



DEPARTMENT OF WATER SUPPLY • COUNTY OF HAWAII

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March 2, 2000

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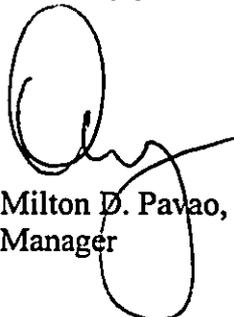
Ms. Genevieve Salmonson, Director  
Office of Environmental Quality Control  
235 South Beretania Street, Suite 702  
Honolulu, Hawaii 96813

**FINAL ENVIRONMENTAL ASSESSMENT FOR KUKUIHAELE EXPLORATORY WELL  
TAX MAP KEY: PORTION OF 4-8-008:001, COUNTY OF HAWAII, HAWAII**

The Department of Water Supply, County of Hawaii, has reviewed the enclosed Final Environmental Assessment (EA) for the proposed Kukuihaele Exploratory Well, and based on the anticipated impacts of the project, has assessed a Finding of No Significant Impact (FONSI) determination. Please publish notice of availability for this document in the March 8, 2000 edition of the OEQC Environmental Notice.

We have enclosed a completed OEQC Publication Form, four copies of the draft EA, and the project summary on disk. Please call Mr. Keith Okamoto of our staff at (808) 961-8665 if you have any questions.

Sincerely yours,

  
Milton D. Pavao, P.E.  
Manager

KKO:gms

Enc.

... *Water brings progress...*

35

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**FINAL ENVIRONMENTAL ASSESSMENT/  
FINDING OF NO SIGNIFICANT IMPACT**

**FOR**

**(THE KUKUIHAELE EXPLORATORY WELL)**

**KUKUIHAELE, HAWAII**

Proposing Agency:  
OFFICE OF ENVIRONMENTAL  
QUALITY CONTROL



**Department of Water Supply  
County of Hawaii**

**Prepared By:**

**Marc M. Siah & Associates, Inc.**

**February 2000**

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Consulting Civil Structural Environmental & Ocean Engineers  
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**FINAL ENVIRONMENTAL ASSESSMENT/  
FINDING OF NO SIGNIFICANT IMPACT  
FOR  
THE KUKUIHAELE EXPLORATORY WELL  
KUKUIHAELE, HAWAII**

**Proposing Agency:**



**Department of Water Supply  
County of Hawaii**

**Prepared By:**

**Marc M. Siah & Associates, Inc.**

**February 2000**

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## PREFACE

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## PREFACE

This final Environmental Assessment (EA) is prepared pursuant to Chapter 343, Hawaii Revised Statutes (HRS) and Title 11, Chapter 200, Administrative Rules, Department of Health, State of Hawaii. The Department of Water Supply (DWS) proposes to drill, case, and test a single exploratory well, on a 0.26-acre parcel of land in Kukuihaele, adjacent to the existing Kukuihaele 100,000-gallon reservoir site. The well site is a portion of the parcel identified by Tax Map Key (TMK): 4-8-08-01.

The proposed exploratory well will replace the existing Kukuihaele intake which is presently the only source of potable water for the Kukuihaele-Kapulea service area. Continued use of the existing intake is predicated on construction of treatment facilities mandated by the State Department of Health's Surface Water Treatment Rule which is prohibitively expensive for small water systems such as the Kukuihaele-Kapulea system.

The proposed well site is located along Mud Lane, approximately 0.1 mile mauka of State Highway 240 in Kukuihaele. The proposed facilities include an exploratory well and two 8-foot deep, 10' x 10' seepage pits to be used for discharge of the well water during the pumping test.

Upon successful drilling and testing of the exploratory well, it will be outfitted into a production well. The drilling and testing of the proposed well is expected to take approximately six months. Based on the information presented in this report, prepared in accordance with the requirements of Chapter 343, HRS, the impact of the proposed drilling and pump testing is assessed as insignificant and not sufficient to require the preparation of an Environmental Impact Statement. The proposed project, therefore, merits a determination of a Finding of No Significant Impact (FONSI).

## SUMMARY



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## SUMMARY

**Proposing Agency:** County of Hawaii  
Department of Water Supply  
25 Aupuni Street  
Hilo, Hawaii 96720  
Contact: Mr. Keith Okamoto  
Phone: (808)961-8660  
Fax: (808)961-8657

**EA Preparer:** Marc M. Siah & Associates, Inc.  
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**Approving Agency:** County of Hawaii  
Department of Water Supply  
25 Aupuni Street  
Hilo, Hawaii 96720  
Contact: Mr. Keith Okamoto  
Phone: (808)961-8660  
Fax: (808)961-8657

**Project Location:** Kukuihaele, Island of Hawaii

**Tax Map Key:** Portion of 4-8-08-1

**Proposed Action:** The County of Hawaii Department of Water Supply proposes to drill, case, and test a single exploratory well on a portion of land with Tax Map Key (TMK): 4-8-08-01, adjacent to the existing Kukuihaele reservoir site. The proposed action also includes the temporary installation of a test pump and equipment to collect data on yield and water quality.

**Impacts:** No significant impacts are anticipated from construction or testing at the proposed exploratory well site. Construction work, primarily drilling, is anticipated to have insignificant short-term noise and air quality impacts on the surrounding area. All government rules and regulations will be followed during construction to minimize these impacts.

**Agencies Consulted:** Federal Agencies

U. S. Department of Agriculture  
Natural Resources Conservation Service  
P. O. Box 50004  
300 Ala Moana Blvd.  
Honolulu, HI 96850

U. S. Department of the Interior  
Fish and Wildlife Service, Ecological Services  
P. O. Box 50156  
300 Ala Moana Blvd.  
Honolulu, HI 96850

State of Hawaii

Department of Land and Natural Resources  
Water Resources Management Division  
1151 Punchbowl Street  
Honolulu, Hawaii 96813

Department of Land and Natural Resources  
State Historic Preservation Division  
Kakuhihewa Building, Room 555  
601 Kamokila Boulevard  
Kapolei, Hawaii 96707

State Land Use Commission  
State Office Tower, 4<sup>th</sup> Floor  
235 S. Beretania Street  
Honolulu, Hawaii 96813

SUMMARY: SUMMARY

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Department of Health  
Clean Water Branch  
919 Ala Moana Blvd, Room 301  
Honolulu, Hawaii 96814

Department of Business, Economic Development,  
and Tourism  
250 S. Hotel Street, 4th Floor, Ewa Wing  
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County of Hawaii

Department of Water Supply  
25 Aupuni Street  
Hilo, Hawaii 96720

**SECTION 1**

**INTRODUCTION AND PROJECT DESCRIPTION**

## SECTION 1

### INTRODUCTION AND PROJECT DESCRIPTION

#### 1.1 Introduction

Strict compliance with the Surface Water Treatment Rules of the Safe Drinking Water Act imposes heavy economic burdens on small water systems such as the Kukuihaele-Kapulena Water System. The high cost of the treatment process anticipated for this water system is an incentive to identify options for replacing the existing surface intake.

The objective of the Kukuihaele exploratory well project is to evaluate the potentials for development and integration of a groundwater source into the existing Kukuihaele-Kapulena Water System. In light of this objective, the Department of Water Supply (DWS), County of Hawaii proposes to drill and case an exploratory well in the immediate vicinity of the Kukuihaele Reservoir site. Should the exploratory well prove to be productive and sustainable, it will be outfitted into a production well. The new well would replace the existing surface water intake as the source of potable water to the Kukuihaele-Kapulena service area.

#### 1.2 Project Location

The proposed exploratory well will be placed on a land parcel located in the immediate vicinity of the Kukuihaele Reservoir site. It will occupy an approximately 0.26-acre portion of the Bishop Estate land parcel with Tax Map Key (TMK):4-8-08-01, contiguous to the existing Kukuihaele Reservoir site (TMK: 4-8-08-26). The proposed site has an average

## SECTION 1: INTRODUCTION

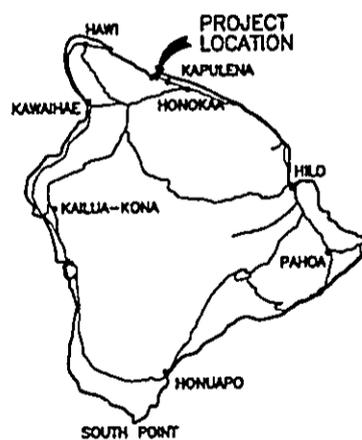
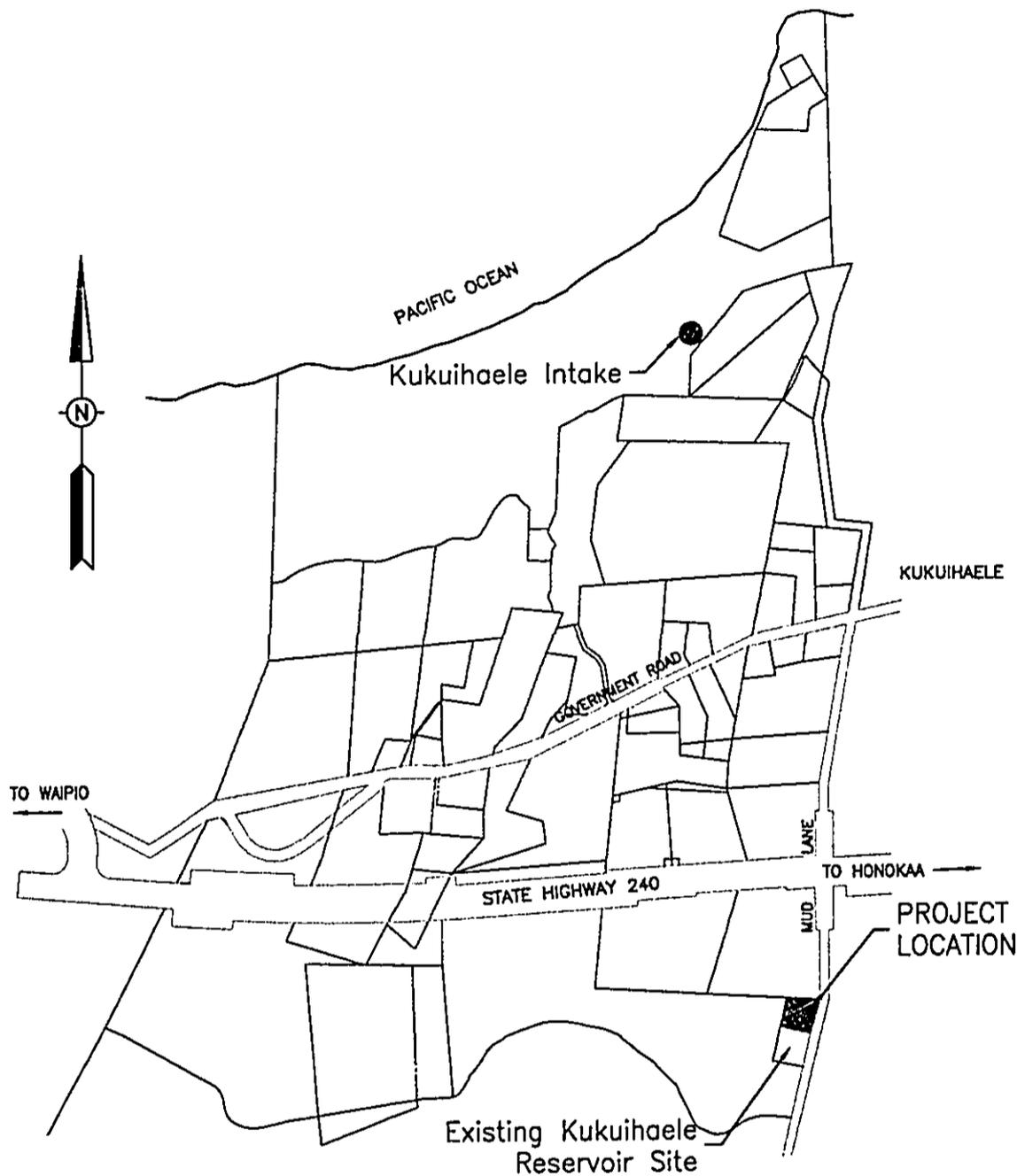
elevation of approximately 956 feet above Mean Sea Level (MSL) and is located about 0.1 miles north of State Highway 240. Vehicular access to the proposed site will be via an existing unimproved dirt road, referred to as "Mud Lane". This road currently serves as the access to the existing Kukuihaele Reservoir as well. Figure 1-1 depicts the general location of the project.

### 1.3 Proposed Facilities

The proposed Kukuihaele exploratory well project involves drilling, casing, and testing of an exploratory well capable of producing potable water at a rate of at least 100-150 gpm. The exact depth of the exploratory well to be drilled and cased will depend on the nature of the soil formation and hydrogeological conditions at the site and may be modified during the course of the drilling. The exact dimensions of the new well will be determined after completion of the drilling of the exploratory well. Based on available data, the total depth of the proposed well is estimated to be 1,006 feet, reaching roughly about 50 feet below sea level. The borehole would have a diameter of 12 inches. Solid steel casing will be installed in the upper 966 feet of the hole; 40 feet of perforated casing would be installed below it. If warranted by conditions encountered during drilling, the well may require an open hole with a minimum diameter of 8 inches beneath the cased portion of the well. The depth of this uncased hole would be determined in the field and would be drilled in addition to the proposed 1,006 feet.

Pump testing will be conducted at various discharge rates ranging from 100 to 1,000 gallons per minute and would be conducted over a period of up to seven consecutive days. At least two 10' x 10' on-site pits with maximum depths of 8 feet will be used for discharge of pump testing

Figure 1 - 1 General Location of the Project



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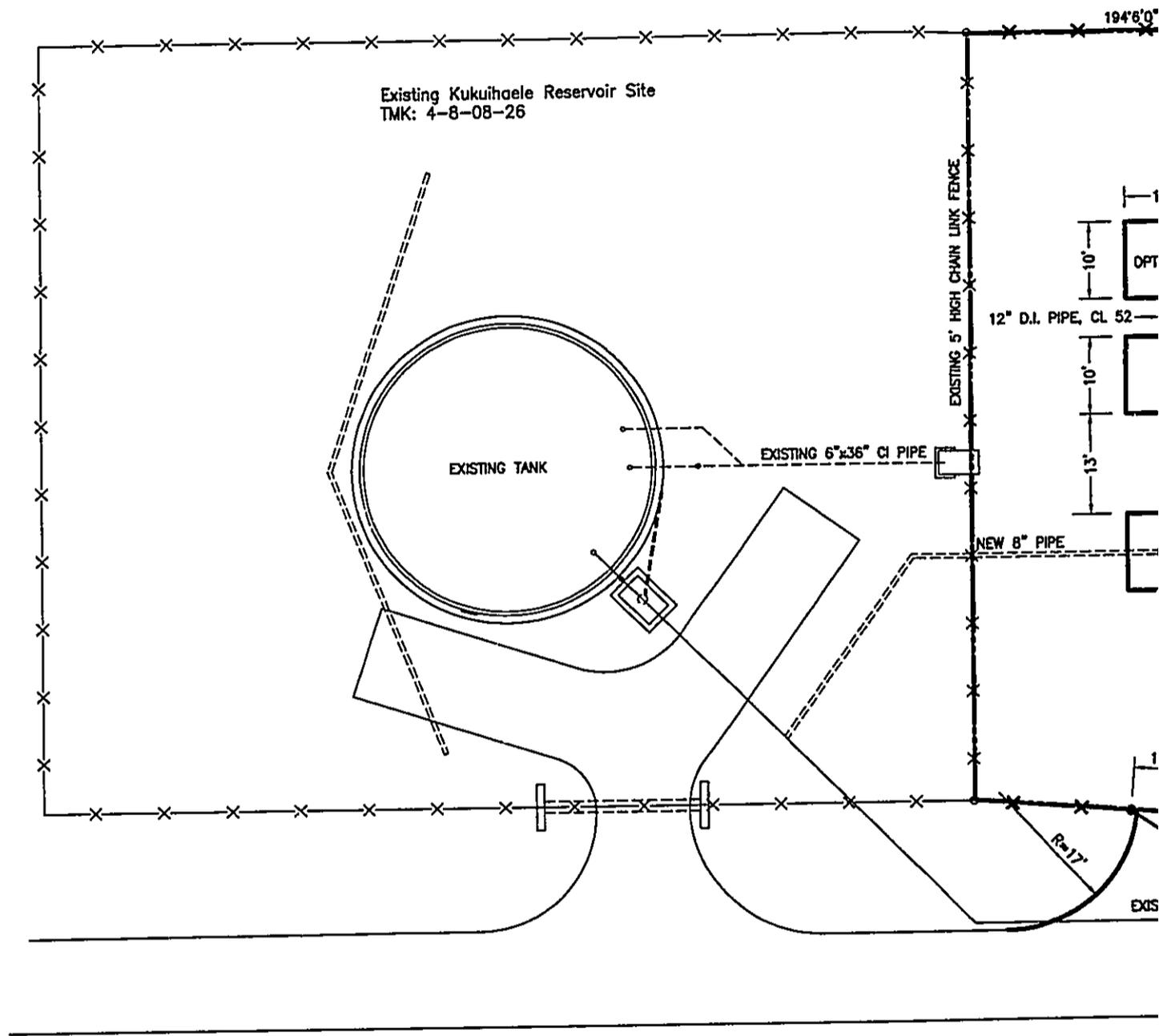
## SECTION 1: INTRODUCTION

water. An initial pump test will be run to determine if the two seepage pits have adequate disposal capacity to dispose of up to 1,000 gpm for the duration of the pump testing. The discharge would be in accordance with the requirements of the State Department of Health's NPDES permit program. The drilling casing and pump testing is expected to be completed over a period of approximately six months. Figure 1-2 shows the site plan and location of the proposed exploratory well.

Once pump testing has been successfully completed, should the quality and yield of the proposed exploratory well prove sustainable, DWS may decide to outfit the well with a deep submersible pumping unit and motor assembly, and convert it into a production well. At that time, DWS will also construct a 20' x 25' single story, CMU control building which would house the motor control center, electrical equipment, alarm system, and chlorination system. The proposed production well will then be connected to the existing Kukuihaele 100,000-Gallon reservoir via a new 8-inch diameter pipeline. The following steps are necessary in order to develop the proposed exploratory well and convert it to a production well which then can be integrated into the existing DWS water system.

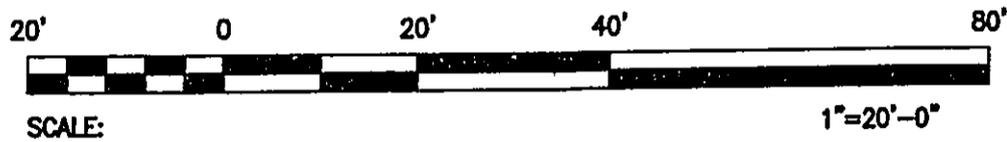
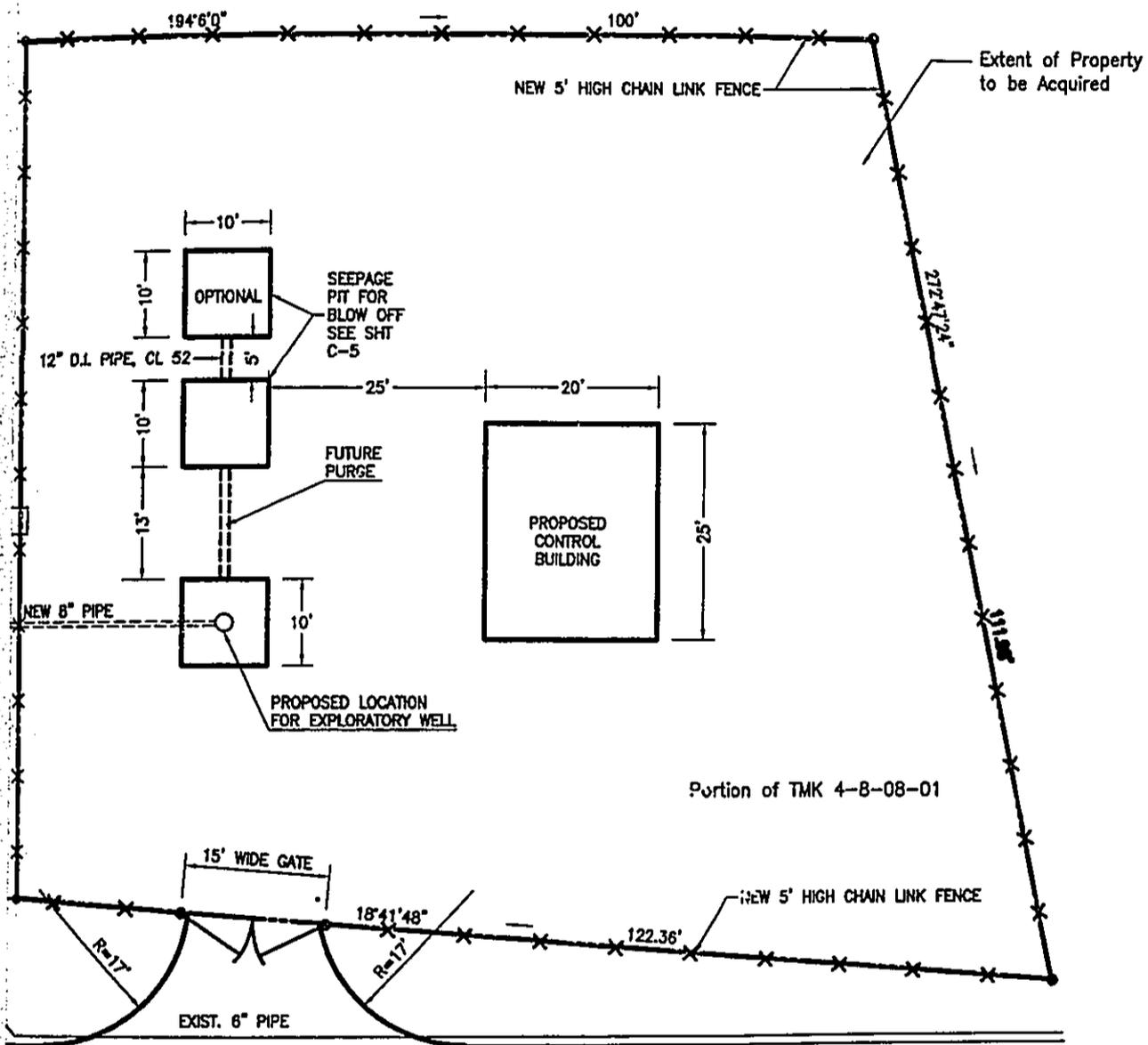
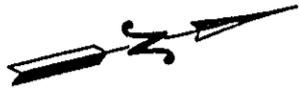
- A. Acquire the land.
- B. Prepare construction plans for the project.
- C. Install exploratory well and conduct pump test.
- D. Install deep well, concrete pad, pumping unit including piping and controls, site piping, connection to the Kukuihaele reservoir.
- E. Construct control building.
- F. Install electrical system including electric power, motor controls, lighting, and telemetering.
- G. Install chlorination system.

Figure 1 - 2 Site Plan for Proposed Kukuihae



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# Proposed Kukuiahaele Exploratory Well



## SECTION 1: INTRODUCTION

Currently, there are two pumping units installed at the Kukuihaele Intake Facility. At any time, only one unit is in operation while the second unit serves as a stand-by. Each unit is rated at 100 gallons per minute (gpm). The proposed production well is expected to have the discharge capacity in the range of 100 to 150 gpm. However, the actual discharge capacity from the proposed well will be determined by the results of the exploratory well pumping test.

### 1.4 Project Need

The current water demands in the Kukuihaele-Kapulena water system are met by the Kukuihaele Intake Facility. Originally, the system was developed to serve the Kukuihaele area. Later, it was extended to serve Kapulena town as well. Recently, Mastronardo Booster Station was added to provide adequate pressure for serving a new subdivision near Mastronardo.

Based on daily pumping rates compiled by DWS, the average daily demand on the system in 1998 is reported at 46.5 gpm or 66,700 gpd. The current storage capacity in the system totals 150,000 gallons.

According to results of hydraulic simulations of the system, a new well at the Kukuihaele Reservoir site would need to supply approximately 110 to 130 gpm to be able to meet system demands at various locations throughout the service area.

### 1.5 Test Pumping

Following construction of the proposed exploratory well, tests will be conducted with a test pump to determine the quantity (yield) and quality

## SECTION 1: INTRODUCTION

of water that can be produced. Testing will include a Step Drawdown Pump Test at various rates to be performed for approximately one hour at each rate. In addition, a Constant Rate Pump Test lasting 120 hours will be conducted to establish sustainable pumping rates. It is anticipated that a diesel-powered rig and pumping unit will be utilized for this phase of the project.

Water withdrawn from the test well will be directed to two on-site seepage pits. No water will be disposed of into streams or natural drainage courses in the area.

Water quality testing will include the analyses mandated for a new potable source, which include analyses for chlorides, pesticides, heavy metals and organics. The tests for contaminants will determine if any treatment processes will be required when the well is put into production. If potential contaminants exist, a Granular Activated Charcoal (GAC) treatment facility may be required. If required, the facility would be constructed at the well site when it is developed for production.

Following testing, the well will be capped and all equipment removed. If development of the well for production is deemed feasible, the exploratory well will be outfitted into a production well.

### 1.6 Project Schedule and Costs

At present, exploratory well drilling for the proposed well site has not been scheduled. Upon acquisition of land and approval of all required permits the expected construction time for well drilling and testing of the exploratory well should be approximately 180 days. The construction

SECTION 1: INTRODUCTION

costs for the proposed exploratory well including drilling, casing, and pump testing are estimated at \$900,000.

**SECTION 2**

**DESCRIPTION OF EXISTING CONDITIONS**



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## SECTION 2

### DESCRIPTION OF THE EXISTING CONDITIONS

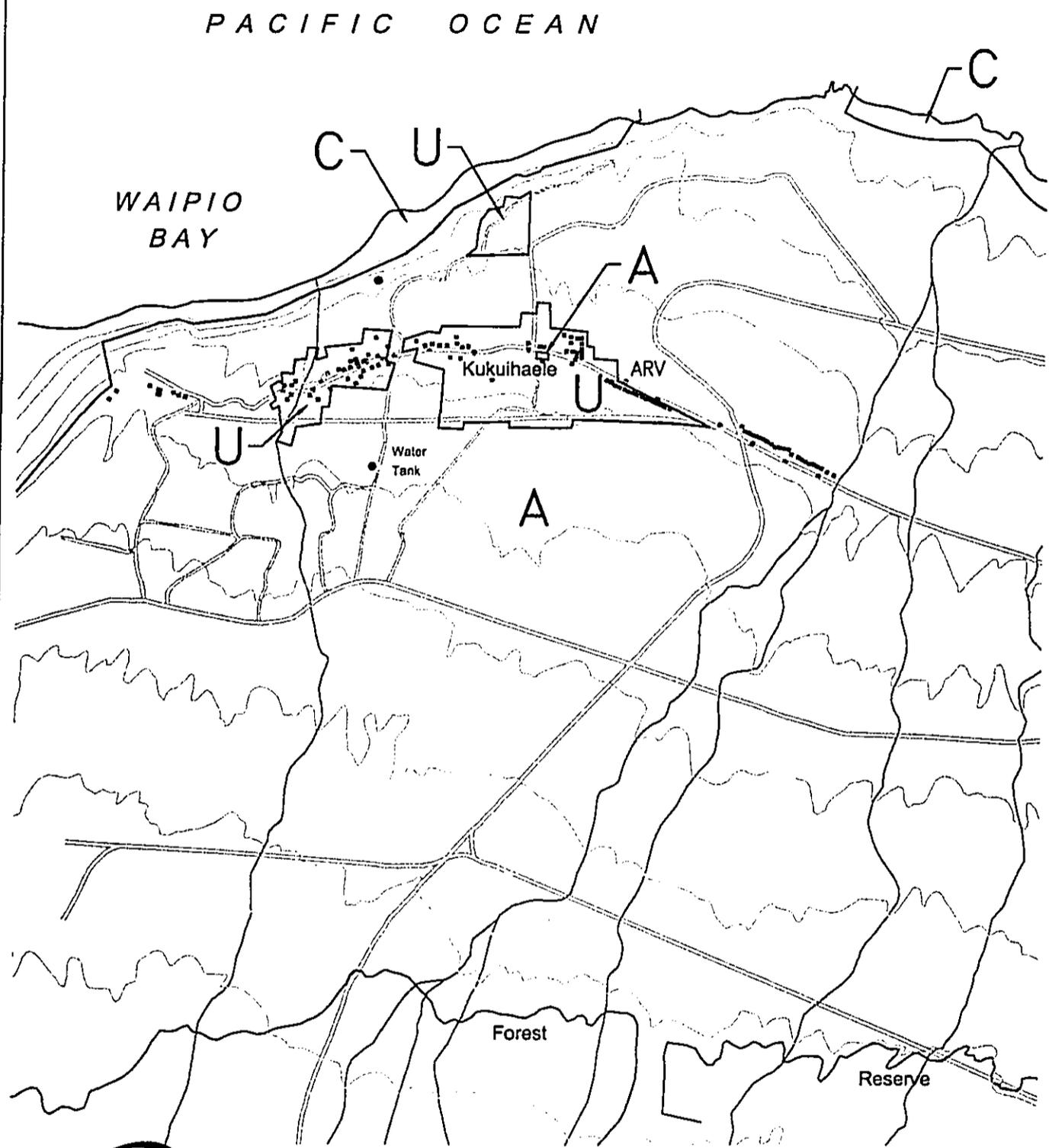
#### 2.1 Existing Land Use

The Hawaii Land Use Statute of Chapter 205, Hawaii Revised Statutes (HRS), classifies all lands in the State into four land use districts: Urban, Agricultural, Conservation and Rural. Land use on the project site and in its immediate vicinity is designated as Agricultural, as depicted in Figure 2-1. Construction of public water storage reservoirs and appurtenances including booster-pumping stations are permissible uses within the agricultural districts (§205-4.5(7), HRS).

#### 2.2 Climate

The project site is located on the northeast side of the Island of Hawaii exposed to the prevailing northeasterly trade winds, which blow more than 50% of the time. Rainfall in the project area is approximately 80 inches per year. This area is relatively drier than north of Waipio Valley and south of Honokaa where average annual rainfall is in excess of 100 inches. Most of the rainfall occurs during the winter months from November through April. Figure 2-2 depicts the hyetograph showing mean annual rainfall throughout the island. Due to high elevations at the project site, the mean annual temperature in the project area is approximately 72.6 F°.

Figure 2 - 1 Land Use Map



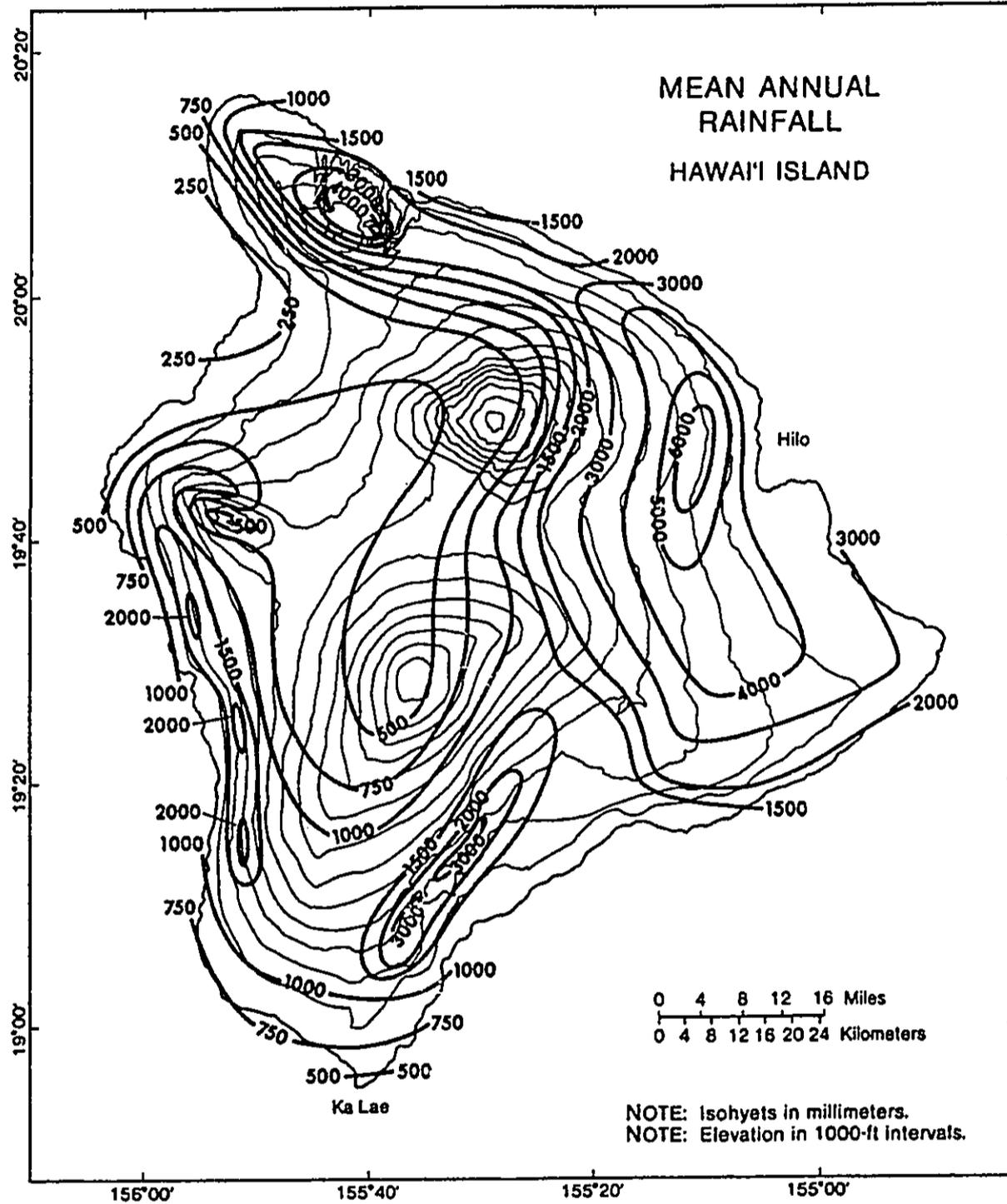
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Figure 2 - 2 Mean Annual Rainfall, Hawaii Island, Hawaii



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### 2.3 Topography and Geology

The general topography of the proposed exploratory well site and its immediate vicinity is characterized by relatively flat to mild slopes as depicted in Figure 2-3. The average elevation at the site is about 956 feet above Mean Sea level (MSL).

The site, which is located northeast of the Kohala Mountains, sits on a formation of a Hamakua volcanic series, capped by Pahala ash, and bounded by a Pleistocene lava flow formation. The Hamakua series consists of the tholeiitic basalt, olivine basalt, and oceanites of the early shield building stage. It is exposed only in the lower part of the sea cliffs. The rocks are usually thin beds of pahoehoe and a'a volcanic flows. The general geological features of the Island of Hawaii are represented in Figure 2-4.

### 2.4 Soils

According to the Natural Resource Conservation Services' soil survey, soils in the general area of the project site are classified as Kukaiau silty clay loam (KuD & KuE) as presented in Figure 2-5.

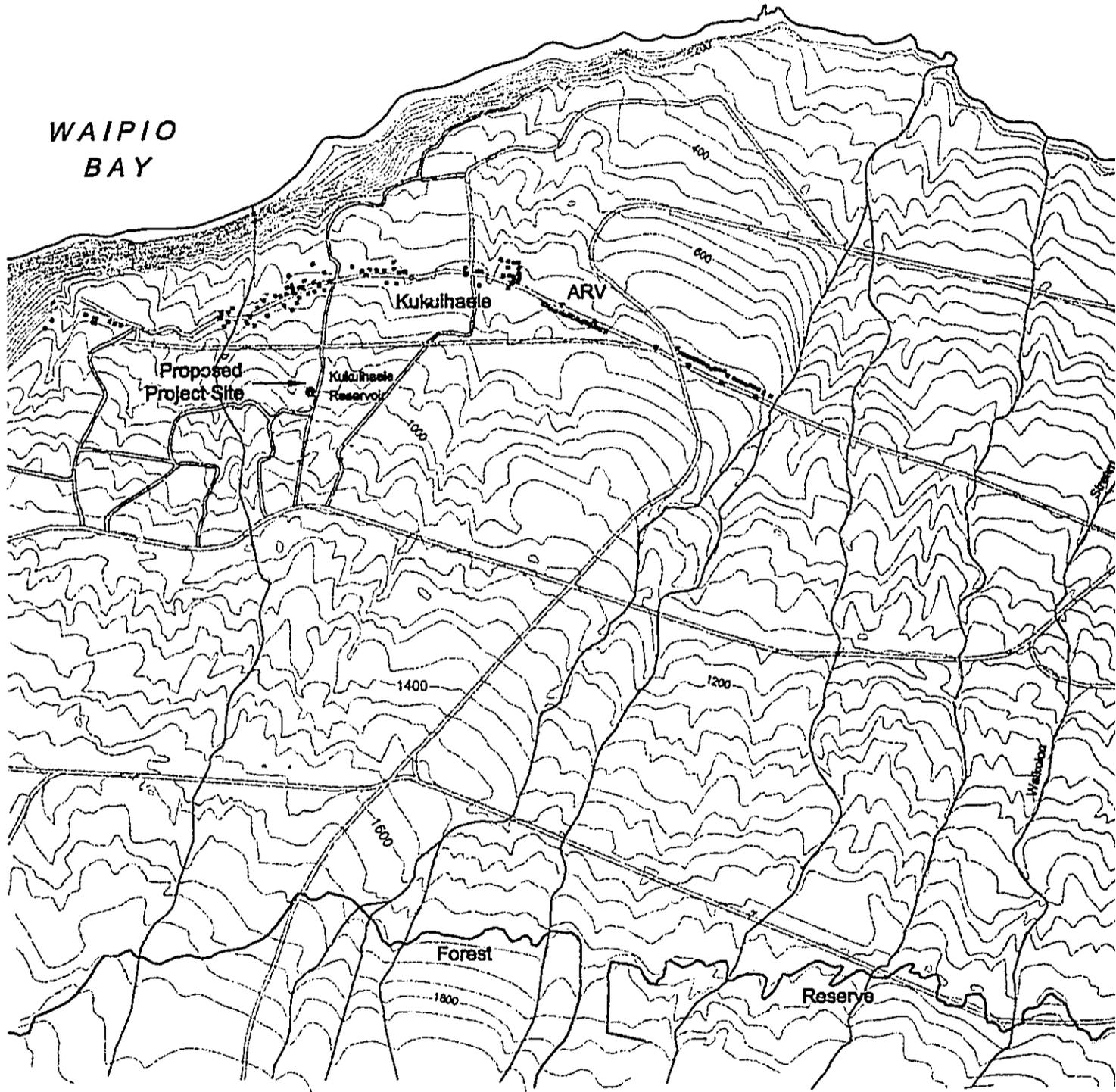
Typical slopes for Kukaiau silty clay loam (KuD) soil range from 12 to 20 percent. It is a deep to very deep, well-drained soil occurring on moderately steep uplands where volcanic ash comprises its formation. Its surface layer is extremely acid, and the subsoil is medium to slightly acid. Permeability of these soils is moderately rapid while runoff is medium and the erosion hazard is moderate.

Figure 2-3 General Topography of F



PACIFIC OCEAN

WAIPIO BAY



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Topography of Project Site

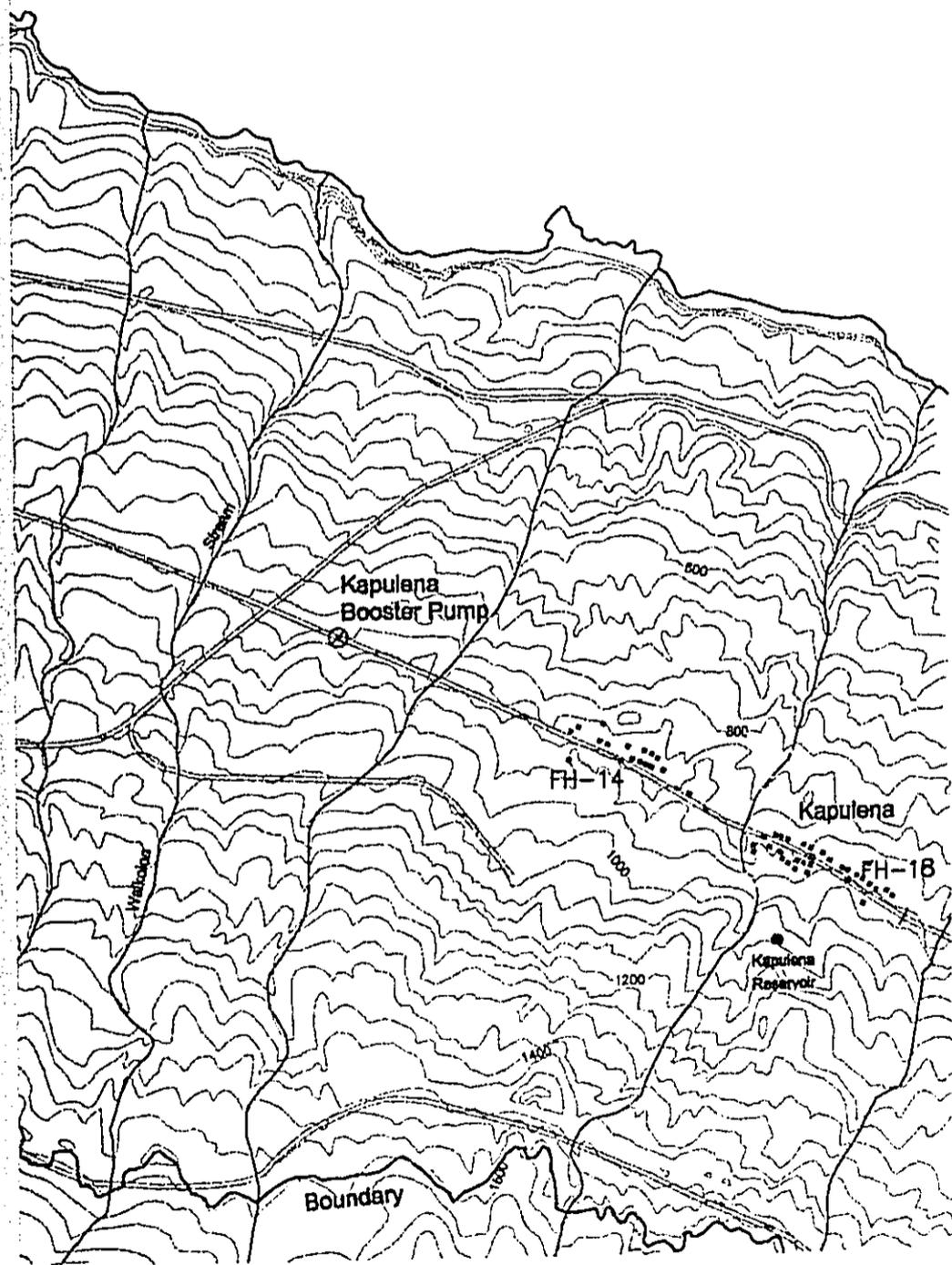
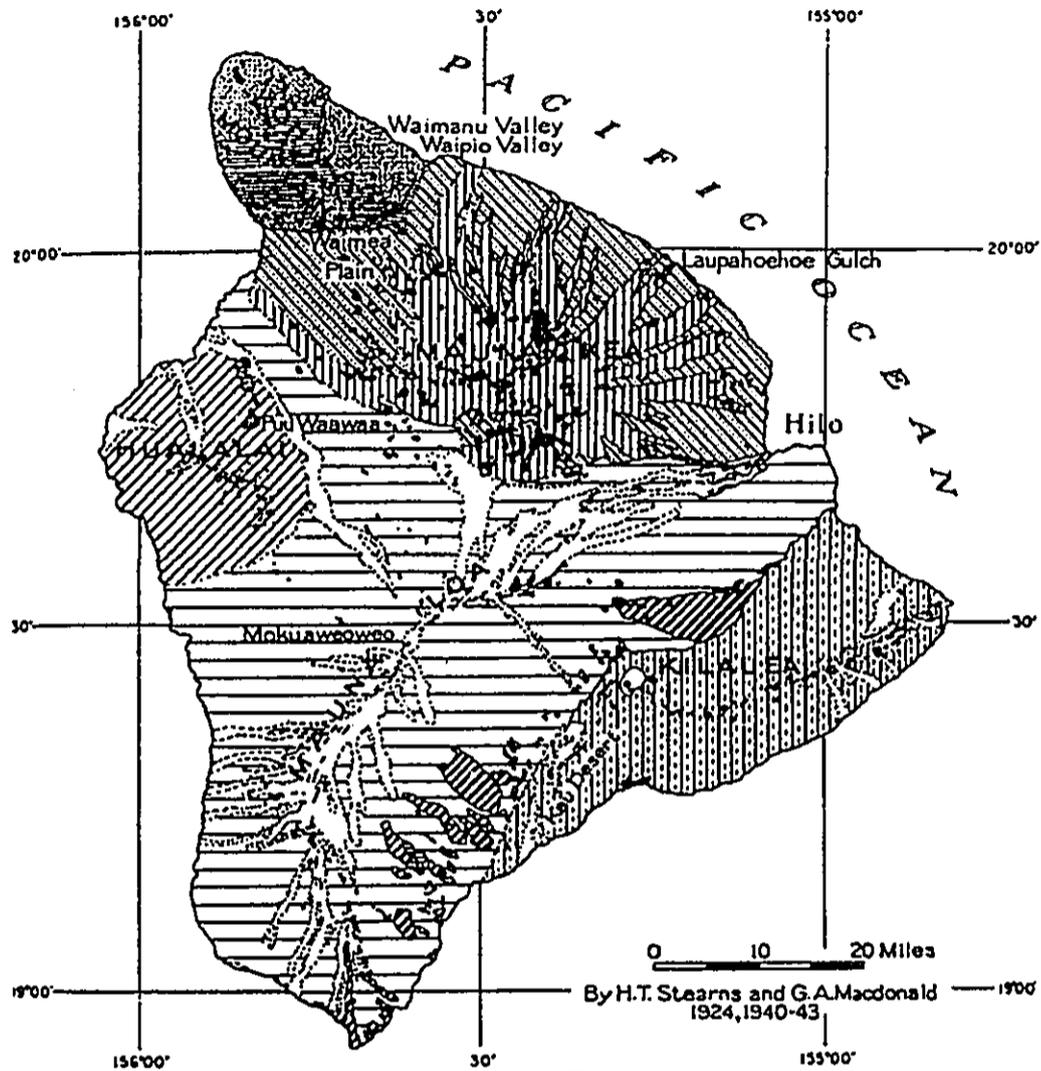


Figure 2 - 4 Geological Features of the Island of Hawaii



**EXPLANATION**

	HUALALAI VOLCANO	KOHALA MOUNTAIN	MAUNA KEA VOLCANO	MAUNA LOA VOLCANO	KILAUEA VOLCANO
HOLOCENE	Hualalai volcanic series Historic lavas		Laupahoehoe volcanic series Recent lavas	Keu volcanic series Historic lavas	Puna volcanic series Historic lavas
	Prehistoric lavas		Pleistocene lavas	Prehistoric lavas	Prehistoric lavas
PLEISTOCENE	Waawaa volcanics A. pumice cone B. trachyte lava flow	Hawi volcanic series	Hamakua volcanic series, capped by Pahala ash	Kahuku volcanic series, capped by Pahala ash	Hilina volcanic series, capped by Pahala ash
	GREAT EROSIONAL UNCONFORMITY Pohole volcanic series		GREAT EROSIONAL UNCONFORMITY Ninole volcanic series		
	Cinder and spatter cones and pit craters			Fissure vent	



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Figure 2 - 5 General Soil Map



1119FIG2-S.DWG 02/22/00 15:44



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## SECTION 2: EXISTING CONDITIONS

Kukaiau silty clay loam (KuE) soil occurs on steep uplands with a slope ranging from 20 to 35 percent. It is a well-drained soil formed in volcanic ash. Its surface layer is extremely acidic and the subsoil is medium to slightly acidic with moderately rapid permeability. Runoff is rapid and the erosion hazard is severe.

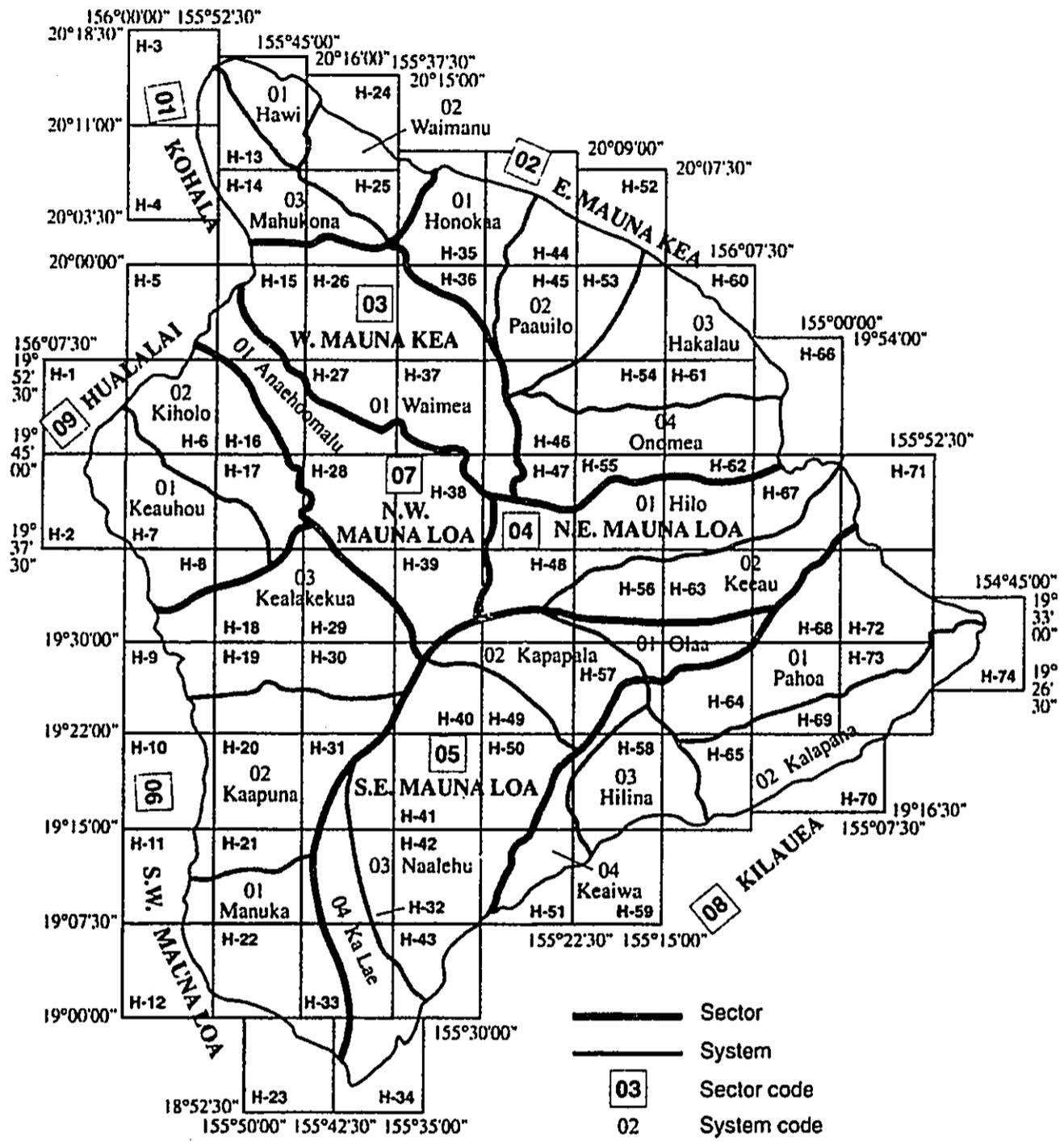
### 2.5 Hydrology

#### 2.5.1 Aquifer or Hydrologic Unit Status

According to the Aquifer Classification System adopted by the State, the proposed well site is located in an area classified as the Honokaa Aquifer System in the East Mauna Kea Aquifer Sector. Boundaries of various aquifer sectors and systems for the Island of Hawaii are shown in Figure 2-6. The boundary of the East Mauna Kea Aquifer Sector follows a topographic divide from the peak of Mauna Kea northwest to Waimea, then northerly along Lalakea where the Mauna Kea and Kohala rocks meet, to Kukuihaele above Waipi'o Bay. The southern boundary follows the Mauna Loa/Mauna Kea contact from Humu'ula saddle along the Wailuku River to Hilo. The aquifer sector is restricted to rocks of the Mauna Kea Volcano, the basement of which is the Hamakua Volcanics. Covering the Hamakua Volcanics in many places, especially inland toward the poorly defined rift zones, are the Laupahoehoe Volcanics.

The East Mauna Kea Aquifer Sector extends over 604 square miles and encompasses the Honokaa, Paauilo, Hakalau, and Onomea Aquifer Systems. The Honokaa Aquifer System is defined in the east to the ridge between Kaha'upu Gulch and Kahawaili'ili Gulch. The western boundary is Lalakea. This sector has abundant groundwater resources. The most primary source is the basal lens, which may extend five to seven miles inland of

Figure 2 - 6 Boundaries of Aquifer Sectors and Systems



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SECTION 2: EXISTING CONDITIONS

the coast. The Laupahoehoe series of the same volcano blankets portions of the Hamakua formation and contains high level of perched water. High-level dike water is likely to be found in Hamakua rocks at great depths along the northwest rift of Mauna Kea. Although a sedimentary caprock does not exist at the coast, the Laupahoehoe series, may act as caprock where it reaches the sea. The freshwater lens is on the order of 1000 feet thick near the coast, and thickens to several hundred feet further inland. Sustained yield of the Honokaa Aquifer is estimated to be 31 MGD, which far exceeds the current level of the quantity pumped or the total installed capacity of 1.39 MGD. The most probable area for potable groundwater is in the 800 - 1000 foot elevation.

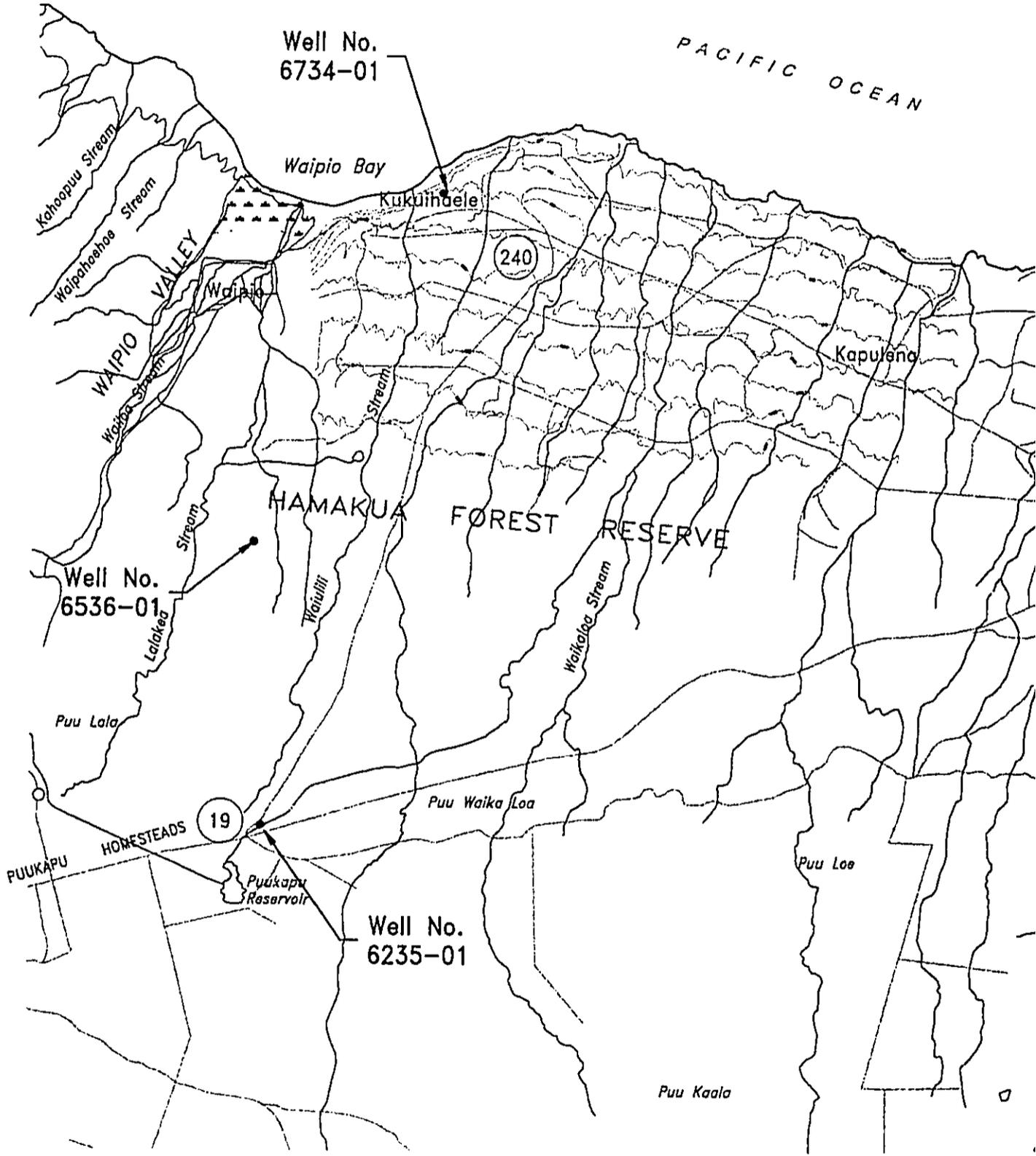
According to the records of wells compiled by the State Department of Land and Natural Resources, five wells are located in the general area of Kukuihaele-Kapulena Water System. Figure 2-7 shows the locations of these wells. Specific information about these wells is also summarized in Table 2-1. The depth of existing wells range from 486 feet to a little more than 1,400 feet.

Table 2-1 Data on Wells Located in the Vicinity of the Project Site

Well No.	Well Name	Total Depth, ft	Ground Elevation, ft (MSL)	Static Head, ft (MSL)
6235-01	Waimea C C	1415	2814	1657
6528-01	Haina	909	855	4.51
6528-02	Enerch #1	486	446	3.46
6536-01	Lalakea Gulch Tu	-	2200	-
6734-01	Kukuihaele	-	-	-

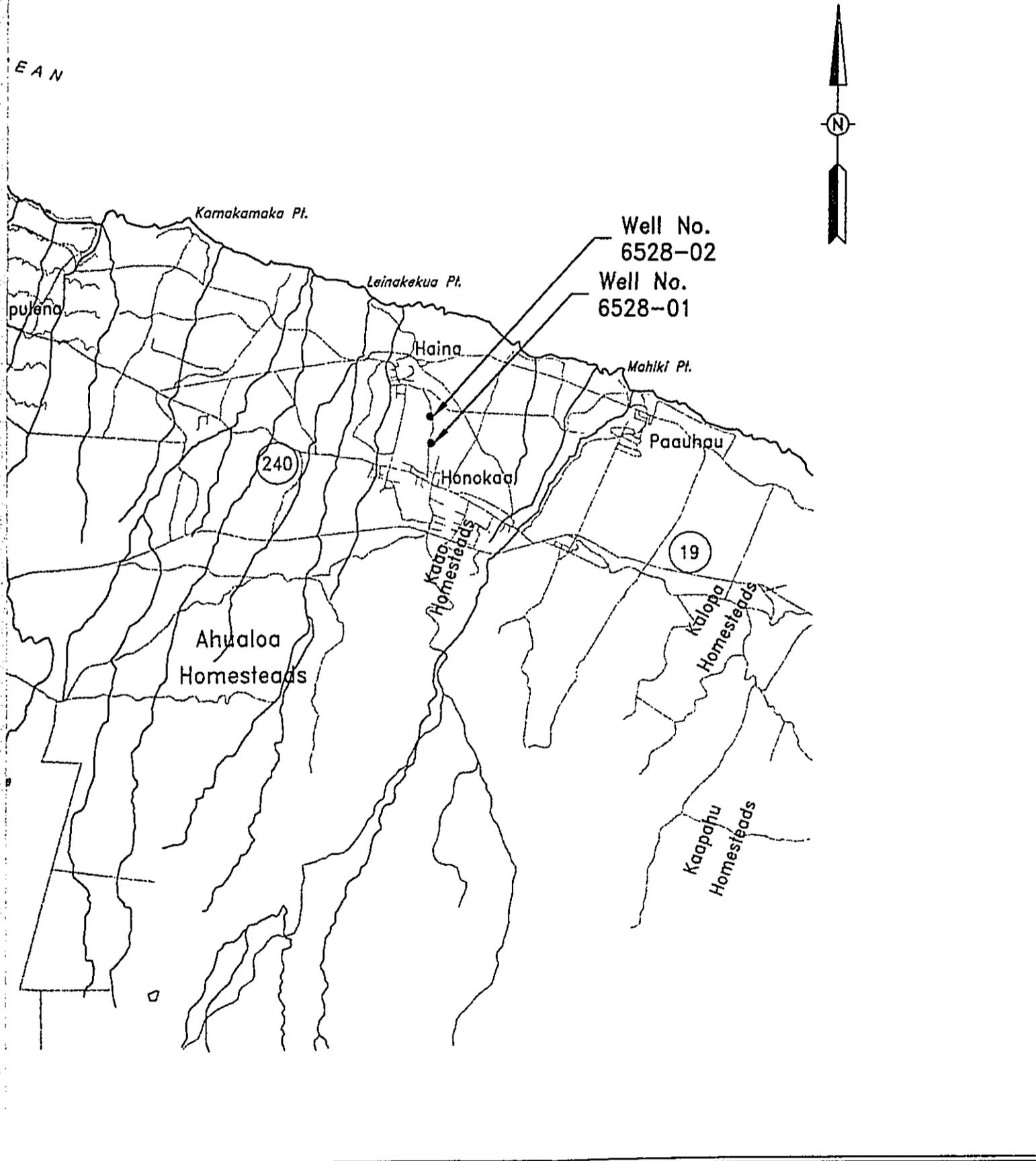
Source: Commission of Water Resource Management, DLNR

Figure 2 - 7 Locations of Existing Wells in



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Existing Wells in the Project Area



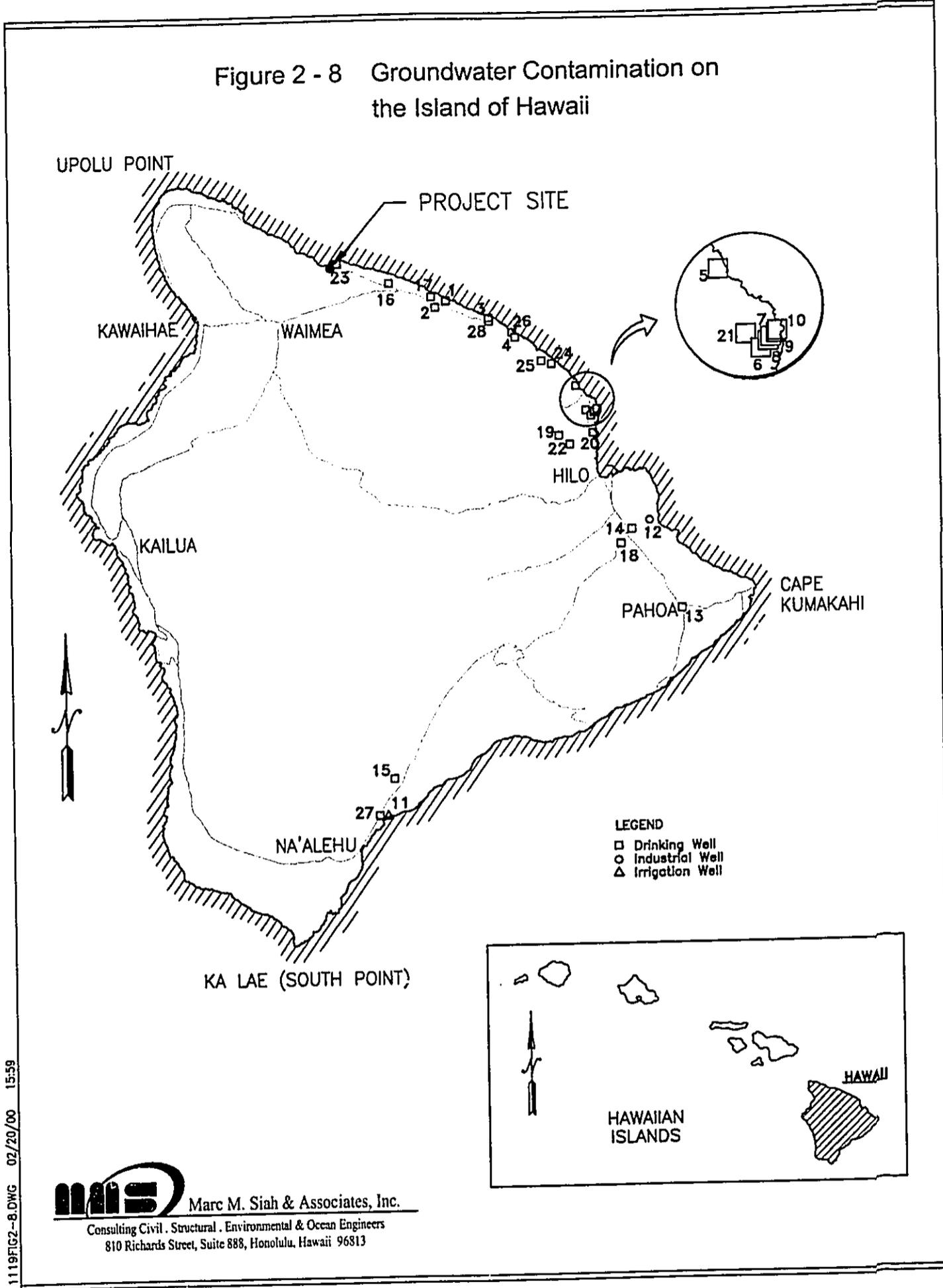
2.5.2 Surface Water

Waipio and Lalakea streams are the two major perennial streams in the general area of the project site. On their way to the ocean, both streams pass a few miles north of the project site. They are both designated as candidate streams for protection in the Hawaii Stream Assessment study. The intermittent Waiulili Stream runs less than a mile north of the project site while Waikoekoe runs approximately 1.5 miles south of the exploratory well site. The lower Hamakua Ditch and tunnel system runs less than 0.5-miles mauka of the site providing irrigation water for sugarcane operations. The Lalakea ditch and tunnel system also conveys an average flow of 1 MGD to Lalakea reservoir, which was previously used to irrigate sugarcane fields. With the demise of sugar plantations, its operation has been suspended. Overflow from Lalakea reservoir spills into the normally dry streambed of Waiulili Gulch.

2.6 Contamination Analysis and Vulnerability Assessment

The proposed exploratory well site and its general vicinity has historically been used for agricultural and rural activities. Based on the State Department of Health's groundwater contamination maps for the State of Hawaii, depicted in Figure 2-8, only Haina Well No.1, which is located approximately 8 miles east of the proposed exploratory well site, has shown traces of Atrazine in the water. The level of Atrazine detected in the well water in 1997 is reported at 0.11 ppb which is less than four percent of EPA's Maximum Contaminant Level. Haina Well No.1 is situated down gradient of large tracts of land currently used for agriculture. Historic aerial photographs of the area up gradient of the proposed well site do indicate a limited use of land for agriculture. Based on available information, it is anticipated that the risk of

Figure 2 - 8 Groundwater Contamination on the Island of Hawaii



1119FIG2-8.DWG 02/20/00 15:59

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## SECTION 2: EXISTING CONDITIONS

finding contaminants in the proposed well from prior agricultural use of the area is very small. This is due to the fact that the proposed well will tap into an aquifer at a depth of more than 1,000 feet below ground level. The site is overlain by an intervening shallow aquifer which will be more prone to receiving contaminants. In addition, based on a review of available data, there are no known points or locations of contamination in the general area of the proposed exploratory well. There are no hazardous waste site listed with the State Department of Health's Hazard Evaluation and Emergency response Office. According to the County of Hawaii Department of Public Works Solid Wastes Division, there is no landfill in the area of the proposed action. The closest solid waste transfer station is located in Honokaa, approximately seven miles southwest of the proposed exploratory well site.

The area north (upstream) of the proposed well site is entirely agricultural land with no residences. According to the State Department of Health Division of Environmental Health, there are no cesspools in the area. The residential areas with septic systems are all located south (down gradient) of the proposed well site. The closest residence is approximately .5 miles south of the well site. According to the State Department of Health's UST and LUST database, there are no underground storage tanks within a one-mile radius of the property. Therefore, the proposed well site is upgradient and relatively far from potential sources of contamination and is not expected to affect the proposed well's water quality. Chlorides data on all exiting wells tapping the Honokaa aquifer system indicate levels less than 80 ppm.

Upon completion of the drilling of the proposed exploratory well, water samples will be collected and analyzed to confirm that the well is

## SECTION 2: EXISTING CONDITIONS

suitable as a potable source. Since no hazardous materials will be used or produced during the drilling, no special treatment is anticipated.

### 2.7 Earthquake Hazards

The Hawaiian Islands are divided into three seismic zones as specified by the Uniform Building Codes (UBC) for the purpose of structural design. The entire Island of Hawaii is classified as Zone 3 as per UBC (1994), which is the most seismically active area of the state. Given that the least active zone is Zone 0, and the most active zone is Zone 4, the possibility of an earthquake occurring on the Island of Hawaii is high. All new structures will be designed and constructed to resist stresses produced by lateral forces, which apply to Seismic Zone 3.

### 2.8 Flood Considerations

Flood Insurance Rate Maps (FIRM) were used to evaluate the potential for flooding at the proposed exploratory well site. Based on FIRM Map Number 155166 0200 C dated September 16, 1998, the project site is designated as Zone X. This designation refers to areas situated outside of the 500-year flood plain as shown in Figure 2-9.

### 2.9 Flora and Fauna

The proposed exploratory well site is located in an area historically used for agriculture. Botanical survey of the area indicates that some introduced species could be observed in the vicinity of the project area. These introduced species include yellow flowered wild radish (*Raphanus raphanistrum*), wild clover (*Trifolium repens* L.), Indian paintbrush (*Castilleja arvensis*), and marsh purslane (*Ludwigia palustris* [L.] ELL.).



## SECTION 2: EXISTING CONDITIONS

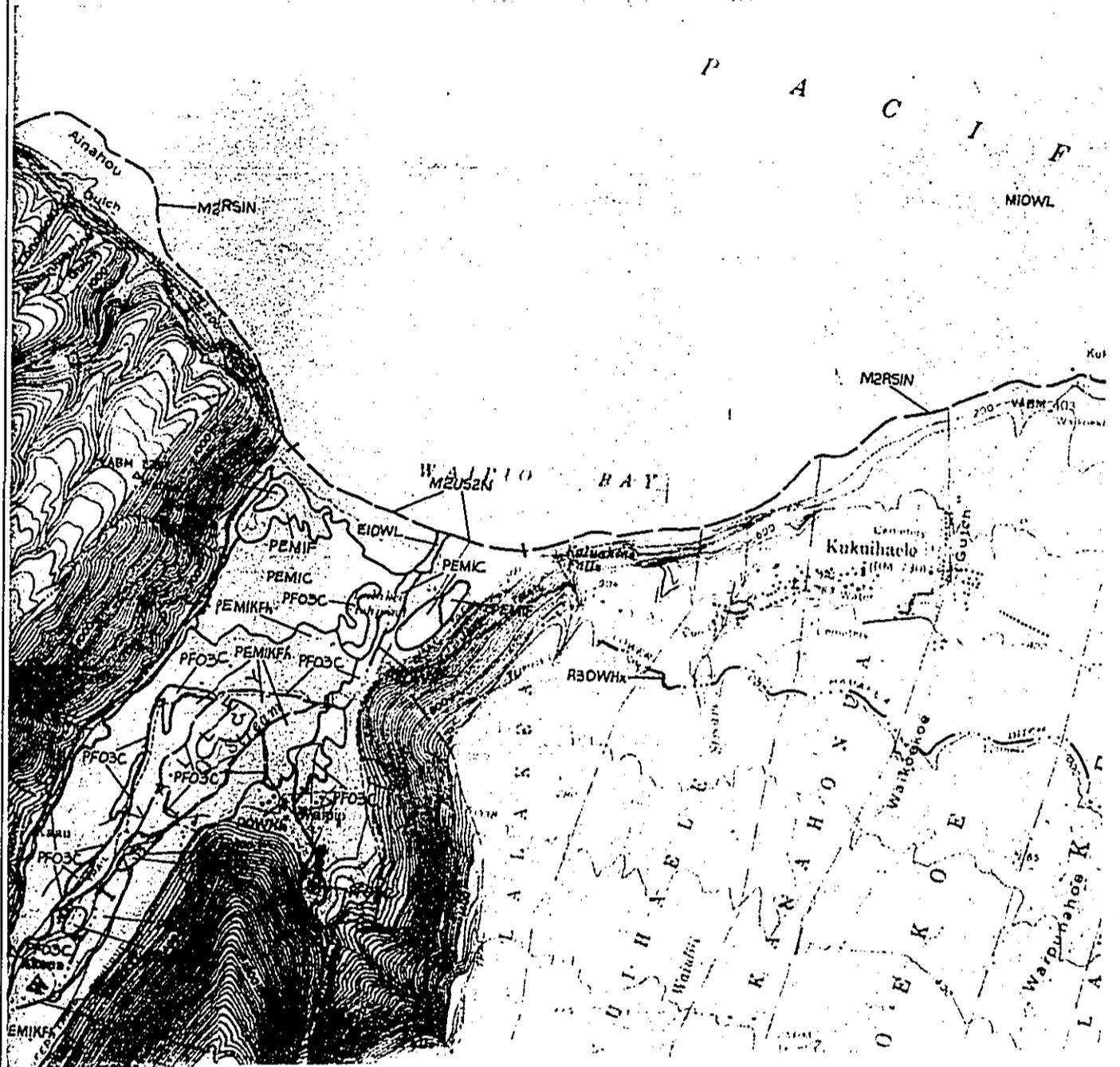
Native species in this area include popolo (*Solanum americanum*) and koaliawa (*Ipomoea indica* [Burm.] Merr.). Vegetation in the undisturbed gullies and ravines in the area are mostly introduced ironwood, Java plum, guava, and Christmas-berry shrubs. None of the native species identified in the survey are listed as threatened or endangered plants nor are any proposed candidates for listing. Most of the native species are ubiquitous in the native forests of Hamakua and Kohala.

Based on existing data compiled through various bird and mammal field and literature surveys in the area, common species that could be found near the project site include the endemic Hawaiian Hawk, indigenous White-tailed Tropic Birds, Great Frigate Bird, and indigenous, migratory Pacific Golden Plover. Hawaiian Hawks were first listed as an endangered species in 1967, *but they are currently under review by the U.S. Fish and Wildlife Service for down listing from the endangered to threatened status since their populations are healthy and maintaining themselves.* Traditionally, the Hamakua area has had one of the denser populations of Hawaiian Hawks on the island.

### 2.10 Wetlands

Based on U.S. Fish and Wild Life Service criteria, a wetland must have one or more of the following three attributes: (1) it supports predominantly hydrophytes, periodically, (2) the substrate is mainly undrained hydric soil, and (3) the substrate is saturated with water or covered by shallow water at some time during the growing season. As shown in Figure 2-10, there are no wetlands in or around the proposed exploratory well site. Most of the wetlands in the area are located within the Waipio Valley.

Figure 2 - 10 Wetland Map



1119FIG2-10.DWG 02/22/00 16:30

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### 2.11 Archaeological and Historic Sites

Based on a search of archaeological information compiled by the State Historic Preservation Division, the area has historically been used for agricultural activities. Specifically, the parcel is located on old sugarcane cropland, which would mean that the probability of having any historic or archaeological site on or near the proposed well site is very low. A letter from the Department of Land and Natural Resources, Historic Preservation Division, dated June 3, 1999, presented in Appendix A, further confirms this assertion. Should any historic artifacts and/or burial sites be found during construction of the exploratory well, work must be stopped and the State Historic Preservation office must be contacted for implementation of a proper monitoring and preservation program.

### 2.12 Aquatic Resources

There are no standing or flowing bodies of water on or near the proposed exploratory well site.

### 2.13 Scenic and Aesthetic Resources

The proposed parcel is located along an existing unimproved dirt road. In the north and east, it borders agricultural lands with no special scenic characteristics. The existing Kukuihaele Reservoir which is a 35-foot diameter concrete tank surrounded by a 6-foot high perimeter fence defines the southern boundary of the proposed well site. Neither the site nor its surroundings offer a unique or aesthetically rich view plain.

## 2.14 Existing Water System Infrastructure

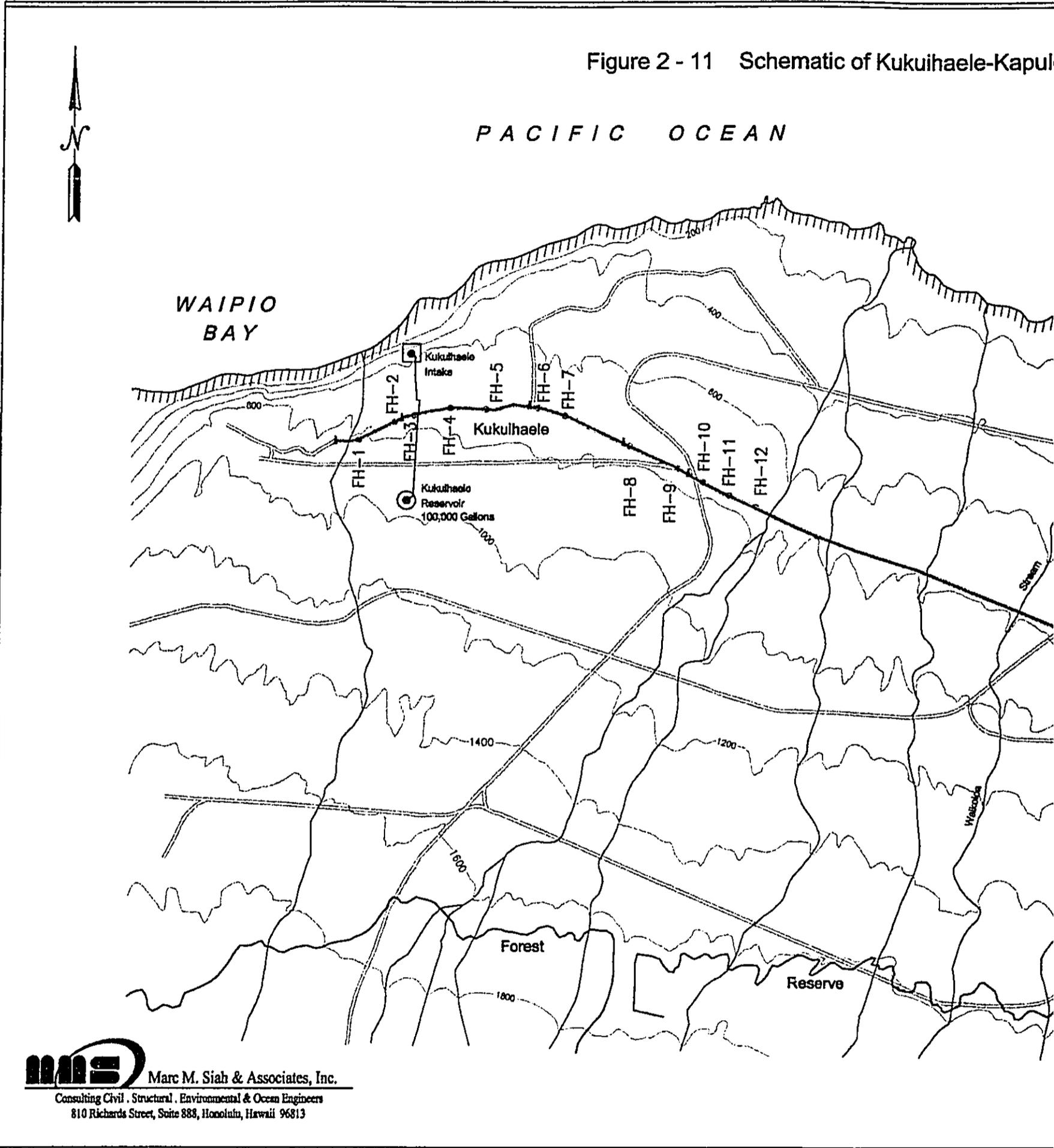
The existing Kukuihaele-Kapulena Water System, which serves the north-eastern coastal areas between Honokaa and Waipio Valley, consists of: (a) an intake pumping station at Kukuihaele; (b) two reservoirs with a total storage capacity of 150,000 gallons at Kukuihaele and Kapulena, respectively; (c) two booster stations at Kapulena and Mastronardo; and (d) approximately 27,000 lineal feet of either 4- or 6-inch ductile iron transmission lines. A schematic of this water system and its service area is shown in Figure 2-11. Originally, this water system was developed to serve Kukuihaele only. Later it was extended to serve Kapulena town as well, and recently, Mastronardo Booster Station was added to provide adequate pressure to a new subdivision in the vicinity of Mastronardo.

The intake structure at Kukuihaele is the only water source for the existing water system. The intake structure is situated at an approximate elevation of 550 feet above Mean Sea Level (MSL) tapping a coastal spring. After chlorinating, the intake water is pumped via transmission lines to either Kukuihaele and Kapulena Storage Reservoirs or directly to service points along the transmission and distribution system.

### 2.14.1 Storage Reservoirs

The existing water system includes two reservoirs, which act as storage as well as distribution reservoirs.

Figure 2 - 11 Schematic of Kukuihaele-Kapulu



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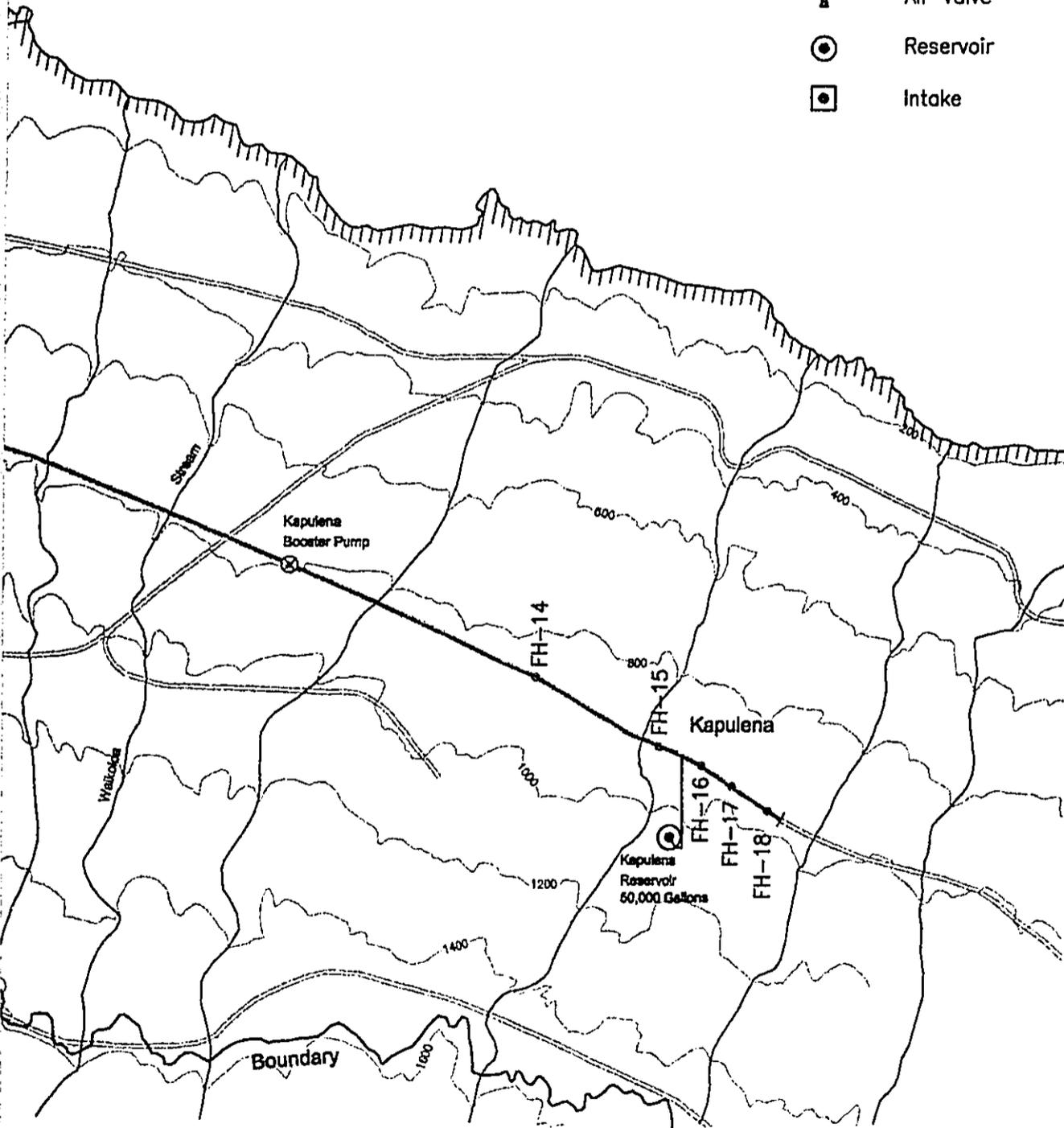
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# Ikuihaele-Kapulena Water System

## Legend

- Fire Hydrant
- ▲ Air Valve
- ⊙ Reservoir
- ⊠ Intake



## SECTION 2: EXISTING CONDITIONS

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Kukuihaele Reservoir is situated on a roughly one-acre lot located approximately 0.1 mile south of State Highway 240. It is a 100,000-gallon concrete tank with a diameter of 35 feet. The elevation of the reservoir bottom is 956.0 feet above MSL and overflow elevation is at 970.5 feet MSL. The intake pumps feed the reservoir via approximately 2,700 feet of 4- and 8-inch ductile iron pipes.

Kapulena Reservoir is situated on an approximately 0.5-acre parcel amidst macadamia orchards, about 0.3 miles south of State Highway 240. The 50,000-gallon concrete reservoir has a diameter of 25 feet. The bottom elevation of the reservoir is 1,045.0 feet above MSL and the overflow elevation is 1,059.5 above MSL. Kapulena boosters feed this reservoir.

### 2.14.2 Transmission Lines

The Kukuihaele-Kapulena Water System encompasses approximately 17,000 lineal feet of 4-inch and 10,000 lineal feet of 6-inch ductile iron pipes laid mostly along State Highway 240 and Government Main Road. There are five air valves and eighteen fire hydrants within this water system.

### 2.14.3 Pumping Stations

The Kukuihaele-Kapulena Water System includes three booster/pumping stations used to distribute water to various take-outs within the service area. They are Kukuihaele Pumping Station, Kapulena Booster Station, and Mastronardo Booster Station, respectively.

## SECTION 2: EXISTING CONDITIONS

Kukuihaele Pumping Station has two pumping units installed in the Kukuihaele intake structure at an elevation 546.3 above MSL. Each unit has a design flow rate of 100 gpm and a design head of 450 feet. For regular daily operation, only one of these pumps is on. The second pump is employed as a standby unit. The Kukuihaele pump is controlled by a Level switch at Kukuihaele reservoir. When the water level in the Kukuihaele reservoir drops down to a preset level, the pump is turned on. It will shut off automatically when the Kukuihaele reservoir is full.

Kapulena Booster Station is situated approximately 2.5 miles east of Kukuihaele Reservoir along State Highway 240. The elevation of Kapulena Booster Station is 790.7 feet above MSL. The station houses two pumps. Each pump is rated at 50 gpm and a head of 260 feet. This station is used to boost the pressure in the eastern parts of the distribution system while delivering water to Kapulena Reservoir. A level switch at Kapulena Reservoir controls its operation.

Mastronardo Booster Station was recently completed and put into service to provide adequate pressure to residences in the Mastronardo area.

**SECTION 3**

**PROJECT IMPACTS AND MITIGATION MEASURES**



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## SECTION 3

### PROJECT IMPACTS AND MITIGATION MEASURES

The following subsections describe the project's potential impacts and offers mitigative measures to address them. Some of the impacts discussed include construction noise, air quality, flora and fauna, surface water and groundwater quality, archaeological and historic resources, traffic, public health and safety, and socioeconomic conditions.

#### 3.1 Short Term Impacts and Mitigation Measures

Short-term impacts of the project are due to site clearing, grubbing, and grading, well drilling and installation, construction activities and landscaping. These activities are limited to the project site and will occur only during the construction period.

##### 3.1.1 Construction Noise

Noise generated from drilling and construction activities will likely be unavoidable during the entire drilling and construction phase. Unavoidable construction noise impacts will be mitigated to some degree by the contractor's compliance with the provisions of the State Department of Health Administrative Rules, Chapter 11-46, "Community Noise Control". Mobilization of equipment as well as the well drilling should be done only during the daytime. Construction work is prohibited during the weekends and holidays. To mitigate any noise impacts generated from well drilling, the use of muffled construction equipment is recommended. Construction equipment is also expected to be properly maintained. In addition, strict compliance with the guidelines in regards to the hours of heavy equipment operation and noise

### SECTION 3: PROJECT IMPACTS AND MITIGATIVE MEASURES

curfew times as set forth by the DOH noise control regulation must be observed. No significant noise impacts from the pumping test are anticipated.

#### 3.1.2 Air Quality

Short-term ambient air quality at the project site is expected to be affected due to construction activities such as clearing, grubbing, and grading as well as vehicular emissions from construction equipment. All operations must be conducted in conformance with the State Department of Health's regulations regarding vehicular emissions. The contractor should be responsible for employing dust control measures such as regular watering and sprinkling to minimize wind-blown particles. Areas, recently graded, should be grassed as soon as possible to prevent dust from becoming a nuisance. Ambient air quality may also be adversely affected by emissions from construction equipment and other motor vehicles, thus, all construction equipment shall be equipped with adequate emission control measures. Potential exhaust emissions from construction equipment are anticipated to have negligible impacts on ambient air quality in and around the project areas.

In summary, the project is not expected to have significant impacts on ambient air quality.

#### 3.1.3 Flora and Fauna

With the exception of the Hawaiian Hawk, no known rare or endangered species of flora and fauna are found at the project site. Thus, it is anticipated that the proposed project will have limited short-term impacts on sensitive and endangered species.

## SECTION 3: PROJECT IMPACTS AND MITIGATIVE MEASURES

### 3.1.4 Surface Water and Groundwater Quality

It is expected that the impacts on surface water and groundwater will be insignificant. The nearest surface water features to the proposed site include three intermittent streams namely Waiulili Stream and Waikoekoe Gulch as well as Hamakua ditch. The quality of surface water within the general area of the proposed project is classified as Class 2 inland water according to the Department of Health Water Quality Standards Map.

All storm runoff on the site will be contained on-site. The drilling contractor in accordance with the requirements of the Department of Health, Clean Water Branch, will dispose of discharge from pumping tests. The discharge will be directed to two on-site seepage pits to be constructed by the contractor. Impacts of the proposed well on the groundwater are considered insignificant as the capacity of the proposed well is well below the anticipated safe yield of the aquifer. Well annulus will be grouted to sea level or below to impede potential surface contamination of the well.

### 3.1.5 Archaeological and Historical Resources

No archaeological or historical sites are known to exist at the proposed well site, and no short-term impacts on such resources due to construction are expected. Should any artifact and/or burial site be encountered during construction at the proposed well site, all activities will be ceased and the State Office of Historic Preservation will be notified. After consultation with this office and implementation of a monitoring program, construction activities will be allowed to continue.

### 3.1.6 Traffic

Vehicular access to the project site is via an existing unimproved dirt road. Since there are no residential developments in the area, any temporary

# CORRECTION

THE PRECEDING DOCUMENT(S) HAS  
BEEN REPHOTOGRAPHED TO ASSURE  
LEGIBILITY  
SEE FRAME(S)  
IMMEDIATELY FOLLOWING

## SECTION 3: PROJECT IMPACTS AND MITIGATIVE MEASURES

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## SECTION 3: PROJECT IMPACTS AND MITIGATIVE MEASURES

increase in traffic volume for transport of construction materials and drilling equipment is unlikely to affect traffic in the vicinity of the project site. If necessary to mitigate potential traffic congestion and delays on State Highway 240, the movement of construction vehicles can be restricted during the morning and afternoon peak traffic hours. It is anticipated that all construction related vehicles would park in the vicinity of the project site.

### **3.1.7 Public Health and Safety**

The contractor shall be responsible for implementing appropriate measures to ensure public health and safety during the construction period. The construction area will be delineated and properly marked.

### **3.1.8 Socioeconomic Conditions**

Construction of the proposed well may provide short-term additional opportunities for local construction workers. It will also benefit the local material suppliers, in both retail and service sectors. The additional requirements for community service generated from the construction are expected to be minimal since only a few workers are needed. Thus, the proposed project will have no impacts on community service needs.

### **3.2 Long Term Impacts and Mitigation Measures**

No long-term impacts are expected to result from the proposed exploratory well. If the results of the pumping test and water quality analysis are favorable, the exploratory well will be outfitted into a production well. The following subsections address the production well's long-term impacts on the surrounding area's ambient noise, flora and fauna, drainage, stream flow, infrastructure, socioeconomic, and land use.

## SECTION 3: PROJECT IMPACTS AND MITIGATIVE MEASURES

### 3.2.1 Noise

Noise level generated by the production well is expected to be in the range of 40-45 dBA which is insignificant and well below the acceptable 75 dBA limit.

### 3.2.2 Flora and Fauna

Since the only endangered species in the area, the Hawaiian Hawk, is currently being reviewed for downlisting because of their increasing numbers, no significant long-term impacts are expected on the flora and fauna in the area.

### 3.2.3 Drainage

Grading and construction of proposed facilities will increase on-site storm runoff, which will either be diverted to seepage pits or allowed to sheet flow into the existing drainage ways in the area. The project has no significant impacts on drainage in the area.

### 3.2.4 Stream Flow and Groundwater

As mentioned in Section 3.1.4, the nearest surface water features to the proposed exploratory well site are two intermittent streams namely Waiulili Stream and Waikoekoe Gulch as well as Hamakua ditch. Waiulili Stream is approximately 1150 feet southwest of the existing water tank. Waikoekoe Gulch is approximately 2050 feet southeast of the existing reservoir. Hamakua ditch is approximately 200 feet south of the existing water tank. The inverts of the streams or the ditch are approximately 10 feet below ground level. The proposed well which will be over 1,000 feet deep will tap an aquifer at approximately 50 feet below sea level. This aquifer in turn is overlain by a shallower aquifer. The vertical separation between the invert of the streams and the deeper aquifer includes a semi-permeable layer, which separates the two aquifers. Therefore, it is not anticipated that the proposed exploratory

### SECTION 3: PROJECT IMPACTS AND MITIGATIVE MEASURES

well will affect flows in the surface streams. It is suspected that the stream flows to be more affected by pumping water from the shallower aquifer. In addition, potential impacts of the proposed project on the groundwater in the area are also considered insignificant since the limited pumping anticipated from the well is well below the potential yield of the aquifer.

#### 3.2.5 Electrical Infrastructure

Currently, power is not available at the existing reservoir site. The closest power line is along Highway 240 approximately 0.1 mile away from the site. The exploratory well drilling and testing will be accomplished by utilizing a diesel-powered rig and pump. Should the exploratory well prove productive and sustainable, the existing grid must be extended to include the well site. This can be accomplished by installation of approximately 0.1 mile of overhead line and a pole system. Therefore, the proposed project has a small long-term impact on HELCO's power grid. This impact, however, is a small fraction of the total daily load on the system.

#### 3.2.6 Socioeconomic Conditions

The proposed exploratory well is necessary to replace the existing Kukuihaele surface water intake. Initially, water produced by the proposed well, which will supply the service area, will be more costly than water from the existing intake. It is not expected, however, that the surface source will be allowed to supply the water without additional treatment as mandated by the Surface Water Treatment Rule of the Safe Drinking Water Act. Cost of adequate treatment and operation and maintenance of such facility will result in much higher prices for the treated water than that of the proposed well. In the long run, installation of the new well will be more feasible for the Department of Water Supply as well as the local community.

## SECTION 3: PROJECT IMPACTS AND MITIGATIVE MEASURES

### 3.2.7 Land Use and Planned Development

The proposed facility will be located on agriculturally zoned land, which is compatible with the permissible land use for the property. The project is not expected to impact land prices of adjacent properties.

### 3.2.8 Accessory Facilities

The proposed action entails installation of an exploratory well at the proposed site as explained in Section 1.3. With the exception of two 10' x 10' seepage pits to be used for disposal of pumping test waters, there are no accessory facilities required during the exploratory phase of the project. Once the pumping test is completed successfully and the well is proven to be a viable source, DWS will outfit the well into a production well. The water from the production well will flow to the existing Kukuihaele reservoir located adjacent to the proposed well site. The only accessory facility envisioned for the proposed production well is a 20' x 25' single story CMU control building which will house the motor control center, electrical equipment, alarm system, and chlorination system. The building will be naturally vented. The production well would be connected to the existing 100,000-gallon Kuikuihaele Reservoir. No adverse environmental impacts are anticipated from the accessory facilities for either the exploratory well or the production well.

**SECTION 4**

**ALTERNATIVES TO THE PROPOSED ACTION**

## SECTION 4

### ALTERNATIVES TO THE PROPOSED ACTION

The alternatives for the proposed exploratory well project include "No Action", "Delayed Action", "Alternative Sites", and "Alternative Sources". Each of these alternatives are discussed on the following pages.

#### 4.1 No Action

The objective of the exploratory well is to determine the potential for installation of a new production well at the site to replace the existing surface water intake facility as the source of potable water for the Kukuihaele-Kapulena Water System. "No Action" means that no exploratory well will be drilled. This alternative is not acceptable to the Department of Water Supply (DWS) due to the fact that in order to improve reliability and quality of the water in the service area, the DWS must either construct a treatment facility in compliance with the Surface Water Treatment Rule or replace the existing intake structure with a production well. The "No Action" alternative, therefore, is not a viable and/or practical option.

#### 4.2 Delayed Action

The "Delayed Action" alternative means that the exploratory well will be drilled some time in the future. Continued exploitation of the existing surface water source without adequate treatment is in violation of the Safe Drinking Water Act and must be addressed expeditiously. This alternative is not acceptable since it jeopardizes public health and safety.

### Alternative Sites

In a recently completed site selection study for an exploratory well in the Kukuihaele-Kapulena Water System, three alternative sites were evaluated. These alternative sites included the Kukuihaele Reservoir site, the Kapulena Reservoir site, and an intermediate location between Kukuihaele Reservoir and Kapulena Reservoir. Hydraulic evaluation and feasibility analyses for integration of each alternative site into the existing system determined that the Kukuihaele Reservoir site is the most feasible location for the new well. The other two alternate sites, namely a new location between Kukuihaele Reservoir and Kapulena Booster, and the Kapulena Reservoir site were ranked two and three, respectively. A new well site between Kukuihaele and Kapulena Reservoirs must be capable of supplying water to these two existing reservoirs. This option means that the Kapulena Booster must be upgraded and re-configured to allow simultaneous pumping towards Kapulena Reservoir as well as the Kukuihaele Reservoir. Such upgrading is costly and the system will be hydraulically less efficient. Similarly, the system performance and integration for a new well at the Kapulena Reservoir site would be poor compared to a new well at the Kukuihaele Reservoir site. Therefore, the best location for the new well is the site identified by this proposed agency action. Use of alternative sites is not recommended.

### 4.3 Alternative Sources

#### 4.3.1 Enhanced Water Conservation

The proposed well is not intended to offset an increase in demand for potable water in the area. Rather, water from the proposed well will substitute water currently supplied by the Kukuihaele intake. The DWS has determined that installation and operation of a treatment system, which complies with the SWTR for this source, is highly unfeasible. Since the need for the proposed well is prompted by changes in water testing and treatment requirements for surface

## SECTION 4: ALTERNATIVES TO THE PROPOSED PLAN

water, decreasing water use in the Kukuihaele service area would not eliminate the need for a substitute source for the Kukuihaele intake.

The DWS has already initiated programs to promote conservation measures. The use of low flow fixtures is required for all new construction and renovation projects. In addition DWS is engaged in promoting a xeriscape program, leak detection and repair program and a low fixture retrofit program.

### 4.3.2 Wastewater Reuse

The County of Hawaii has initiated wastewater reuse measures in certain parts of the island. The treated wastewater effluent is used mainly for irrigation in golf courses. Reuse of wastewater effluent to replace potable demand in the Kukuihaele service area is neither a viable option nor acceptable by the community at this time.

### 4.3.3 Rainwater Catchments

Construction of rainfall catchments in the area is not a viable alternative in the area due to long dry periods, which occur during the summer.

In light of the above explanations for alternative actions, and the fact that the Department of Water Supply has determined that continued usage of the existing intake source requires costly construction, operation and maintenance treatment facilities placing an unjustifiable economic burden on its resources. Thus, only replacement of this source with a groundwater source is viewed as practically feasible and can bring the DWS into compliance with the requirements of the Surface Water Treatment Rule. Therefore, the proposed action is the only reasonable alternative for providing a reliable source for the Kukuihaele-Kapulena service area.

**SECTION 5**

**IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS  
OF RESOURCES AND UNRESOLVED ISSUES**

## SECTION 5

### IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES AND UNRESOLVED ISSUES

The proposed exploratory well project involves irreversible and irretrievable uses of energy, labor, materials, and capital funds by the County of Hawaii. The Department of Water Supply needs to acquire the land proposed for the exploratory well as expeditiously as possible. There are no unresolved issues in regard to the proposed exploratory well at the present time.

**SECTION 6**

**LIST OF NECESSARY PERMITS AND APPROVALS**

## SECTION 6

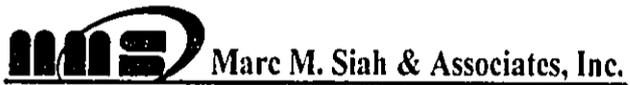
### LIST OF NECESSARY PERMITS AND APPROVALS

The following permits and approvals are anticipated for the development of the proposed Kukuihaele exploratory well project:

- A. Plan Approval - Department of Water Supply, County of Hawaii.
- B. Well Construction Permit - Commission on Water Resource Management, Department of Land and Natural Resources.
- C. Pump Installation Permit - Commission on Water Resource Management.
- D. Department of Land and Natural Resources, State of Hawaii.
- E. State Historic Preservation Office, Department of Land and Natural Resources.

**SECTION 7**

**FINDINGS AND NOTICE OF ANTICIPATED  
DETERMINATION**



**Marc M. Siah & Associates, Inc.**

Consulting Civil Structural Environmental & Ocean Engineers  
810 Richards Street, Suite 888, Honolulu, Hawaii 96813

## SECTION 7

### FINDINGS AND NOTICE OF ANTICIPATED DETERMINATION

#### 7.1 Significant Criteria

The proposed project, including the installation and pump testing of an exploratory well on a portion of parcel, TMK: 4-8-08-01, in the Kukuihaele area of the Island of Hawaii involves acquisition of approximately 0.26 acres of land adjacent to the existing Kukuihaele Reservoir by the Department of Water Supply. The improvements involve grading and site preparation, installation of an exploratory well, water quality sampling and analysis and pump testing. Should the well prove to be productive and sustainable, it will then be outfitted and converted into a production well, which will replace the existing intake facility at Kukuihaele. The replacement will eliminate the need for construction of treatment facilities for the existing intake in order to comply with the requirements of the Surface Water Treatment Rule of the Safe Drinking Water Act.

The proposed installation of an exploratory well project would not have any significant and adverse impacts on the environment, therefore, an Environmental Impact Statement is not necessary for the project. Based on the "Significant Criteria" listed in Section 12 of Hawaii Administrative Rules Title 11, Chapter 200, an applicant or agency must determine whether an action may have a significant impact on the environment, including all phases of the project, its expected consequences both primary and secondary, its cumulative impact with other projects, and its short and long term impacts. In making the determination, the "Significant Criteria Rules" are employed as the basis for identifying whether the proposed project has significant environmental impacts. Based on these rules the following conclusions are reached:

SECTION 7: FINDINGS AND NOTICE OF ANTICIPATED DETERMINATION

1. *The Kukuihaele exploratory well project would not result in irrevocable commitment, loss or destruction of any natural or cultural resources.*  
The proposed exploratory well will be constructed in the vicinity of the existing Kukuihaele reservoir site. No significant natural resources are present at the project site. No known cultural resources would be impacted.
  
2. *The proposed project would not curtail the range of beneficial uses of the environment.* The proposed project, will not curtail beneficial uses of the site and its surroundings. In fact, it will enhance the usefulness of the public and private properties in the area. The water to be withdrawn from the proposed well will be a small fraction of the developable yield of the aquifer.
  
3. *The proposed action does not conflict with the State's long term environmental policies or goals and guidelines.* These policies as set forth in Chapter 344; Hawaii Revised Statutes support conservation of natural resources, and enhancement of the equality of life. The proposed project will allow abandonment of an existing surface water intake, which is no longer in compliance with the requirements of the Surface Water Treatment Rule. The project will improve the reliability and quality of water from the existing Kukuihaele-Kapulena Water System.
  
4. *The economic or social welfare of the community or State would not be substantially affected.* The proposed well will provide a more reliable source of water for the service area. Its development allows the DWS to abandon the existing surface water intake, which must otherwise be expanded to include adequate treatment facilities in order to be in compliance with the law. In other words, it will save the County additional monies, which would have to be spent to upgrade the existing intake.

SECTION 7: FINDINGS AND NOTICE OF ANTICIPATED DETERMINATION

5. *The proposed action does not negatively affect public health.* The project would improve the reliability and quality of the water source in the Kukuihaele-Kapulena service area. By replacing a non-complying surface source with more reliable groundwater source as suggested by the proposed action the public health will indeed be improved.
  
6. *No substantial secondary impacts, such as population changes or affects on public facilities, are anticipated.* The proposed exploratory well project will replace the existing source in Kukuihaele service area and will not have any impact on other public facilities and/or population increases in the area.
  
7. *No substantial degradation of environmental quality is anticipated.* The project area is unremarkable in terms of environmental resources, and implementation of standard mitigation measures would suffice to protect the ambient environmental quality. The project is not expected to result in concentrations of air pollutants exceeding State or Federal Standards.
  
8. *The proposed action does not involve a commitment to larger actions, nor would cumulative impacts result in considerable impacts on the environment.* The proposed action, if successful, will lead to development of a new production well independent of other water systems. The project will provide reliable and good quality water to the customers.
  
9. *No rare, threatened or endangered species or their habitats would be affected.* With the exception of the Hawaiian Hawk, no known endangered or threatened flora and fauna species would be affected by the project.
  
10. *Air quality, water quality or ambient noise levels would not be detrimentally affected.* The proposed project will not adversely affect

## SECTION 7: FINDINGS AND NOTICE OF ANTICIPATED DETERMINATION

air or water quality. It also will not generate solid wastes or produce emissions that will have significant impacts on the public health or the environment. Short-term impacts from construction activity include increased noise levels, dust and exhaust from construction machinery which will be mitigated by implementation of standard methods that the County will require the contractor to use.

11. *The project would not affect environmentally sensitive areas, such as flood plains, tsunami zones, erosion-prone areas, geologically hazardous lands, fresh waters or coastal waters.* No environmentally sensitive areas would be affected by the proposed well construction. The proposed project is on mildly sloping grounds well inland of the coast and outside of flooding and tsunami inundation zones. No seismic risks or volcanic hazards are anticipated.
12. *The project does not substantially affect scenic vistas and view plains in the County, or State plans and studies.*
13. *The proposed project does not require substantial energy consumption.*

### 7.2 Notice of Anticipated Determination

On the basis of the foregoing information, it is anticipated that the proposed exploratory well would not have significant impacts on the environment. As such, a notice of anticipated determination of *Findings of No Significant Impact* for the proposed project is appropriate.

### 7.3 Reasons Supporting the Anticipated Determination

The nature and scale of the proposed project are such that no significant environmental affects are anticipated. A few negative impacts which have been identified in this Environmental Assessment can be mitigated or minimized

SECTION 7: FINDINGS AND NOTICE OF ANTICIPATED DETERMINATION

through sensitive site planning and engineering design, implementation of careful construction methods and compliance with all governmental requirements including those of the State Department of Health and Department of Water Supply, County of Hawaii.

**SECTION 8**

**AGENCIES CONSULTED**



**Marc M. Siah & Associates, Inc.**

Consulting Civil Structural Environmental & Ocean Engineers  
810 Richards Street, Suite 888, Honolulu, Hawaii 96813

## SECTION 8

### AGENCIES CONSULTED

#### Federal Agencies

U. S. Department of Agriculture  
Natural Resources Conservation Service  
P. O. Box 50004  
300 Ala Moana Blvd.  
Honolulu, HI 96850

U. S. Department of the Interior  
Fish and Wildlife Service, Ecological Services  
P. O. Box 50156  
300 Ala Moana Blvd.  
Honolulu, HI 96850

#### State of Hawaii

Department of Land and Natural Resources  
Water Resources Management Division  
1151 Punchbowl Street  
Honolulu, Hawaii 96813

Department of Land and Natural Resources  
State Historic Preservation Division  
601 Kamokila Blvd., Room 555  
Kapolei, Hawaii 96707

State Land Use Commission  
State Office Tower, 4<sup>th</sup> Floor  
235 S. Beretania Street  
Honolulu, Hawaii 96813

SECTION 8: AGENCIES CONSULTED

Department of Health  
Clean Water Branch  
919 Ala Moana Blvd, Room 301  
Honolulu, Hawaii 96814

Department of Business, Economic  
Development, and Tourism  
250 S. Hotel Street  
4th Floor, Ewa Wing  
Honolulu, Hawaii 96813

County of Hawaii

Department of Water Supply  
25 Aupuni Street  
Hilo, Hawaii 96720

## REFERENCES

 **Marc M. Siah & Associates, Inc.**

Consulting Civil Structural Environmental & Ocean Engineers  
810 Richards Street, Suite 888, Honolulu, Hawaii 96813

## REFERENCES

1. U. S. Department of Agriculture, Soil Conservation Service. Soil Survey of Island of Hawaii, State of Hawaii, 1972.
2. University of Hawaii, Department of Geography, Atlas of Hawaii (3<sup>rd</sup> Ed.), University of Hawaii Press, Honolulu, Hawaii, 1998.
3. State of Hawaii, Department of Land and Natural Resources, Division of Water and Land Development, Rainfall Atlas of Hawaii, R76, 1976.
4. Water Sources Protection Plan Volume I & II, Commission on Water Resources Management, Department of Land and Natural Resources, State of Hawaii, March 1992.
5. Macdonald, Gordon A., Abbott, Agatin T., and Peterson, Frank L., Volcanoes in the Sea, University of Hawaii Press, Honolulu, Hawaii, 1990.
6. Stearns, Harold T., Geology of the State of Hawaii, Pacific Books, Palo Alto, California, 1985.
7. Hawaii Well Construction & Pump Installation Standards, Department of Land and Natural Resources, Commission on Water Resource Management, Honolulu, Hawaii, 1997.
8. Takemoto, Roy R., Final Environmental Statement - Amanresort, Office of Environmental Quality Control, February 1994.
9. Marc M. Siah & Associates, Inc., Kukuihaele Exploratory Well Site Selection Study, 1998.

## APPENDICES

## **Appendix A – Letters of Correspondence**

BENJAMIN J. CAYETANO  
GOVERNOR OF HAWAII



STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

HISTORIC PRESERVATION DIVISION  
Kakuihewa Building, Room 555  
601 Kamohala Boulevard  
Kapolei, Hawaii 96707

TIMOTHY E. JOHNS, CHAIRPERSON  
BOARD OF LAND AND NATURAL RESOURCES

DEPUTIES  
JANET E. KAWALO

AQUATIC RESOURCES  
BOATING AND OCEAN RECREATION  
CONSERVATION AND RESOURCES  
ENFORCEMENT  
CONVEYANCES  
FORESTRY AND WILDLIFE  
HISTORIC PRESERVATION  
LAND  
STATE PARKS  
WATER RESOURCE MANAGEMENT

June 3, 1999

Dr. Marc M. Siah  
Marc M. Siah & Associates, Inc.  
810 Richards Street  
Honolulu, Hawaii 96813

LOG NO: 23363 ✓  
DOC NO: 9905PM07

Dear Dr. Siah:

**SUBJECT:** Request for Information on Historic Sites  
Kukuihaele, Hamakua, Hawaii Island  
TMK: 4-8-08:26 and 4-8-08:1

Thank you for your letter of April 20, 1999 and the opportunity to review and comment on the proposed exploratory well located at the above referenced location.

We have no records of historic sites on the two parcels listed above. It appears to us that the parcels are located on old sugarcane cropland, which would mean that there is a low probability of significant historic sites. We thus believe that the proposed well will have "no effect" on significant historic sites.

If you have any questions please contact Patrick McCoy (692-8029).

Aloha,

A handwritten signature in black ink, appearing to read "Don Hibbard".

DON HIBBARD, Administrator  
State Historic Preservation Division

PM:amk

## **Appendix B – Comments and Responses to Draft EA**



Consulting Civil · Structural · Environmental & Ocean Engineers  
810 Richards Street, Suite 888, Honolulu, Hawaii 96813

BENJAMIN J. CAYETANO  
DIRECTOR



RECEIVED

GENEVEVE BALMORSON  
DIRECTOR

STATE OF HAWAII  
OFFICE OF ENVIRONMENTAL QUALITY CONTROL  
278 SOUTH BERETANIA STREET  
SUITE 102  
HONOLULU, HAWAII 96813  
TELEPHONE 808-541-1111  
FACSIMILE 808-541-1111

December 8, 1999

Mr. Milton D. Pavao, Manager  
Hawaii County Department of Water Supply  
25 Apunui Street  
Hilo, Hawaii 96720

Dear Mr. Pavao:

Subject: Draft Environmental Assessment for the Kukuiahaele  
Exploratory Well, Hawaii

Thank you for the opportunity to review the subject document. We  
have the following comments.

1. Orientation Maps

Please provide maps with the appropriate scale and coverage to  
analyze the aquifer or hydrologic unit that show the  
following:

- a) Contamination information: Points or regions of known  
contamination, points of potential contamination (landfills,  
individual wastewater disposal systems, hazardous waste sites,  
dry wells and injection wells), known or assumed chloride  
leaks at specified depths in relation to nearest or adjacent  
wells, and the likely wellhead protection area for the  
proposed well.

2. Aquifer or Hydrologic Unit Status

Please provide a description of the aquifer or hydrologic unit  
status including the following:

- Data table presenting the following information as  
appropriate
  - Current installed capacity including subtotals for  
individual wells and/or groups of wells.

Mr. Milton D. Pavao  
December 8, 1999  
Page 2

- Pending installed capacity and/or use for the  
proposed well and subtotals for individual wells  
and/or groups of wells within the aquifer

3. Contamination Analysis and Vulnerability Assessment

Please provide a record of contamination problems in the  
aquifer or hydrologic unit including but not limited to  
saltwater intrusion, turbidity, heavy metals, inorganic and  
organic chemicals, microbiological agents, water quality  
parameters (such as pH, alkalinity, calcium, conductivity and  
temperature), and radioactivity. If contamination exists, the  
sources and duration of the contamination should be listed.  
Water quality data from nearby wells should be presented as  
well as any anticipated need for treatment or filtering  
systems. Discuss past and existing land uses within the  
likely wellhead protection area and the potential for future  
contamination from those uses.

The potential for contamination should be assessed based on  
geologic and hydrologic considerations. Although sources of  
contamination might be presently absent, vulnerability to  
contamination might be great, if contamination sources occur  
in the future, due to factors such as high rates of  
infiltration or thin, protective soil horizons.

Any hazardous materials used and/or produced during drilling  
and treatment should be described. The method of handling  
these hazardous materials should also be disclosed.

4. Hydrologic Impact Analysis

Please describe the basis for the determination that the well  
will not impact the nearby streams. Will the streams be  
monitored during the pump tests? If not, please justify the  
decision not to monitor the streams.

5. Financial and Institutional Arrangements

In some instances, a well is developed by private financing,  
the transfer of public lands to government or private  
developers, or in return for a water allocation credit to  
supply an urban development. The EA should include a full  
discussion of any institutional, financial or land use  
arrangements or commitments related to developing the well and  
delivering water to end users.

Mr. Milton D. Pavao  
December 8, 1999  
Page 3

These arrangements may include the formation of public utility companies and subsequent rate-setting, the establishment of county water commitments, the co-funding of state or county water system development, an executive order or other set-aside of state lands, and purchase of land or easements by public entities.

Any or all of these arrangements and all permits or governmental approvals required to fulfill these commitments should be listed.

6. **Alternative Analysis**

Please provide a list of alternatives to new groundwater development and discussion of their related costs and benefits. The list should include wastewater reuse, rainfall catchment, existing potable and non-potable water supplies, water conservation and Demand Side Management or Integrated Resources Planning. Show why developing a new source is more cost efficient than water conservation programs (slow-flow and low-flush retrofits, leak detection, etc.).

7. **Impacts of Accessory Facilities**

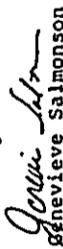
Please describe the impacts associated with the well's permanent production facilities including pumps, distribution pipelines, control devices, storage facilities, access roads and accessory structures.

8. **Existing Surface Intake System**

What is the current withdrawal amount from the existing intake system? When is the deadline to meet with the EPA's new surface water treatment rules?

Should you have any questions, please call Jeyan Thiruganam at 586-4185.

Sincerely,

  
Genevieve Salmonson  
Director

C: Marc Siah and Associates

RECEIVED JAN 20 2000



DEPARTMENT OF WATER SUPPLY • COUNTY OF HAWAII  
25 AUPUNI STREET • HILO HAWAII 96720  
TELEPHONE (808) 961-8660 • FAX (808) 961-8657

January 18, 2000

Ms. Genevieve Salmonson, Director  
Page 2  
January 18, 2000

Ms. Genevieve Salmonson, Director  
State of Hawaii  
Office of Environmental Quality  
State Office Tower, Suite 702  
235 South Beretania Street  
Honolulu, Hawaii 96813

**KUKUIHAELE EXPLORATORY WELL  
DRAFT ENVIRONMENTAL ASSESSMENT - ANTICIPATED FONSI**

Thank you very much for your comments concerning the Draft Environmental Assessment for the Hawaii County Department of Water Supply's proposed Kukuihaele Exploratory Well. We appreciate your thorough review of the document and offer the following responses in addressing your concerns.

**1. Orientation Maps**

**Contamination Information** - Based on the review of available data, there are no known points or locations of contamination in the general area of the proposed exploratory well. There are no hazardous waste sites listed with the State Department of Health's Hazard Evaluation and Emergency Response Office. According to the County of Hawaii Department of Public Works Solid Wastes Division, there is no landfill in the area of the proposed action. The closest solid wastes transfer station is located in Honokaa, approximately seven miles southwest of the proposed exploratory well site.

The area north (upstream) of the proposed well site is entirely agricultural land with no dwelling or residences. According to the State Department of Health Division of Environmental Health, there are no cesspools in the area. The residential areas with cesspools or septic systems are all located south (down gradient) of the proposed well site. The closest residence is approximately 1/4 mile south of the well site. According to the State Department of Health's UST and LUST database, there are no underground storage tanks within a one-mile radius of the property. Therefore, the proposed well site is up gradient and relatively far from potential sources of contamination and is not expected to affect the proposed well's water quality.

Chlorides data in all existing six wells tapping the Honokaa aquifer system indicate levels less than 80 ppm.

... *Water brings progress...*

**2. Aquifer or Hydrologic Unit Status**

Section 2.5 of the *DEA* will be revised to include more information about aquifer status. As indicated in Section 2.5.1 of the *DEA*, the proposed well is located within the boundaries of the Honokaa Aquifer System of East Mauna Kea Aquifer Sector. The safe yield of the aquifer is estimated at 31 MGD while the total installed capacity in this aquifer is 1.39 MGD. With the exception of the proposed exploratory well, there is no pending project within the aquifer sector.

**3. Contamination Analysis and Vulnerability Assessment**

As described in Section 2.1 of the *DEA*, past and present land uses for the proposed well site and its vicinity include agricultural and rural. Based on the State Department of Health's groundwater contamination maps for the State of Hawaii, only Haina Well No.1, which is located approximately 8 miles east of the proposed well site, has shown traces of Atrazine in its water. The level of Atrazine detected in the well water in 1997 is reported at 0.11 ppb which is less than four percent of EPA's Maximum Contaminant Level. The Haina Well No. 1 is situated down gradient of large tracts of land currently used for agriculture. Historic aerial photographs of area up gradient of the proposed well site do indicate a limited use of land for active agriculture. Based on available information, it is anticipated that the risk of finding contaminants in the proposed well from prior agricultural use of the area to be very small. This is due to the fact that the proposed well will tap into an aquifer at a depth of more than 1,000 feet below the ground surface which is overlain by an intervening shallow aquifer which will be more prone to receiving any contaminant.

Upon completion of the drilling of the proposed exploratory well, water samples will be collected and analyzed to confirm that the well is suitable for a potable source. Since no hazardous materials will be used or produced during the drilling, no special treatment is anticipated. Section 2.5.1 of *DEA* will be revised to include the above information.

**4. Hydrologic Impact Analysis**

As discussed in Section 3.2.4 of the *DEA*, there are two intermittent streams and Hamakua Ditch in the general surrounding of the proposed well site. The inverts of the ditch or the streams are a little more than ten feet below the ground surface. The proposed well which will be over 1,000 feet deep taps an aquifer at approximately 50 feet below Mean Sea Level. This aquifer is in turn overlaid by a shallower aquifer. The vertical separation between the invert of surface streams and the deeper aquifer includes a semi-impermeable layer, which separates the two aquifers. Therefore, it is not anticipated that the proposed exploratory well will affect flows in the surface streams. It is suspected that the stream flows to be more affected by pumping water from the shallower aquifer.

Ms. Genevieve Salmonson, Director  
Page 3  
January 18, 2000

5. Financial and Institutional Arrangements

As discussed in Section 1 of the *DEA*, the DWS of the County of Hawaii plans to develop the new well to replace the existing Kukuihaele Intake currently serving Kukuihaele-Kapulea service area. The DWS will acquire the land and fund the project. There are no other arrangements or commitments for the development of the proposed facilities. A list of all permits required for the proposed development is included in Section 6 of the *DEA*.

6. Alternative Analysis

Section 4 of the *DEA* will be revised to include wastewater reuse, rainfall catchments, water conservation and Demand Side Management or Integrated Resource Planning.

7. Impact of Accessory Facilities

Section 3 of *DEA* will be revised to include a description of impacts associated with the proposed well's permanent production facilities including pumps, distribution pipelines, control devices, storage facilities, access roads and accessory structures.

8. Existing Surface Intake

The withdrawal rate at the existing Kukuihaele is approximately 90,000 gallons per day. Since the source has not been designated as *under surface water influence*, there is no deadline for compliance with EPA's Surface Water Treatment Rule.

Should you have any questions or need additional information and/or clarification, please contact our Water Resources and Planning Branch at 961-8665.

Sincerely yours,



Milton D. Pavao, P.E.  
Manager

copy - Marc M. Siah & Associates, Inc. ✓