

Should you have questions or require additional information, please call Lawrence Whang at 548-5221.

Kazu Hayashida

KAZU HAYASHIDA
Manager and Chief Engineer

cc: Stanley Shimabukuro & Assoc.

MHS:vc
cc: K. Hayashida
L. Whang

80-9?7

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

WALLACE MIYAHIRA
DIRECTOR AND CHIEF ENGINEER

ENV 80-79

March 17, 1980

MEMORANDUM

TO : HONORABLE FRANK F. FASI, MAYOR
CITY AND COUNTY OF HONOLULU

FROM : WALLACE MIYAHIRA, DIRECTOR AND CHIEF ENGINEER

SUBJECT: EIS FOR WAIPAHU 16-INCH WATER MAIN
FROM WAIKELE ROAD TO WAIPAHU WELLS

We have reviewed the subject EIS and have the following comment.

1. Construction plans should be coordinated with our Divisions of Engineering and Wastewater Management.

WALLACE MIYAHIRA
Director and Chief Engineer

cc: Board of Water Supply

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA
HONOLULU, HAWAII 96843

COPY

FRANK F. FASI, Mayor
YOSHIE H. FUJINAKA, Chairman
DAT QUON PANG, Vice Chairman
RYOKICHI HIGASHIONNA
TERESITA R. JUBINSKY
WALLACE S. MIYAHIRA
ROBERT A. SOUZA
CLAUDE T. YAMAMOTO

KAZU HAYASHIDA
Manager and Chief Engineer

March 24, 1980

TO : MR. WALLACE MIYAHIRA
DIRECTOR AND CHIEF ENGINEER
DEPARTMENT OF PUBLIC WORKS

FROM : KAZU HAYASHIDA
BOARD OF WATER SUPPLY

SUBJECT: YOUR LETTER OF MARCH 17, 1980, ON THE ENVIRONMENTAL IMPACT STATEMENT FOR WAIPAHU 16-INCH WATER MAIN FROM WAIKELE ROAD TO WAIPAHU WELLS

Thank you for your comment on our proposed waterline project.

The construction plans will be coordinated with your Divisions of Engineering and Wastewater Management.

Should you have questions or require additional information, please call Lawrence Whang at 548-5221.

KAZU HAYASHIDA
Manager and Chief Engineer

cc: Mayor Frank F. Fasi
Stanley Shimabukuro & Assoc.

Pure Water...man's greatest need – use it wisely

DEPARTMENT OF TRANSPORTATION SERVICES
CITY AND COUNTY OF HONOLULU
HONOLULU MUNICIPAL BUILDING
650 SOUTH KING STREET
HONOLULU, HAWAII 96813

FRANK F. FASI
MAYOR

DIRECTOR
TF3/80-744

April 7, 1980

MEMORANDUM

TO : HONORABLE FRANK F. FASI, MAYOR

FROM : AKIRA FUJITA, ACTING DIRECTOR

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT FOR WAIPAHU 16" WATER MAIN FROM WAIKELE ROAD TO WAIPAHU WELLS

The Environmental Impact Statement does not mention the impact of this project on City bus operations. The project area is served by Routes 50 and 81 with 30-minute base, 15-20 peak headways along Waipahu Street.

Bus service will be affected during the construction period. Bus stops may need to be relocated. The construction work must be coordinated with MTL.

AKIRA FUJITA
Acting Director

cc: BWS

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU

COPY

April 10, 1980

TO : MR. AKIRA FUJITA
ACTING DIRECTOR
DEPARTMENT OF TRANSPORTATION SERVICES

FROM : KAZU HAYASHIDA
BOARD OF WATER SUPPLY

SUBJECT: YOUR LETTER OF APRIL 7, 1980, COMMENTING ON THE ENVIRONMENTAL IMPACT STATEMENT (EIS) FOR WAIPAHU 16-INCH WATER MAIN FROM WAIKELE ROAD TO WAIPAHU WELLS

Thank you for your comments on our proposed waterline project. Your letter will be appended to the revised EIS.

We will coordinate the construction work with MTL to minimize any disruption to your bus service and will indicate this in the revised environmental document.

Should you have questions or require additional information, please call Lawrence Whang at 548-5221.

KAZU HAYASHIDA
Manager and Chief Engineer

cc: Honorable Frank F. Fasi, Mayor
Stanley Shimabukuro & Assoc.

"REPRESENTING ALL THE PEOPLE OF WAIPAHU"

Waipahu Community Association

HONOLULU SAVINGS AND LOAN BUILDING
94-229 WAIPAHU DEPOT STREET
WAIPAHU, HAWAII 96797

TELEPHONE 677-4950

RECEIVED
BD OF WATER SUPPLY
Apr 10 3 07 PM '80

April 7, 1980

Frank F. Fasi, Mayor
City and County of Honolulu
Honolulu Hale
Honolulu, HI 96813

Dear Mayor Fasi:

The Environmental Impact Statement (EIS) prepared in connection with the completion of the 16-inch water main from Waikele Road to Waipahu Wells, dated March 5, 1980, has been reviewed.

Early implementation of the State Water Commission recommendations (appendix F - to this EIS) are desirable, particularly paragraphs 2,3, 9, 12, and 13 as they relate to exploration, distribution and conservation of water.

Exploration and development of fresh water resources adjacent (insofar as practicable) to ultimate users would constitute tremendous savings in every respect in the long run.

This well-documented, well-written and informative report points up the expensive procedure in use, that of pumping water to areas far from the point of origin.

The opportunity of reviewing matters of concern to our community is appreciated.

Sincerely,

C. O. "Andy" Anderson
President

COA:ls

Copy to: Senators Kuroda, Young, Miziguchi and Cayetano; Reps. Shito and Kibano; Councilmen Akahane and Matsumoto; Board of Water Supply.

COMPRISING OF:
Crestview/Seaview Association, D. D. E. - Leeward District, Friends of Waipahu Cultural Garden Park, Harbor View Neighborhood Association, Leeward Community College, Oahu Sugar Company, Robinson Heights Association, Wailani Neighborhood Association, Wailani Rise Association, Waipahu Advocates for the Elderly, Waipahu Businessmen's Association, Waipahu Highlands Association, Waipahu Jackrabbits, Waipahu Recreation Advisory Council, Waipahu Recreation Center

BOARD OF WATER SUPPLY
CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA
HONOLULU, HAWAII 96843

FRANK F. FASI, Mayor
YOSHIO H. FUJINAKA, Chairman
[illegible]ON PANG, Vice Chairman
[illegible]CHI HIGASHIONNA
[illegible]TA R. JUBINSKY
WA[illegible]ACE S. MIYAHIRA
RO[illegible]T A. SOUZA
CL[illegible]DE T. YAMAMOTO

COPY

April 18, 1980

KAZU HAYASHIDA
Manager and Chief Engineer

Mr. C. O. Anderson
President
Waipahu Community Association
Honolulu Savings and Loan
Building
94-229 Waipahu Depot Street
Waipahu, Hawaii 96797

Dear Mr. Anderson:

Subject: Your Letter of April 7, 1980, Commenting on the Environmental Impact Statement (EIS) for Waipahu 16-Inch Main from Waikele Road to Waipahu Wells

Thank you for your comments on the EIS for our proposed waterline project.

We offer the following replies to them:

1. "Early implementation of the State Water Commission recommendations (appendix F - to this EIS) are desirable, particularly paragraphs 2, 3, 9, 12, and 13 as they relate to exploration, distribution and conservation of water."

   We plan to implement, as soon as possible, the applicable recommendations proposed by the State Water Commission. Presently, preliminary work has begun on paragraphs 3, 9, 12, and 13.

   Paragraph 2 was implemented by the State when it designated the Pearl Harbor Basin as a water control area.

2. "Exploration and development of fresh water resources adjacent (insofar as practicable) to ultimate users would constitute tremendous savings in every respect in the long run."

We agree with your statement and have always tried to develop sources close to our consumers. However, since water resources in Honolulu have been fully developed, we have been forced to import water from the Pearl Harbor area to meet the increasing water demands.

Should you have questions or require additional information, please call Lawrence Whang at 548-5221.

Very truly yours,

Kazu Hayashida

KAZU HAYASHIDA
Manager and Chief Engineer

cc: Office of Environmental
Quality Control
Stanley Shimabukuro & Associates

SECTION 13

UNRESOLVED ISSUES

Since the proposed project and its primary service area are within the Pearl Harbor Ground Water Control Area (PHGWCA), this action is subject to Regulation No. 9 and policies of the State Department of Land and Natural Resources (DLNR) regarding management of the PHGWCA. The BWS is currently working with DLNR to achieve a reasonable solution regarding management of water in this area, both from practical and preservational considerations.

This section is presented to provide current information on the status of the project and on unresolved issues, to clarify the present situation.

I. BACKGROUND

The primary purpose for the proposed 16-inch transmission line is to provide BWS the necessary flexibility to continue serving the Ewa-Waianae area and Waipahu, regardless of whether increased pumapage at Waipahu Wells is permited by DLNR. Currently, about 1 mgd of the 4.89 mgd is usually transported from Waipahu Wells (which is within the Pearl Harbor Water District service area) to the Ewa-Waianae Water District service area.

This flexibility in operation is necessary because of current transmission problems with the existing system.

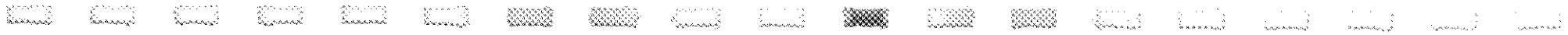
An existing 16-inch line extending from Waipahu Wells along Waipahu Street connects to the 30-inch main at Kunia Road which then transports water to the Ewa-Waianae Water District. Several water lines radiate from the existing 16-inch line to distribute water to Waipahu town. As the existing 16-inch line meets the junction of the line originating from Hoaeae Wells, water pressure from the Hoaeae Wells line often effectively prevents the westward flow of water within the 16-inch main. Thus, the usual 1 mgd export is blocked and the Ewa-Waianae Water District service area may have an inadequate water supply. The proposed 16-inch line will connect Waipahu Wells directly with the 16-inch line at the intersection of Waikele Road and Waipahu Street, which then connects to the 30-inch line along Farrington Highway. Therefore, the current transmission problem of the existing system would be alleviated. Refer to Figure 1-5, page 1-11.

The secondary purpose for the proposed 16-inch line is to provide a backup for the existing 16-inch line should that line break. The proposed line also would allow added flexibility in providing adequate fire flow for an existing residential area located mauka of Waipahu Street between Pilimoi and Awamoi Streets, should the existing 16-inch main break.

II. UNRESOLVED ISSUE

BWS is finalizing a water use plan to be submitted to DLNR in September of this year. In this plan BWS is requesting the authority to regulate pumpage at its own well fields to allow operational flexibility in providing water according to changing needs of various areas. This may result in increased pumpage at one well field, but would be accompanied by a simultaneous and equal decrease at another; therefore, total pumpage will not exceed the allowable BWS upper limits of 70.7 mgd for the Pearl Harbor Water District or 76.95 mgd for the PHGWCA.

If this operational flexibility is permitted by DLNR, then the proposed 16-inch line would enable increased pumpage from Waipahu Wells, which is currently prevented because of transmission limitations of the existing 16-inch line.



APPENDIX A

SURFACE FLOW RECHARGE

A recent study suggests that surface flow from the streams into the Pearl Harbor area could be diverted through recharge areas [A.1]. The following discussion is taken from that study:

Average annual direct runoff from the 90-square mile Pearl Harbor area is 47.27 mgd. Natural recharge is greatest in the uplands, where average direct annual runoff in streams in the 800 and 400 foot altitudes is 29 and 38 mgd, respectively. Because streams are flashy and have a wide range of recharge, only 60% of the average annual runoff can be economically diverted through ditches to recharge areas, or 28.36 mgd. The diversion may be increased slightly if reservoirs are used in conjunction with ditches to temporarily detain flows in excess of ditch capacity. Practical tests are needed to determine the advantages and disadvantages of different types of recharge structures, such as a reservoir or basin, large diameter deep shafts, deep wells, or combinations of all these structures.

One problem with this scheme is the sediment load carried by the surface waters. High flows must be used if recharge is to be effective, but flows must not be so high as to cause clogging of recharge facilities with sediment or woodland debris.

Another problem involves water quality. Diversion of water from a stream may prevent the water quality in the stream from meeting State water quality standards. Application of minimum flow standards to streams, which would effectively restrict diversion of stream waters, may be necessary and desirable to protect water quality [A.2].

REFERENCES

[A.1] Hirashima, G. T. 1971. Availability of Stream Flow for Recharge of the Basal Aquifer in the Pearl Harbor Area, Hawaii. U.S.G.S. Water - Supply Paper 1999-B. Prepared in cooperation with the Board of Water Supply, City and County of Honolulu. U.S. Government Printing Office, Washington, D.C.

[A.2] Department of Health. 1978. Water Quality Management Plan for the City and County of Honolulu, Volume 1. State of Hawaii, Department of Health, Honolulu, Hawaii.

10. ESTABLISH A COMPREHENSIVE STATEWIDE PROGRAM FOR MINIMUM STREAMFLOW CONTROL TO PROVIDE AND PROTECT WATER RESOURCES FOR ECOLOGICAL, AESTHETIC, AND RECREATIONAL USES.

11. UTILIZE THE STATE FUNCTIONAL PLAN ON WATER RESOURCES (WHEN FORMULATED) TO GUIDE STATE FUNDING OF WATER PROGRAMS AND PROJECTS, CONSIDERING STATE COST-SHARING IN AND SUPPORT OF BOND FINANCING FOR COUNTY PROJECTS, COORDINATION OF FEDERAL FUNDING OF STATE AND COUNTY PROGRAMS AND PROJECTS, PROMOTION OF CONSERVATION PROGRAMS, AND SUPPORT OF RESEARCH PROGRAMS BY AGENCIES BENEFITTING FROM THE RESULTS.

12. BALANCE THE RATE OF URBAN DEVELOPMENT WITH THE RATE OF MUNICIPAL WATER DEVELOPMENT.

13. OPTIMIZE ISLAND-WIDE WATER DEVELOPMENT ON OAHU, CONSIDERING THE ISLAND'S FULL RANGE OF HYDROLOGIC POTENTIALS AND LIMITATIONS AND REASONABLE COSTS.

14. OPTIMIZE ISLAND-WIDE WATER DEVELOPMENT ON MAUI, CONSIDERING THE ISLAND'S FULL RANGE OF HYDROLOGIC POTENTIALS AND LIMITATIONS AND REASONABLE COSTS.

Source: State Water Commission. 1979. Hawaii's Water Resources: Directions for the Future. State Water Commission, Honolulu, Hawaii.

APPENDIX F

PRIORITY RECOMMENDATIONS OF THE STATE WATER COMMISSION

1. CONTINUE AND INTENSIFY CONSERVATION PROGRAMS UNDERTAKEN BY THE COUNTY WATER DEPARTMENTS AND THE MILITARY TO STABILIZE OR REDUCE PER CAPITA CONSUMPTION OF MUNICIPAL WATER.

2. CONTROL FURTHER DEVELOPMENT OF GROUND WATER FROM THE PEARL HARBOR BASIN AND TRIBUTARY SOURCES BY APPLICATION OF THE GROUND WATER USE ACT (CHAPTER 177, HRS). AS AN IMMEDIATE INTERIM MEASURE, IMPOSE A MORATORIUM ON INCREASE EXPORT OF WATER FROM THE PEARL HARBOR AREA.

3. TO MEET PROJECTED MUNICIPAL WATER DEMANDS ON OAHU, EMPHASIZE THE DEVELOPMENT OF NEW SURFACE AND GROUND WATER SOURCES AND ALTERNATIVE SOURCES, TOGETHER WITH RESEARCH TO IMPROVE DEVELOPMENT METHODS.

4. STATE AND COUNTY GOVERNMENTS TAKE INTO ACCOUNT THE FINITE LIMITATIONS OF OAHU'S WATER RESOURCES IN ESTABLISHING POLICIES THAT INFLUENCE THE RATE OF POPULATION INCREASE AND RELATED URBAN DEVELOPMENT.

5. THE STATE LEGISLATURE ADOPT A PERMIT SYSTEM TO CONTROL THE DEVELOPMENT AND USE OF HAWAII'S SURFACE AND GROUND WATER RESOURCES IN ORDER TO PREVENT DEPLETION AND QUALITY DETERIORATION, AND PROVIDE FOR AN INDEPENDENT "WATER USE CONTROL BOARD" TO ADMINISTER THE PROGRAM.

6. THE LEGISLATURE AUTHORIZE THE FORMULATION OF A COMPREHENSIVE WATER CODE BY A DESIGNATED AGENCY TO DEFINE EXPLICITLY WATER RIGHTS IN HAWAII AND TO DELINEATE THE ROLE OF GOVERNMENT IN WATER MANAGEMENT.

7. ACCELERATE AND IMPROVE PROGRAMS FOR GATHERING AND UTILIZING INFORMATION ON WATER RESOURCES, INCLUDING SUSTAINABLE YIELDS, WATER DEMANDS, WATER CONSERVATION OPPORTUNITIES, METHODS AND COSTS OF WATER DEVELOPMENT, AND ASSESSMENT OF ENVIRONMENTAL IMPACTS OF DEVELOPMENT.

8. UPGRADE MUNICIPAL WATER SERVICES IN RURAL COMMUNITIES TO MINIMUM DELIVERY, QUANTITY, AND QUALITY STANDARDS.

9. PROVIDE IRRIGATION WATER FOR DIVERSIFIED AGRICULTURE WHEREVER PRACTICABLE, AND ASSURE THE CONTINUING AVAILABILITY OF WATER FOR AGRICULTURE IN GENERAL.

and reasons upon which his limitation is based, and afford the Owner an opportunity for informal hearing before taking action.

4. This rule shall apply to all areas of the City except in "designated groundwater areas" established by the State of Hawaii, Department of Land and Natural Resources, pursuant to Chapter 177, Hawaii Revised Statutes, as amended.

APPENDIX E

BOARD OF WATER SUPPLY, CITY AND COUNTY OF HONOLULU

RULES AND REGULATIONS

Section 3-313: Utilization of Well Water.

1. All water wells shall be operated in a manner that will readily and effectively prevent wastage and pollution of water. The Manager may exclude high-level tunnels from the provisions of this section if it is specifically determined in each case that wastage of water therefrom cannot be reasonably corrected.

2. The Manager may limit the amount of water drawn from any well covered under these Rules and Regulations if there is a reasonable basis to expect that the overdraft will:

a. Cause or bring about overdraft conditions; or

b. Excessively lower the ambient groundwater table; or

c. Cause or bring about excessive salt water intrusion, excessive mineralization, or other degradation of water quality, which may render a domestic water source unfit for such purposes; or

d. Interfere with the operations of existing established water sources.

3. If the Manager proposes to limit draft from any well, he shall inform the Owner of sufficient facts

	TRANSECT STATION LOCATION
MAMMALS	
Felis catus cat	1,2,3,4
Canis familiaris dog	1,2,3,4
Herpestus auropunctatus auropunctatus mongoose	2,3,5
Rattus rattus black rat	2,3,5
Rattus norvegincus brown rat	2,3,5
Mus musculus house mouse	1,2,3,5
AMPHIBIANS	
BUFONIDAE	
Bufo marinus Bufo toad	1,2,3,4,5
REPTILES	
GEKKONIDAE	
Lepiodactylus lugubris mourning gecko	1,2,3,4,5
Hemidactylus frenatus house gecko	1,2,3,4,5
TYPHLOPIDAE	
Typhlina bramina Hawaiian blind snake	2,3,4,5

APPENDIX D

FAUNA CHECK LIST FOR WAIPAHU 16-INCH WATER MAIN FROM WAIKELE ROAD TO WAIPAHU WELLS

BIRDS

	TRANSECT STATION LOCATION
COLUMBIDAE	
Columba livia	
rock dove, feral pidgeon	1,3
Streptopelia chinensis chinensis	
lace-necked dove	1,2,3,4,5
Geopelia striata striata	
barred dove	1,2,3,4,5
STURNIDAE	
Acidotheres tristis tristis	
common mynah	1,2,3,4,5
ZOSTEROPIDAE	
Zosterops japonica japonica	
Japanese white eye	2,3,4,5
PLOCEDIAE	
Passer domesticus	
house sparrow	1,2,3,4,5
Padda oryzivora	
Java sparrow	2,3
FRINGILLIDAE	
Richmondena cardinalis	
cardinal	2,3,4,5
Paoaria coronata	
red-crested cardinal	2,5

KEY TO TRANSECT STATION LOCATIONS

Station	Location
1	Waipahu Street from the intersection with Waikele Road to Wainui Road
2	Kalaiku Street from the intersection with Wainui Road to Manager's Drive
3	Kalaiku Street between Manager's Drive and Paiwa Street
4	Paiwa Street from the intersection with Kalaiku Street (Hapapa Street) to approximately H-1 Freeway
5	Cane haul raod from Paiwa Street east to "Mahoe Street", continuing north to Waiphau Wells

	TRANSECT STATION LOCATION
CARIACEAE	
Carica papaya L. Papaya	2,3
RUTHACEAE	
Citrus aurantifolia Lime	3
NYCTAGIANACEAE	
Bougainvillea spectabilis Bougainvillea	2,3
COMPOSITAE	
Bidens pilosa Beggar Tick, Spanish Needle	3
LAURACEAE	
Persea americana Avacado	2

	TRANSECT STATION LOCATION
MIMOSIDEAE	
Samanea saman Monkeypod	1
Leucaena glauca Koa-haole	1,2,3,4,5
EUPHORBIACEAE	
Ricinus communis (L.) Castor Bean	2,5
Euphorbia pulcherrima (Willd.) Poinsettia	2
Euhporbia hirta (L.) Garden Spurge	2
Euphorbia geniculata (L.) Wild Spurge; kaliko	5
Codiaeum variegatum (L.) Croton	2,3
ANACARDIACEAE	
Mangifera indica (L.) Mango	2,3
MALVACEAE	
Hibiscus sp. Hibiscus	2,3
Abutilon molle Hairy Abutilon	2
STERCULIACEAE	
Watteria americana	2,5
MYRTACEAE	
Psidium guajava Guava	2

	TRANSECT STATION LOCATION
CYPERACEAE	
Cyperus rotundus L. Nutgrass	4,5
PALMAE	
Cocos nucifera Coconut	2
ARACEAE	
Anthurium andraeanum Anthurium	2,3
Colocasia esculenta Taro	2
Philodendron sp. Philodendron	2,3
AMARANTHACEAE	
Amaranthus spinosus L. Spiny amaranth	5
Alternanthera sessilis L. Sessile Joyweed	2,3,5
CONVOLULACEAE	
Ipomoea tuberculata Morning Glory	5
DICOTYLEDONS	
CRASSULACEAE	
Crassula argenteu Jade Plant	3
ROSACEAE	
Rosa sp. Rose	2

APPENDIX D

FLORA CHECKLIST
FOR
WAIPAHU 16-INCH WATER MAIN
FROM WAIKELE ROAD TO WAIPAHU WELLS

February, 1980

	TRANSECT STATION LOCATION
GYMNOSPERMS	
ARAUCARIACEAE	
Araucaria heterophylla Norfolk Island Pine	2
MONOCOTYLEDONS	
GRAMINEAE	
Cynodon dactylon Bermuda Grass	2,4
Phyllostachys sp. Bamboo	2
Rhynchcelytrum repens (Willd.) Natal Redtop	5
Brachiaria mutica Paragrass	2,5
Chloris radiata Radiate Fingergrass	2,5
Eragrostis tenella Love Grass	2,5
Panicum maximum Jacq. Guinea Grass	2,3,5
Sorghum halepense (L.) Johnson Grass	5

are based on standards and guidelines developed due to enactment of the Safe Drinking Water Act (P.L. 93-523). It sets the parameters for inorganic and organic chemicals and for such factors as turbidity and coliforms. Inorganic and organic chemicals and coliforms are monitored by the State Department of Health and turbidity is monitored by the County.

- Record-keeping, inspection, issuance of regulations, and judicial review;

- A 15-member National Drinking Water Advisory Council to advise the EPA Administrator on scientific and other responsiblilities under the Act;

- A requirement that the Secretary of Health, Education, and Welfare ensure that standards for bottled drinking water conform to the primary regulations established under the Act - or to publish reasons for not doing so;

- Authorization of appropriations totaling $156 million for fiscal year 1975, 1976, and 1977.

Primary standards were designed to provide maximum feasible protection of the public health, utilizing the best treatment methods generally available, with cost as a consideration. The standards are ultimately to include maximum contaminant levels, treatment techniques, and criteria for operation, maintenance, siting, and intake of public water supply systems.

Secondary standards will also be prescribed for taste, odor, and appearance of drinking water, including sodium and total dissolved solids in the water. Secondary standards are to be enforced at the discretion of the individual states.

STATE DEPARTMENT OF HEALTH, CHAPTER 49, POTABLE WATER SYSTEMS

These regulations were adopted by virtue of Chapter 340E, Hawaii Revised Statutes, the purpose being to establish drinking water quality standards. These standards

SAFE DRINKING WATER ACT, 1974

The Safe Drinking Water Act of 1974 (P.L. 93-523) designates the Federal Government (Environmental Protection Agency or EPA) with the primary responsibility of establishing national standards. The states are responsible for enforcing the standards and otherwise supervising public water supply systems and sources of drinking water. A public water system is defined as providing piped water for human consumption and as having at least 15 service connections or regularly serving at least 25 people.

This Act provides for:

- Establishment of primary regulations for the protection of the public health;
- Establishment of secondary regulations relating to the taste, odor, and appearance of drinking water;
- Measures to protect underground drinking water sources;
- Research and studies regarding health; economic, and technological problems of drinking water supplies. Specifically required are studies of viruses in drinking water and contamination by cancer-causing chemicals;
- A survey of the quality and availability of rural water supplies;
- Aid to the States to improve drinking water programs through technical assistance, training of personnel, and grant support;
- Citizen suits against any party believed to be in violation of the Act;

(e) The Director of Health shall prescribe the appropriate parameters, measures and criteria for monitoring stream bottom biological communities including their habitat, which may be affected by proposed actions. Permanent benchmark stations may be required where necessary for monitoring purposes. The water quality criteria for this subsection shall be deemed to be met if time series surveys of benchmark stations indicate no relative changes in the relevant biological communities, as noted by biological community indicators or by indicator organisms which may be applicable to the specific site."

Note: The abbreviation "ug" refers to "microgram". One miligram ("mg") equals 1,000 micrograms.

Total Non-filterable Residue (ug/l)	20,000.0*	50,000.0*	80,000.0*
	10,000.0**	30,000.0**	55,000.0**
Turbidity (Nephelometric Turbidity Units)	5.0*	15.0*	25.0*
	2.0**	5.5**	10.0**

* Wet Season - November 1 through April 30.

** Dry Season - May 1 through October 31.

pH Units shall not deviate more than 0.5 units from ambient conditions and shall not be lower than 5.5 nor higher than 8.0.

Dissolved Oxygen - Not less than 80% saturation.

Temperature - Shall not vary more than 1°C from ambient conditions.

Specific Conductance - Not more than 300 micromhos/cm.

(2) Bottom Criteria For Streams

(a) Episodic deposits of flood-borne soil sediment shall not occur in quantities exceeding an equivalent thickness of 5 mm. (0.20 inch) over hard bottoms 24 hours after a heavy rainstorm.

(b) Episodic deposits of flood-borne soil sediment shall not occur in quantities exceeding an equivalent thickness of 10 mm. (0.40 inch) over soft bottoms 24 hours after a heavy rainstorm.

(c) In soft bottom material in pool sections of streams, oxidation-reduction potential (E_H) in the top 10 cm (4 inches) shall not be less than +100 mv.

(d) In soft bottom material in pool sections of streams, no more than 50% of the grain size distribution of sediment shall be smaller than 0.125 mm (0.005 inch) in diameter.

water. Field monitoring may be further required to insure conformance with this standard as long as a discharge or a suspected discharge is occurring.

(E) Substances or conditions or combinations thereof in concentrations which produce undesirable aquatic life.

(F) Soil particles resulting form erosion on land involved in earthwork, such as the construction of public works; highways; subdivisions; recreational, commercial or industrial developments; or the cultivation and management of agricultural lands. This standard shall be deemed met upon a showing that the land on which the erosion occurred or is occurring is being managed in accordance with soil and water conservation district and the Director of Health, and that a comprehensive conservation program is being actively pursued, or that the discharge has received the best degree of treatment or control, and that the severity of impact of the resudual soil reaching the recieving body of water is deemed to be acceptable."

"5.3 Criteria

(B.) Streams

(1) Water Column Criteria for Streams

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 Kjedahl Nitrogen (ug N/l)	250.0* 180.0**	520.0* 380.0**	800.0* 600.0**
Nitrate + Nitrate Nitrogen (ug (NO_3 + NO_2-N/l)	70.0* 30.0**	180.0* 90.0**	300.0* 170.0**
Total Phosphorus (ug P/l)	50.0* 30.0**	100.0* 60.0**	150.0* 80.0**

APPENDIX B

WATER QUALITY STANDARDS*

"4. Basic Water Quality Criteria Applicable to All Waters

All water shall be free of substances attributable to domestic, industrial, or other controllable sources of pollutants and subject to verification by monitoring as may be prescribed by the Director of Health, as follows:

(A) Materials that will settle to form objectionable sludge or bottom deposits.

(B) Floating debris, oil, grease, scum, or other floating materials.

(C) Substances in amounts sufficient to produce taste or odor in the water or detectable off flavor in the flesh of fish, or in amounts sufficient to produce objectionable color, turbidity, or other conditions in the receiving waters.

(D) High temperatures; biocides; pathogenic organisms; toxic, radioactive, corrosive, or other deleterious substances at levels or in combinations sufficient to be toxic or harmful to human, animal, plant, or aquatic life, or in amounts sufficient to interfere with any beneficial use of the water. To identify the actual or potential effects of a discharge, as a minimum, a phytoplankton bioassay test or a 96-hour bioassay or both shall be required. The methods and test parameters shall be specified by the Director according to established procedures in Section 9 of this Chapter, provided that modifications may be prescribed to meet conditions specific to the disposal situation. Survival of test organisms shall not be less than that in controls which utilize appropriate experimental

* Public Health Regulations 37-A, Department of Health, State of Hawaii. These are the new water quality standards, which went into effect on December 7, 1979.