BOARD OF WATER SUPPLY
COUNTY OF MAUI
P.O. BOX 1109
WAILUKU, MAUI, HAWAII 96793-7109
Telephone (808) 243-7816 • Fax (808) 243-7833

December 4, 1996

Mr. Gary Gill
Office of Environmental Quality Control
220 S. King Street
Honolulu, Hawaii 96813

Dear Mr. Gill:

Subject: **NEGATIVE DECLARATION FOR THE HAIKU WELL PUMP STATION**
STATE WELL NO. 5419-01, TMK 2-7-33:001

The Maui County Department of Water Supply has reviewed the comments received during the 30-day public comment period which began August 8, 1996. The agency has determined that this project will not have significant environmental effect and has issued a negative declaration. Please publish this notice in the OEQC Bulletin.

We have enclosed a completed OEQC Bulletin Publication Form and four (4) copies of the final EA.

Please contact our engineering division at 808-243-7835 should you have any questions.

Sincerely,

David R. Craddick
Director

/HC:sc
cc: Valerie Suzuki - Fukunaga & Associates, Inc.

Enclosures

1996-12-23-MA-FEA - Haiku Well Pump Station State Well 5419-01

Chapter 343, Hawaii Revised Statutes (HRS)

Final

Environmental Assessment

for the

Haiku Well Pump Station
TMK: 2-7-33:1
Haiku, Maui

November 1996

Prepared for:

County of Maui
Department of Water Supply
P.O. Box 1109
Wailuku, Maui, Hawaii 96793
Telephone: (808) 243-7835

Prepared by:

Fukunaga & Associates, Inc.
1388 Kapiolani Blvd. 2nd Floor
Honolulu, Hawaii 96814
Telephone: (808) 944-1821

Chapter 343, Hawaii Revised Statutes (HRS)

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Environmental Assessment

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Haiku Well Pump Station
T.M.K. 2-7-33:1
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November 1996

Prepared for:

County of Maui
Department of Water Supply
P.O. Box 1109
Wailuku, Maui, Hawaii 96793
Telephone: (808) 243-7835

Responsible Official: Dave Craddick Date: 11/26/96
David R. Craddick
Director

Prepared by:

Fukunaga & Associates, Inc.
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Honolulu, Hawaii 96814
Telephone: (808) 944-1821

PREFACE

This environmental assessment (EA) is for the installation of a 350 gallons per minute pump at the Haiku Well (Well No. 5419-1), in which the County of Maui, Department of Water Supply (DWS) proposes to withdraw 500,000 gallons per day (gpd) for municipal use.

The Haiku Well was drilled in 1979 by the State Department of Land and Natural Resources Division of Water and Land Development. In May of 1979, the well was successfully tested. After 73 hours of continuous pumping at 700 gallons per minute (gpm), the well was determined to have a drawdown of about one foot and the chlorides rose from 58 mg/l to stabilize at 89 mg/l. This initial test indicated that the well is able to produce up to 700 gpm without damaging the fresh water aquifer.

From the results of the pump test, the DWS installed a 350 gpm pump in the well in 1994. Because questions were raised on the effects the operation of the pump would have to surface water and ground water levels, a hydrogeologic analysis was conducted based on pump tests performed on Haiku Well during December 1, and December 15-22, 1995 using the installed 350 gpm pump. This EA includes the pump test data and hydrogeologic analysis which evaluates the project's impact to surface water and ground water levels.

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LIST OF FIGURES AND TABLE

I. PROJECT DESCRIPTION

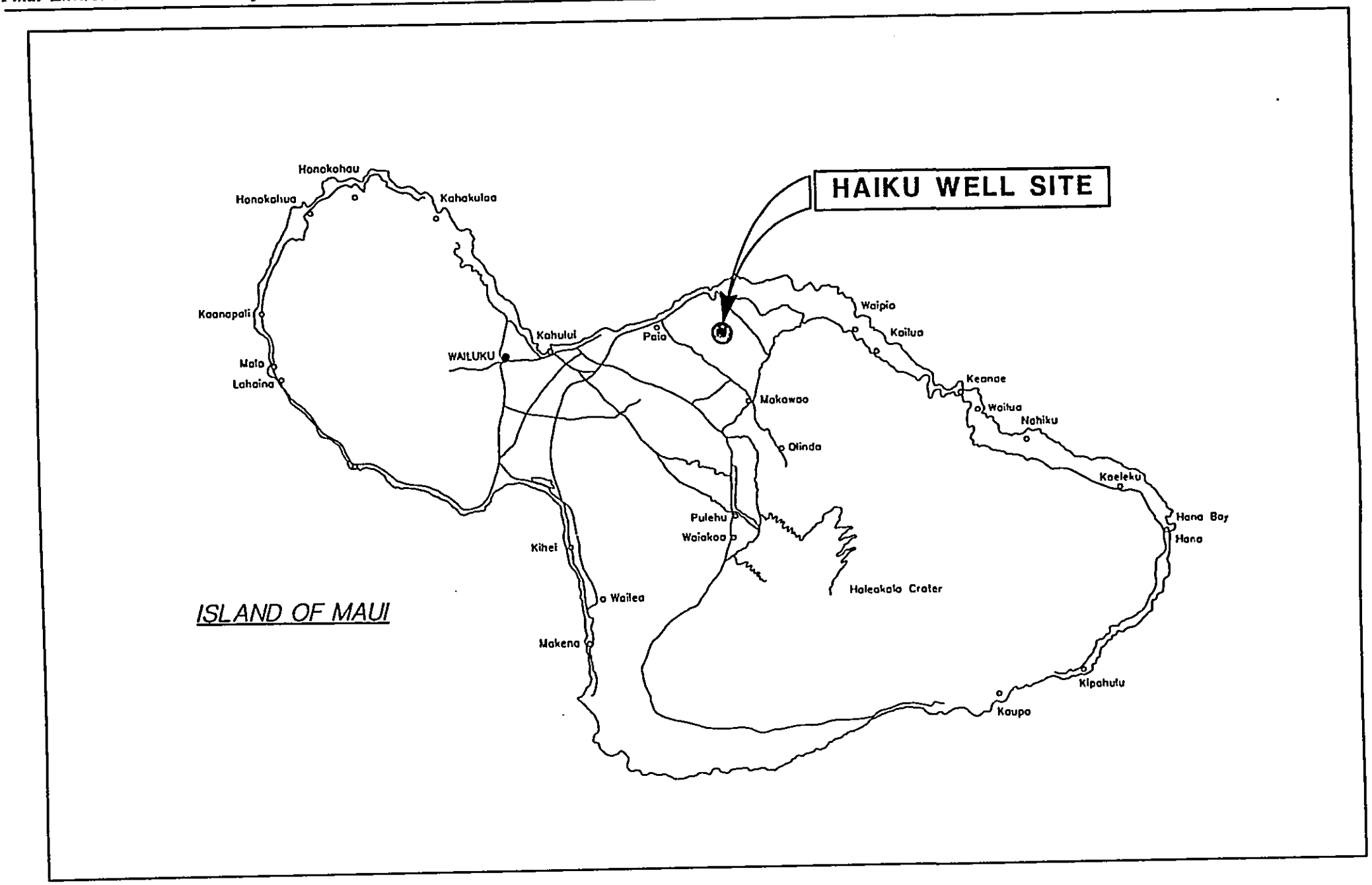
The County of Maui, Department of Water Supply (DWS) proposes to use the 350 gallons per minute pump that was installed at the Haiku Well (Well No. 5419-1) to withdraw 500,000 gallons per day (gpd) for municipal use. The well is located along Maui's Maliko Gulch near the border of the Paia and Haiku Aquifer Systems in the Koolau Sector (See Figures 1 and 2).

The Haiku Well will be utilized to supply potable water to the nearby Haiku community. Water from the Haiku Well will be pumped into the adjacent 250,000 gallon Haiku-Kauhikoa Tank. From the tank, water is supplied to consumers downhill of the tank, via a 12-inch water line running makai along Kokomo Road. Presently, the Haiku-Kauhikoa Tank receives water from the Kamole Weir Water Treatment Plant (WTP).

Located on the Wailoa Ditch, the Kamole Weir WTP treats surface water from the East Maui Irrigation System (EMI). The DWS, in agreement with EMI Co., a subsidiary of Alexander and Baldwin Inc., is allowed to divert up to 12 million gallons per day from the Wailoa Ditch to the Kamole Weir WTP. The EMI collects surface runoff from a watershed area of 57,000 acres (of which 38,000 acres are State owned and 19,000 are owned by EMI Co.) situated on the northern slopes of Haleakala. This runoff is transported by a complex network of approximately 74 miles of ditches and tunnels. The EMI is capable of transporting 195 mgd. During periods of high rainfall the system intercepts as much as 450 mgd, most of which overflows the system and ends up flowing into the ocean. Conversely, the EMI has been known to collect as little as 2.33 mgd during dry periods. During these times, the Kamole Weir WTP becomes the only source of water for the Makawao Water System (minus the Upper Kula System). In the recent past, rainfall occurrence has been less frequent resulting in below normal flows going through the EMI.

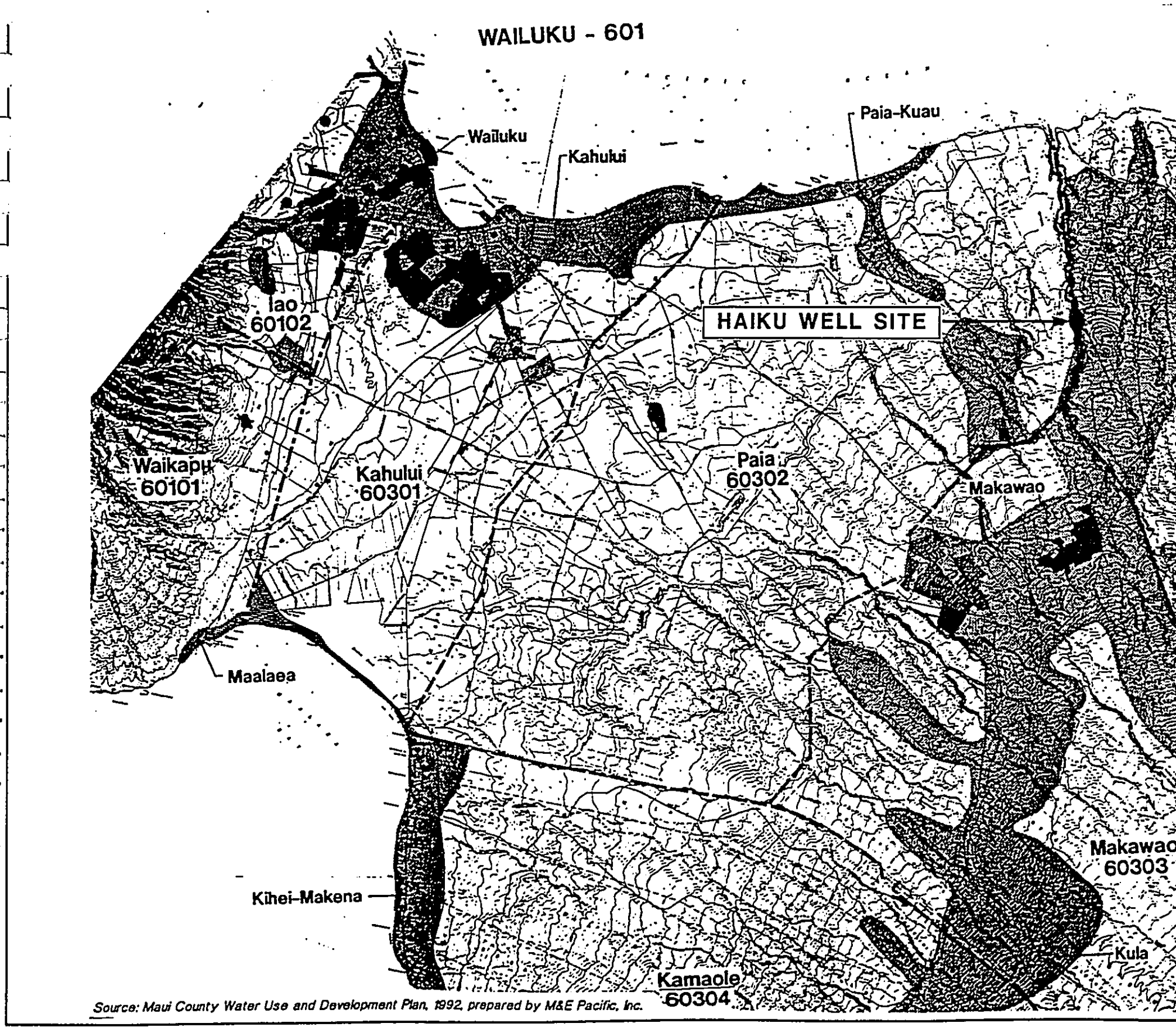
The Makawao Water System serves the Haiku, Makawao, Pukalani, Haliimaile, and Kula communities. Water sources for the water system include the Kamole Weir, Waiakamoi Intakes, Piiholo Intakes, and Hamakua Ditch. The area the Haiku Well is intended to serve is a portion of the Haiku-Pauwela area. Water demand during 1994-1995 for the area averaged 0.25 mgd. Projected demand is expected to increase to 0.50 mgd in 2010. This increase is due to the anticipated growth in agriculture.

Because the area relies solely on the EMI, which is weather dependent, it has been vulnerable to recurring water shortages. To provide a dependable source of potable water for the Haiku area, the DWS proposes to place on-line the Haiku Well 350 gpm vertical turbine pump to withdraw 500,000 gpd of basal water. The well water will conform to Hawaii Administrative Rules, Title 11, Chapter 20, Rules Relating to Potable Water Systems.



ISLAND MAP

Figure 1



Source: Maui County Water Use and Development Plan, 1992, prepared by M&E Pacific, Inc.

KOOLAU AQUIFER SECTOR

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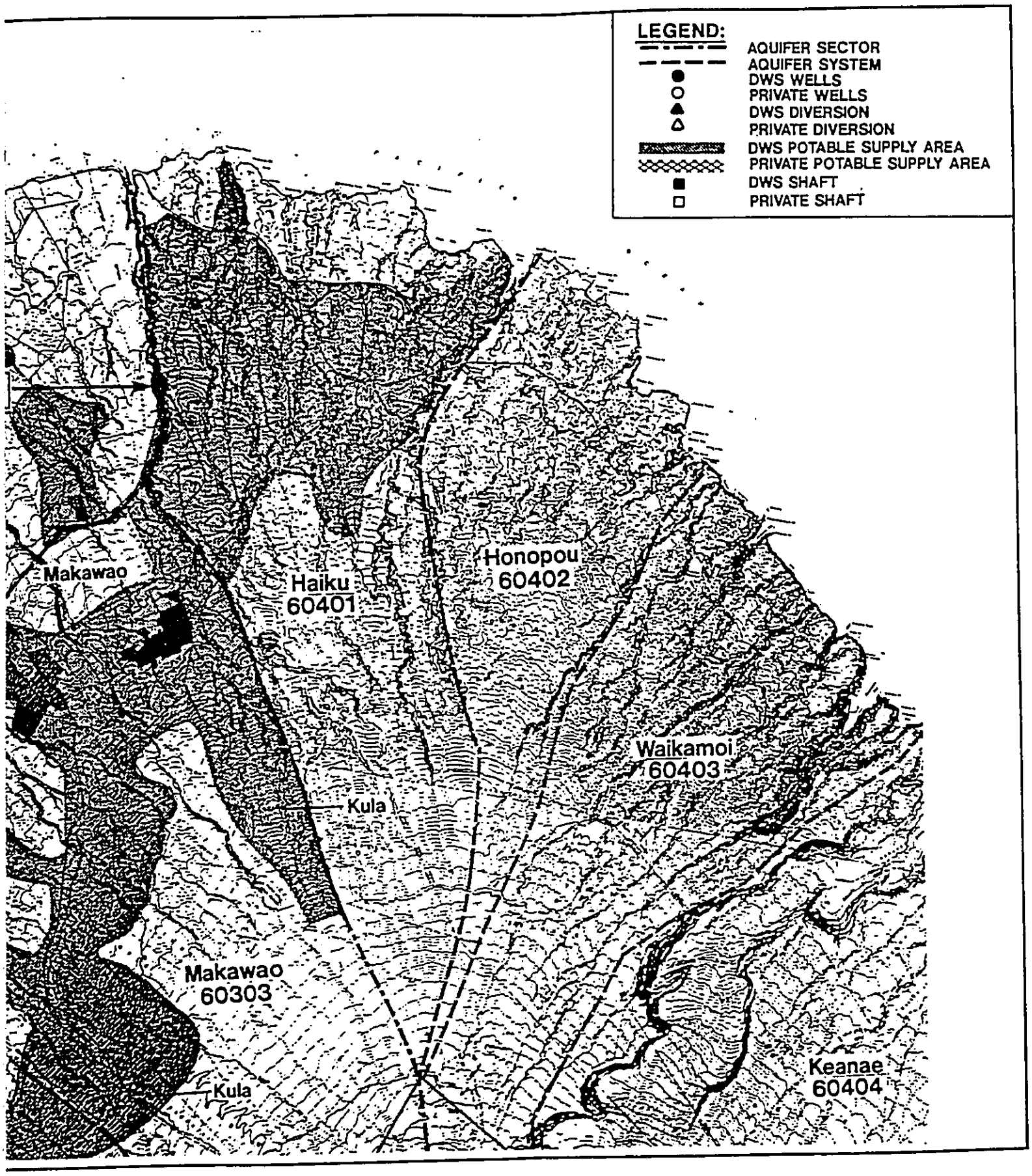


Figure 2

Another project known as the East Maui Water Development Plan (EM Plan) is planned for the area by the DWS and consists of developing the Haiku Aquifer and surrounding aquifers into potable water sources to supplement the Central Maui Water System. The proposed project includes constructing wells and a transmission system to transport 16 mgd, the demand projected in twenty years. The environmental impacts relating to the EM Plan will be addressed in a separate environmental impact statement.

II. DESCRIPTION OF THE ENVIRONMENT

A. Project Location

The project site is located approximately one mile south of Haiku Town in the Makawao District of the island of Maui. The well site location is approximately at latitude 20°54'12" North and longitude 156°19'38" West. The site is east of Maliko Gulch just off of Kokomo Road (See Figure 3).

B. Land Ownership

The project site is located within a County of Maui owned parcel designated as tax map key (TMK): 2-7-33:1 (See Figure 4). Existing improvements at the site include an asphalt concrete roadway, a 250,000 gallon water tank and piping, and a drainage system.

C. Land Classification

The project site is designated for agriculture by the State Land Use Commission and the County of Maui Land Use and Code Administration (See Figure 5).

D. Physical Features

1. Topography

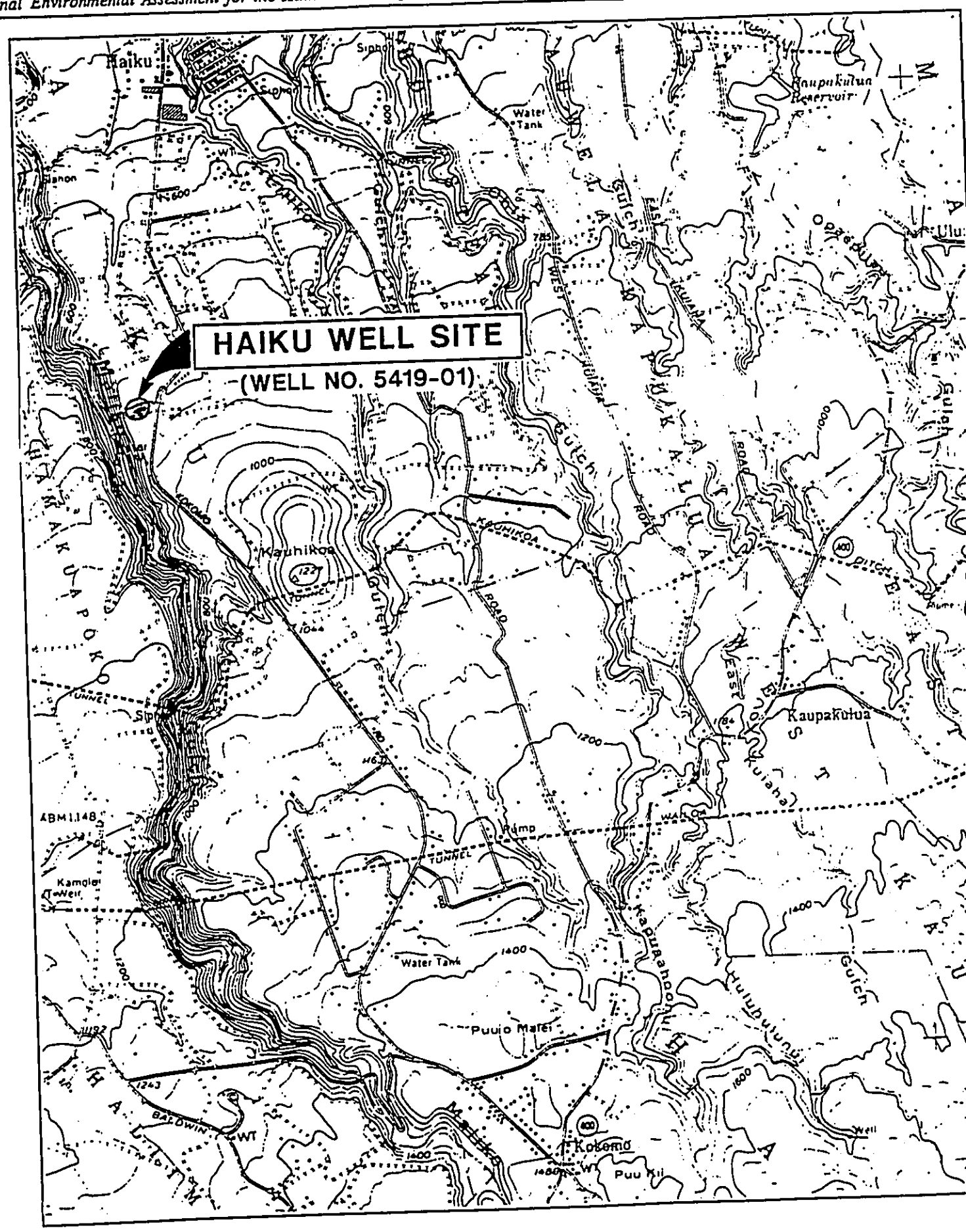
The elevation of the well site is at approximately 830 ft MSL and the land slopes down towards the north and northwest at approximately 10 percent.

2. Soils

A soils report prepared by Soils International on September 22, 1989 for the County of Maui Department of Water Supply (DWS) investigated the soil conditions at the project site. According to the report, the site was found to consist of stiff to very stiff brown and orange-brown clayey silt with gravel. Underlying the clayey silt material were cobbles and boulders.

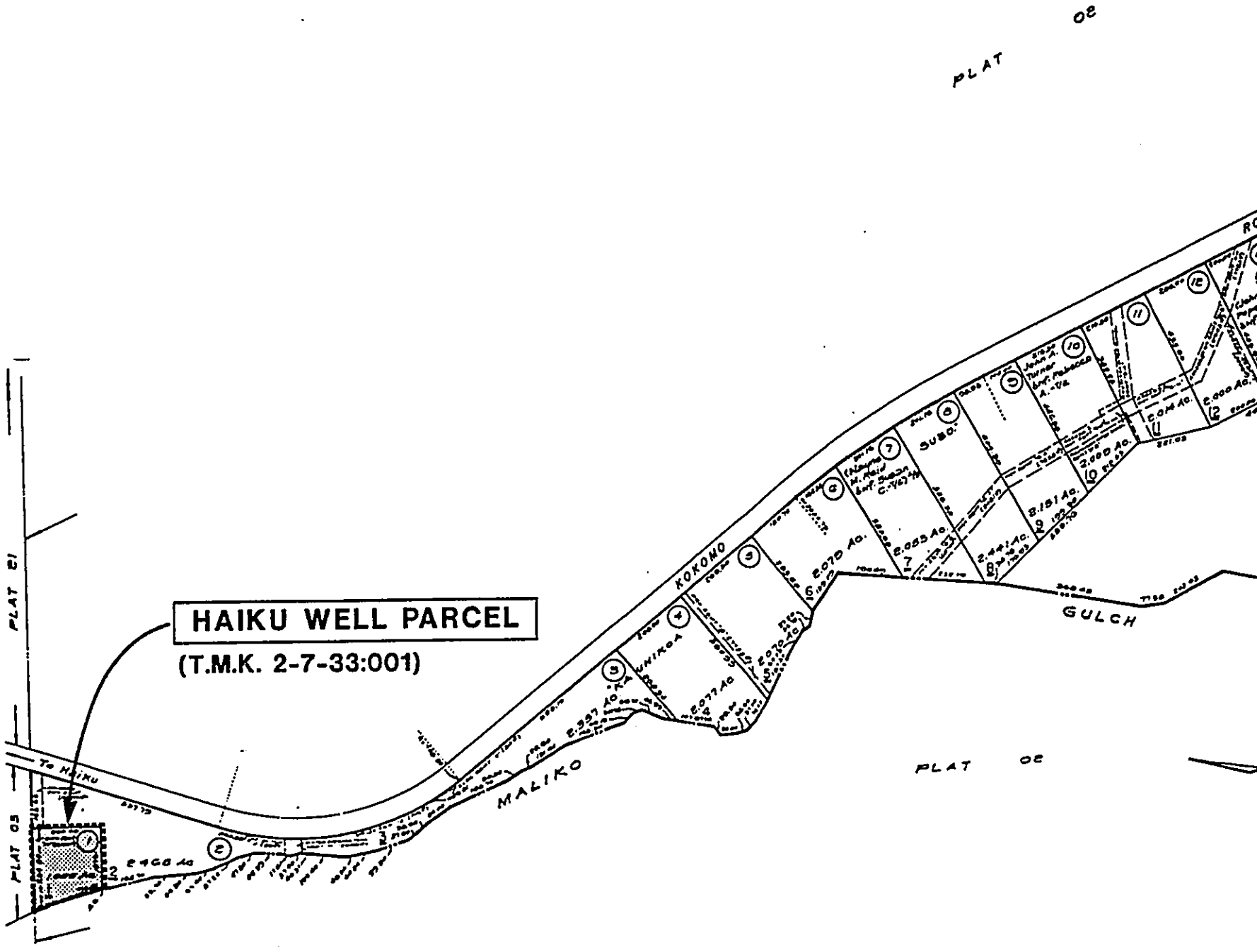
The soil types present in the vicinity of the well site are:

HbC - Haiku Silty Clay has a 7-15 percent slope, moderately rapid permeability, runoff is medium and erosion hazard is moderate.



LOCATION MAP

Figure 3



POR. GR. 59, HAIKU, MAUI, HAWAII (Formerly por. 2-7-02)

LAND OWNERSHIP MAP

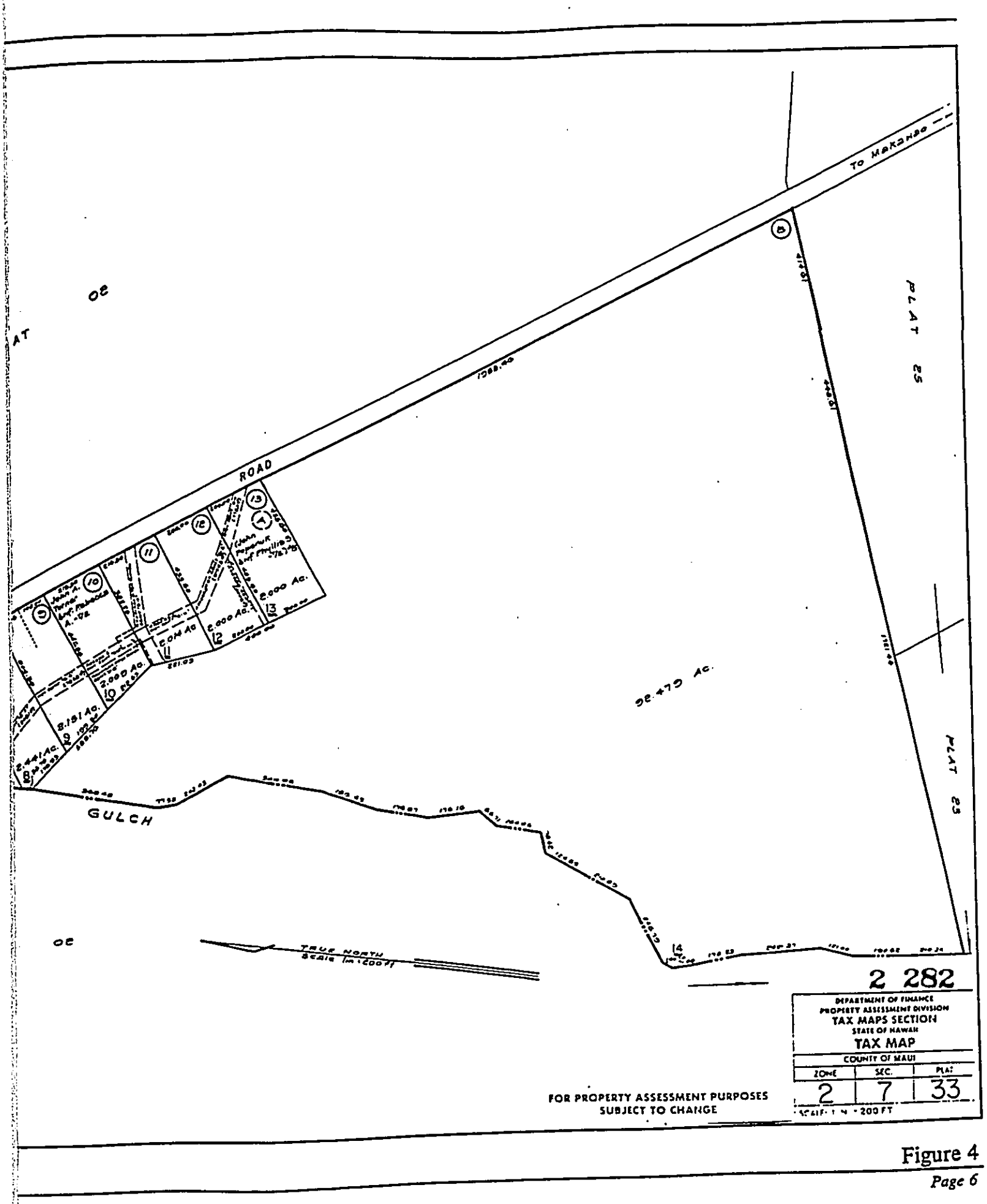
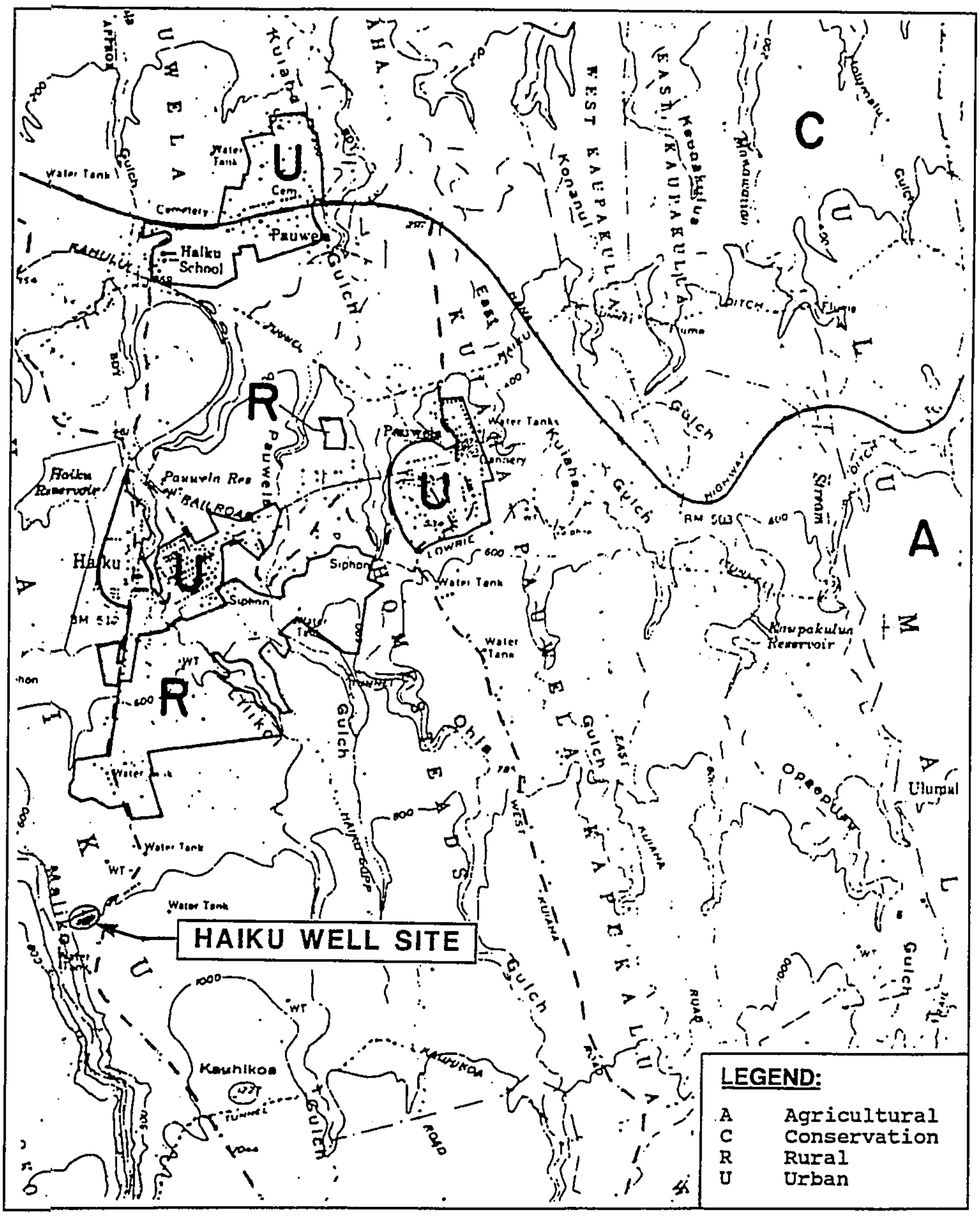

TO MAKAWAO
ROAD
PLAT 25
PLAT 23
GULCH
TRUE NORTH
SCALE 1in.=200ft
FOR PROPERTY ASSESSMENT PURPOSES
SUBJECT TO CHANGE
2 282
DEPARTMENT OF FINANCE
PROPERTY ASSESSMENT DIVISION
TAX MAPS SECTION
STATE OF HAWAII
TAX MAP
COUNTY OF MAUI
ZONE 2
SEC. 7
PLAT 33

Figure 4



STATE LAND USE DISTRICT MAP

Figure 5

H1B - Hamakuapoko Silty Clay has a 3-7 percent slope, moderately rapid permeability, runoff is slow, moderate shrink-swell potential and erosion hazard is slight.

H1C - Hamakuapoko Silty Clay has a 7-15 percent slope, moderately rapid permeability, runoff is medium, moderate shrink-swell potential and erosion hazard is moderate.

rRR - Rough Broken Land has a 40-70 percent slope, runoff is rapid, and geologic erosion is active.

rRK - Rock Land where exposed rock covers 25 to 90 percent of the surface. Land area has level to very steep slopes and shrink-swell potential is high.

E. Geology

The island of Maui was formed between the late Pliocene and Pleistocene periods by two volcanic cones, the East Maui or Haleakala Volcano, and West Maui. The project site lies on the northern slope of the Haleakala Volcano. The Volcano was built over three rift zones--the Honomanu volcanic series, the Kula volcanic series and the Hana volcanic series. At the bottom lies the Honomanu volcanic series, which consists of thin-bedded, typical basaltic pahoehoe and aa. On the top of the Honomanu series lies the Kula volcanic series, which is primarily made up of thick andesitic aa flows. The last series of lava flows, called the Hana volcanic series, occurred along the southeast and east rift zones, which is composed of ultrabasic olivine augite porphyries nonporphyritic andesites.

F. Climate

The temperature ranges from 58 to 75 degrees Fahrenheit during the winter months and from 65 to 80 degrees Fahrenheit during the summer months. The prevailing winds throughout the year are the northeasterly tradewinds which blow in from the ocean and travel up towards the northern slopes of Haleakala at average speeds of 18-20 miles per hour.

G. Flood and Tsunami Hazard

The Federal Emergency Management Agency's June 1, 1981 Flood Insurance Rate Map (FIRM) for Maui County designates the well site within an area of minimal flooding, Zone C (See Figure 6).

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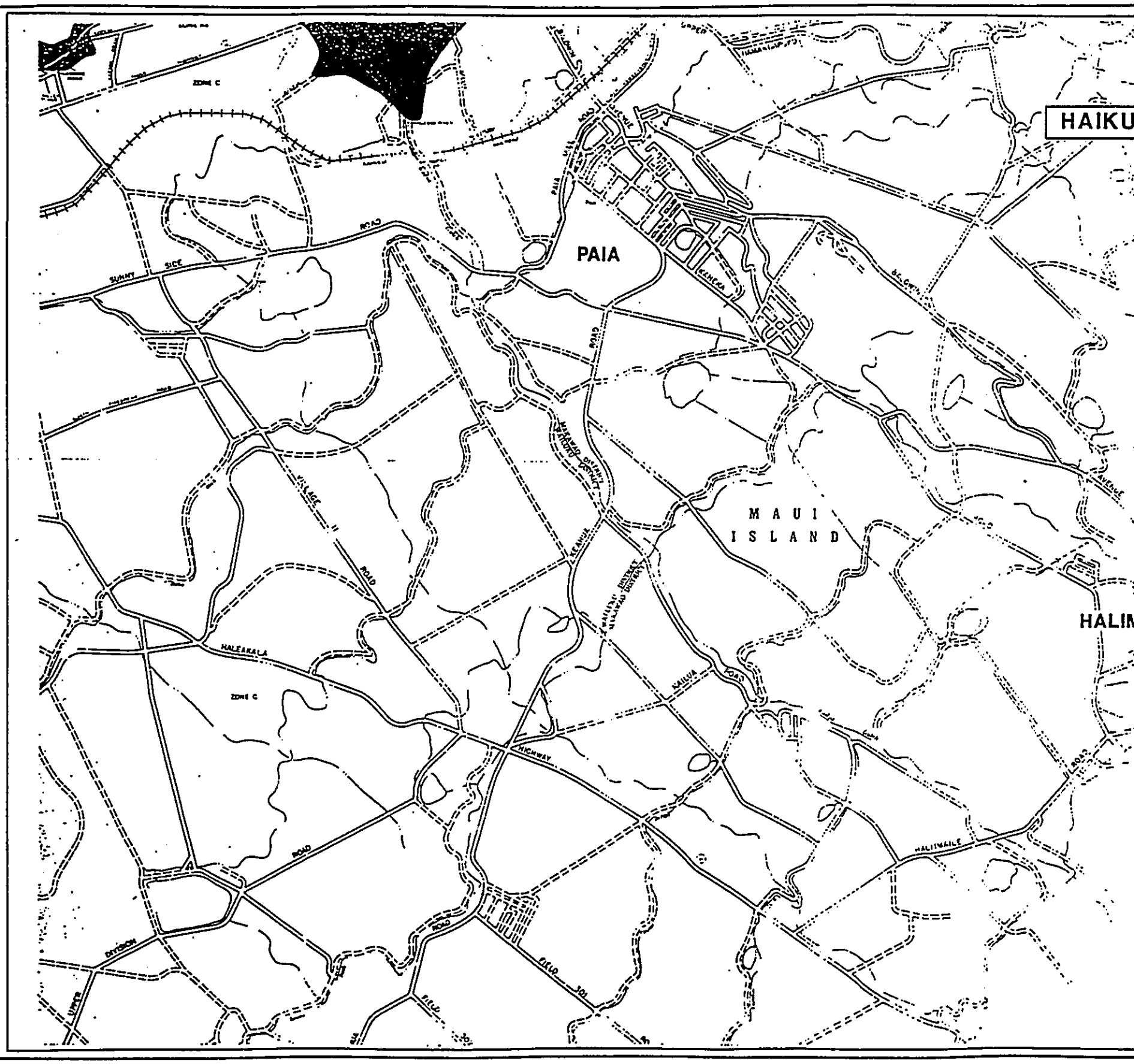

FLOOD INSURANCE RATE MAP

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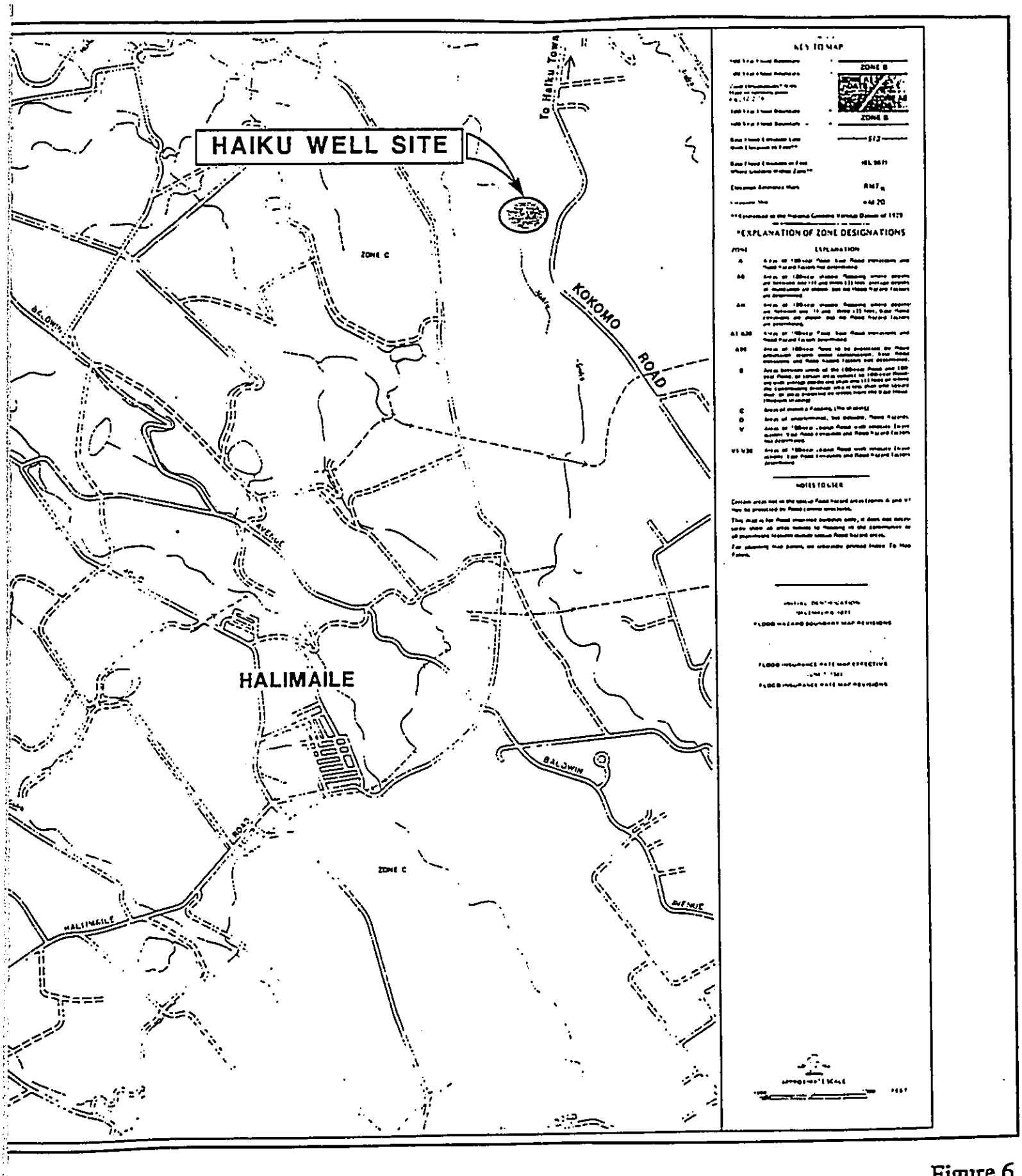


Figure 6

H. Flora

The predominant vegetation zone within the vicinity of the project site consists of guava forest with shrubs. Characteristic vegetation within the zone includes Guava, koa haole, lantana, spanish clover, Bermuda grass, Boston fern, Hilo grass, basket grass, and Kukui.

Due to the previous grading and cutting of the land for the tank development, it is unlikely that there are any endangered species present at the project site.

I. Fauna

Mammals common to the island of Maui include the bat, axis deer, dog, goat, pig, cat mouse and rat. Birds that are associated with the prevalent vegetation type near the project area include the cardinal, barred dove, spotted dove, Pueo, Ricebird, and White Eye. Of these birds, all but the native Hawaiian Pueo and the indigenous golden plover, are introduced species.

J. Archaeological Features/Historical Features

According to the Department of Land and Natural Resources, State Historic Preservation Division, historic sites are unlikely to be present at the project site due to the previous alteration of the land from the tank development. Therefore, the project will have "no effect" on historic sites.

K. Underground Injection Control Line (UIC)

The State of Hawaii, Department of Health's Underground Injection Control Program (July 6, 1984) delineates land areas above the UIC line as areas considered to contain underground sources of drinking water. The Haiku Well site is located above this line. The well was fully grouted when initially drilled. A concrete well pad at the surface was constructed with the pump installation.

L. Hydrology

The following hydrology information is from a report titled "Hydrologic Analysis of Test Data for Haiku Well" prepared by Water Resource Associates. The complete report is presented as Appendix A of this document. The report analyzes data collected from the two pump tests conducted in 1995. Concurrent and related water level data from the nearby Hamakuapoko (H'poko) Wells 1 and 2 are also discussed. The pumping tests were performed by the Maui Department of Water Supply (DWS) and include a step-drawdown test on December 1, 1995 and a 7 day constant-rate test on December 15-22, 1995. Pressure-transducer driven dataloggers were used to record all water levels. A 7-day constant rate test was performed on the Haiku Well on August 25-September 1, 1995, but

drawdown measurements were invalidated by slippage of the pressure transducer cable.

1. Rainfall

The medium annual rainfall at the project site is about 60 inches. A mile and a half to the west, the area is arid with less than 40 inches of medium annual rainfall. On the otherhand, two miles eastward, median annual rainfall increases rapidly to 100 inches, coinciding with a rapidly rising topography.

2. Surface Water

All streams in the Haiku area, except Maliko Gulch, have shallow-to-moderate depths and, therefore, cut only into the poorly permeable andesitic lavas of the Kula formation. Interbedded layers of soil, weathered ash, and dense lavas within the Kula formation may locally perch ground water at high elevations and emerge as intermittent springs or seepage in the stream banks or channels, or in the face of the coastal sea cliff. Especially during rainy periods and where annual rainfall is 100 inches or more. Streams in the rift zone, for the most part, have intermittent flows, depending upon the amount of rainfall and size of their drainage basin. Streams in the eastern part of the rift zone have more frequent and in some cases, perennial flows than those in the western part. The coast, the profiles of the stream channels lie several hundred feet or more above the basal aquifer. The streams serve as natural drains of direct infiltration of rainfall and seepage and springs of perched ground water originally in the Kula formation. The streams in the Haiku-Paia area do not drain any high-level dike or basal water bodies.

3. Ground Water

The Haiku Well essentially sits on the boundary (Maliko Gulch) between the Paia and Haiku Aquifer Systems designated by the State Commission on Water Resource Management. The Haiku Aquifer System lies mostly within the 3-mile wide rift zone and covers an area of about 35 square miles. The system has an estimated groundwater recharge of 61 mgd (million gallons per day) and an estimated sustainable yield of 31 mgd (Commission on Water Resource Management, June 1990).

The Paia Aquifer System covers an area of about 60 square miles, but with much less rainfall, has an estimated natural groundwater recharge of 17 mgd. The sustainable yield of the Paia aquifer system is estimated to be about 8 mgd, or 47 percent of groundwater recharge (Commission on Water Resource Management, June 1990).

An interpretive hydrogeologic cross section of the basal lens in the Haiku area is shown in Figure 7. In the Haiku Aquifer System, reported heads of 3.4 feet in the Pauwela Well (located less than a mile inland) and 5.0 feet in the Baldwin Manor Well (located about a mile inland), suggest that basal groundwater recharge within the Haiku system is greater than in the Paia system. This is expected, since the distribution of rainfall increases toward the east from Maliko Gulch. Ground water in the Haiku system presumably moves in a northwestward direction from areas of high rainfall toward the coast and discharges offshore chiefly as highly diffused and diluted ground water flow from the undersea, offshore basaltic slopes.

In the Paia Aquifer System, reported heads of 3.4 feet in the Maui High School Well (located 1.1 miles inland from the coast), 4.3 feet in H'poko Well 1 (located 2.5 miles inland), 4.7 feet in H'poko Well 2 (located 2.9 miles inland), indicate a basal water gradient that is less than that of the Haiku Aquifer System. This, in turn suggests that the Paia system has less groundwater recharge than the Haiku system. These findings are consistent with the CWRM water budget estimates of recharge in the two aquifer systems.

The Haiku Well's location and principal source of recharge is believed to be in the Haiku Aquifer, which is largely undeveloped.

4. Existing Wells

The Pauwela (Haiku School) and Baldwin Manor Wells are the only deep wells which tap and utilize the basal aquifer of the Haiku Aquifer System. They are located about a mile inland from the coast and yield ground water with a chloride content of 120 and 150 mg/l, respectively. Their reported heads and chloride contents indicate that the western part of the Haiku basal aquifer is thin and unconfined. No other basal wells develop ground water in the eastern part of the system.

In the Paia Aquifer System, the nearest producing well is the Maui High School Well, located 1.2 miles downslope from the Haiku Well. It is reportedly used for irrigation purposes. Five other existing wells (Pumps 11, 12, 13, 17, and 18) belong to HC&S Co. and are used primarily for sugarcane irrigation. These wells are located approximately two miles downslope from the Haiku Well.

There are no municipal basal water wells currently in use in either the Paia or Haiku Aquifer System.

Two existing wells are located within a one-mile radius of the Haiku Well. They are the H'poko Wells 1 and 2 (See Figure 8 and Table 1). These two wells were drilled in 1992 and 1993, respectively, by the Maui DWS and are currently unused.

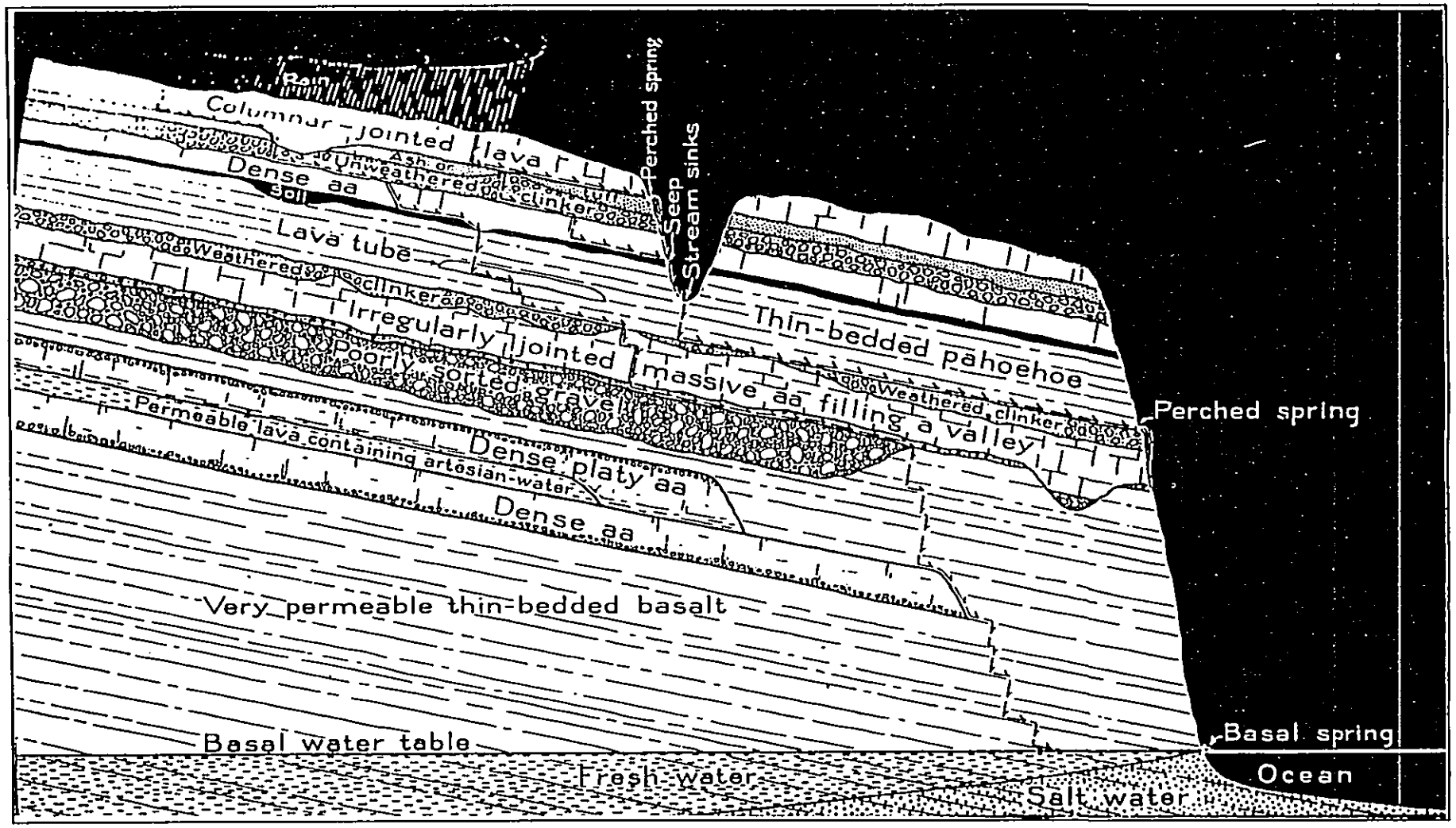
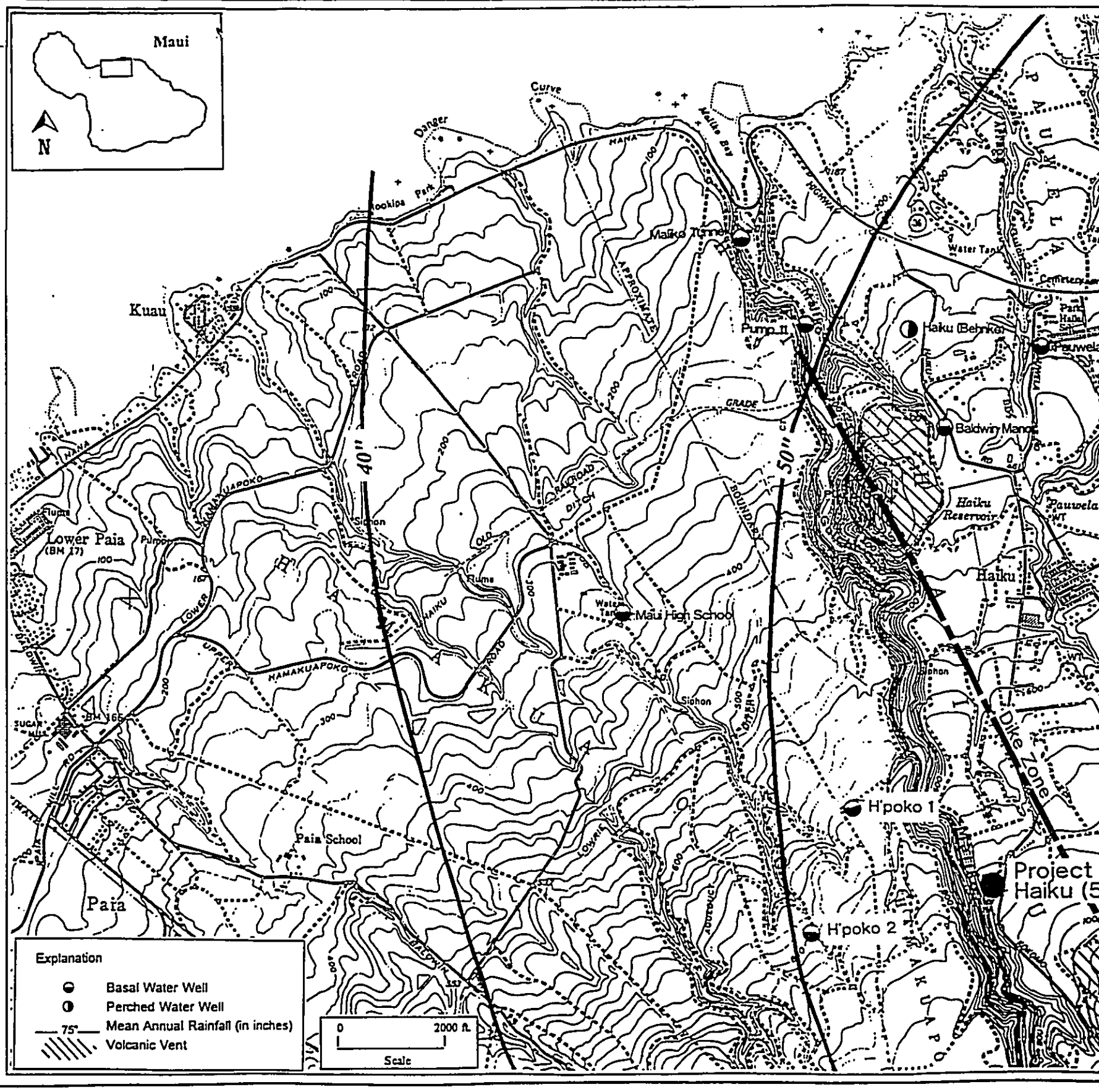


Diagram illustrating the path of percolating water in a lava terrane containing various types of interbedded perching structures, typical of the Kula volcanic series (after Stearns & Macdonald, 1942).

GEOLOGIC PROFILE

Figure 7



EXISTING WELLS

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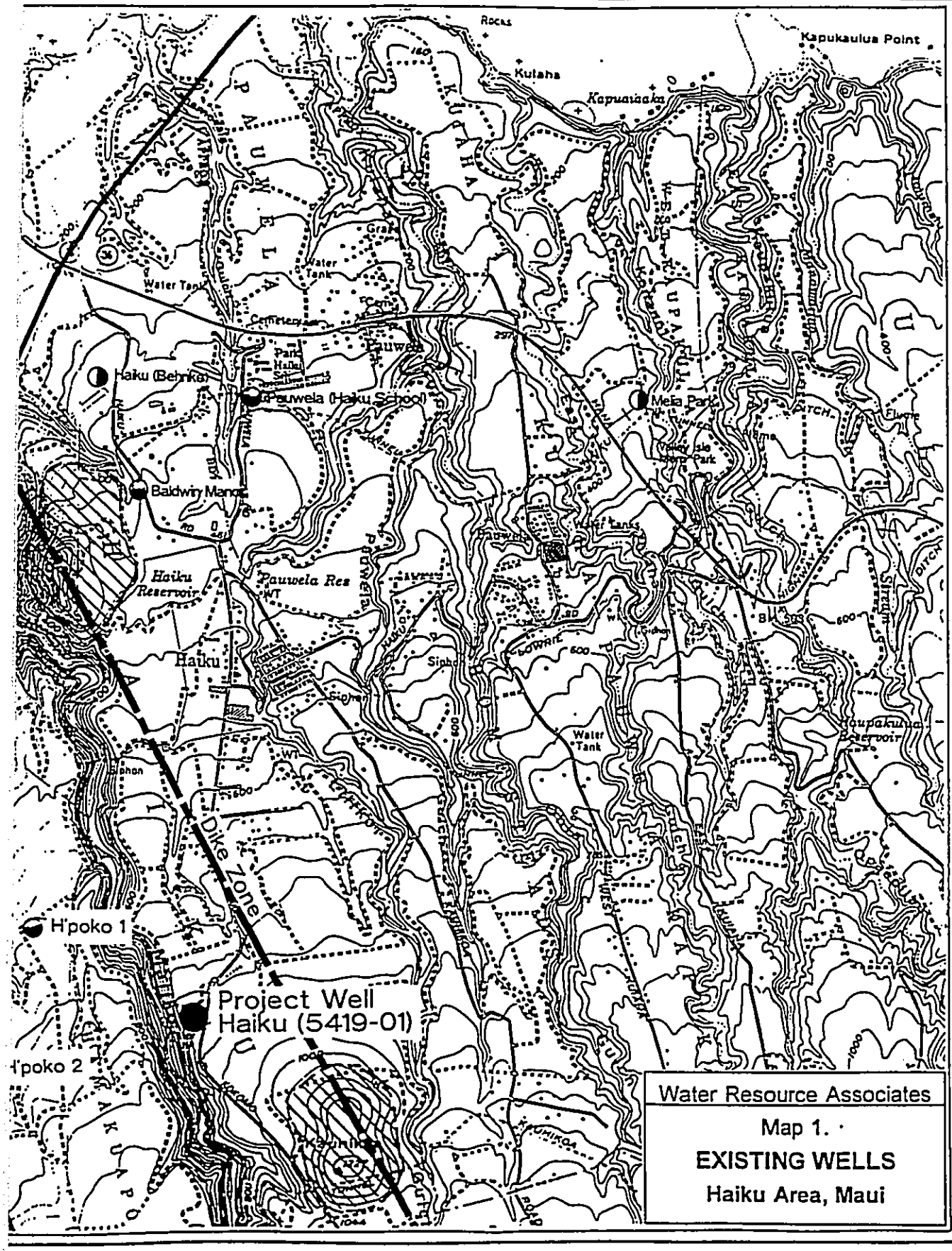

Figure 8

Table 1
Well Records

Name or Location	State Well No.	Year Drilled	Ground Elev. (ft.)	Csg. Dia. (in.)	Csg. Depth (ft.)	Well Depth (ft.)	Static Head (ft.)	Pump Cap. (mgd)	Chl. (ppm)	Use
Baldwin Manor	5519-03	1986	446	8	480	480	5	0.5	150	Dom
Haiku (Behnke)	5519-02	1974	360	4		228	210			Dom
Haiku (5419-01)	5419-01	1979	828	12	859	869	4.3			Mun
Hamakuapoko 1	5420-02	1992	702	12	732	765	4.3		65	Unu
Hamakuapoko 2	5320-01	1993	780	12	780	812	4.7		49-58	Unu
Maliko Tunnel	5620-01		50							
Maui High School	5420-01	1964	349	8	370	371	3.4		82-93	Irr
Melia Park	5518-01		400	4		320				Irr
Pauwela (Haiku School)	5519-01	1967	365	8	382	400	3.4		120	Unu
Pump 11 (Maliko Sh 32)	5520-01	1898	30					6.81	350-975	

Source of Data: Commission on Water Resource Management.

5. Water Quality

The Haiku Well was designed and constructed to tap the basal aquifer lying 825 feet below the ground surface in highly permeable, thin-bedded Honomanu basalts. Any shallow perched groundwater sources that might exist in the poorly permeable, more massive Kula andesitic basalts have been cased off. A twelve-inch diameter solid steel casing extends 829 feet below the ground surface (1 ft. below mean sea level) such that basal ground water alone is developable. The groundwater temperature measured 68°F in 1979 when the well was pumped at a rate of 700 gpm. This temperature indicates that ground water recharge reaching the well, originates some distance inland. The salinity of the well, during the 1979 constant-rate test (4 days at 700 gpm) rose from an initial 53 mg/l to a final 89 mg/l. The August 24–September 1, 1995 constant-rate test (7 days at 350 gpm) showed an increasing chloride range of 65 to 80 mg/l. The minimum reported water temperature was 69.8°F, slightly higher than in 1979, probably due to the lower pumping rate.

A representative water sample was collected from the Haiku Well on August 28, 1995 during the August 24–September 1, 1995 test and analyzed by Montgomery Laboratories, a certified laboratory in Pasadena, California. The results of the inorganic and organic chemical analyses were all within the limits for safe drinking water.

M. Social and Economic Characteristics

The "upcountry" communities within the Makawao water system are generally small and rural with the exceptions of Pukalani and Makawao. Both communities are the population centers in the Makawao Water System and serve as residential communities for the people who work in the Wailuku-Kahului area. In 1991, the populations of Pukalani and Makawao were 5,879 and 5,405 respectively. Located on the upper slopes of Haleakala, far from the resort and tourism centers of Kaanapali, Lahaina, Wailea and Kihei, the primary industries in the area are ranching and agriculture. The crops grown in the area are sugarcane, pineapple, taro, bananas, macadamia nuts, and assorted vegetables.

III. PROBABLE IMPACTS AND MITIGATIVE MEASURES

A. Noise

Noise resulting from the operation of the pump can be an annoyance to nearby residences. In order to minimize this noise, a sound attenuating enclosures will be used.

B. Hydrology

The following hydrology information is based on a report titled "Hydrologic Analysis of Test Data for Haiku Well" prepared by Water Resource Associates. The complete report is presented as Appendix A of this document.

1. Surface Water

The development of the basal Haiku Well is not expected to have any effect on the high-level streamflows in the Haiku-Paia region. Such flows occur in stream channels situated hundreds of feet above the basal aquifer and are characteristically intermittent. Such flows owe their existence to direct runoff and infiltration of rainfall and to percolating ground water which randomly emerge as seepage and springs in the walls and channels of narrow stream basins. By contributing some recharge to the underlying basal aquifer by means of deep percolation, such streamflows may have some effect on underlying basal water resources. However, the converse is not true, that is, basal water and its development cannot affect the streamflows in the region. Furthermore, the Haiku Well was constructed with solid casing from the ground surface to a depth of 829 feet, or one foot below mean sea level, and the annular space around the casing was fully grouted. Therefore, any high-level perched ground water that may have been encountered by the Haiku Well has been isolated from the basal aquifer and, therefore, the development of the Haiku Well will have no effect on streamflows.

No mitigation measures are proposed or required.

2. Ground Water and Existing Wells

The development of the Haiku Well as a 0.5 mgd capacity source will have no measurable effect on the basal water resources in the area. Assuming that the Haiku Well will be pumped, on average, 16 hours a day (a DWS standard), the average withdrawal and use of 0.33 mgd is negligible when compared to the estimated 31 mgd sustainable yield of the Haiku Aquifer System and the 8 mgd sustainable yield of the Paia Aquifer System. Furthermore, the Haiku Well's location and principal source of recharge is believed to be in the Haiku Aquifer, which is largely undeveloped.

No existing wells are expected to be affected by the development of the Haiku Well. Pumping the Haiku Well for seven days at a constant rate of 350 gpm (0.5 mgd) showed no effect on water levels in the nearest existing wells (H'poko Wells) located 3,100 to 3,700 ft. away and no effect on water levels can be expected in other more distantly located wells.

Some past concerns have been expressed by the Mr. Hokoana about the possible effect on the his well (Hokoana Well) located in Maliko Gulch near the mouth. From the analysis of drawdown data, development of the Haiku Well will have no effect on water levels in the Hokoana Well. Furthermore, no measurable short-term or long-term effect on the salinity of the Hokoana Well can be expected.

The salinity of the Hokoana Well was monitored daily during the August 24–September 1, 1995 constant-rate test of the Haiku Well and no trend was observed in the data. The chloride content of the well was essentially steady at 70 mg/l.

No mitigation measures relative to the Hokoana Well are proposed or required.

3. Water Quality

Water samples taken from the Haiku Well during August-September of 1995 were within the limits for (Department of Health) safe drinking water. The analysis detected the soil fumigant DBCP in the water samples, which was within the Department of Health's minimum acceptable level. The DWS will monitor the Haiku Well regularly for DBCP and other contaminants as required by the Department of Health. Should the levels exceed the Department of Health requirements, the DWS proposes to use granular activated carbon as a means of treating the Haiku Well water.

The DBCP may have come from the many years of sugarcane and pineapple cultivation, which were the primary crops grown in the area. DBCP is no longer used.

C. Social and Economic Characteristics

The Haiku Well will benefit the Haiku community by providing a more reliable potable water source to its water system. The Haiku community receives water from the Kamole Weir WTP, which is sometimes collects below average flows. With this new source of potable water, the community will have a more dependable source of municipal water. Unlike the previously mentioned EM Plan, the Haiku well is intended to serve the Haiku area. It will be an additional source of water for the Haiku area, relieving the need for water from the Kamole Weir source.

IV. ALTERNATIVES TO THE PROPOSED PROJECT

A. No Project

One alternative to the proposed project is the "no project" option. Under existing conditions the Haiku Water System depends on surface runoff as its sole source of water supply. The low flows observed at the Wailoa Ditch during dry spells have seriously compromised the adequacy of the water system. Other sources of water will eventually need to be developed to prevent a water shortage problem.

B. Alternate Considerations

One alternative is to develop other wells in the area. This alternative, however, is more expensive and time consuming. New wells will have to be located, drilled and tested before a pump can be installed.

A second alternative would be to increase storage capacity to accommodate excess rain water collected in the EMI. The DWS has recently constructed a 100 million gallon reservoir in Upper Kula and is considering more projects; however, it will be some time before the projects are funded and constructed.

Presently, the cost of treating and pumping water from the lower Wailoa Ditch source to the upper reservoirs would be more than pumping and treating groundwater from the Haiku Well. The use of Haiku well will economically bring immediate relief to the existing water supply situation.

V. AGENCIES AND PERSONS CONSULTED

Table 2 lists the 24 agencies and organizations that were consulted in the review of the Draft Environmental Assessment (DEA). A total of 16 agencies and organizations provided written comments on the DEA. The written comments and responses are presented in Appendix B.

Table 2
List of Agencies and Organizations Consulted

	AGENCY OR ORGANIZATION CONSULTED	DATE	
		COMMENTS RECEIVED	RESPONSE
Federal Government			
1	U.S. Army Corps of Engineers, Pacific Division, Honolulu District Engineer	8/28/96	11/12/96
2	U.S. Department of Agriculture, Soils Conservation Service	9/6/96	11/12/96
3	U.S. Department of the Interior, Fish and Wildlife Service	10/7/96	11/12/96
4	U.S. Department of the Interior, Geological Survey	None	Not req'd
State Government			
5	Department of Agriculture	None	Not req'd
6	Department of Business, Economic Development, and Tourism	8/22/96	11/12/96
7	Department of Business, Economic Development, and Tourism, Energy Division	None	Not req'd
8	Department of Hawaiian Home Lands	9/13/96	11/12/96
9	Department of Land and Natural Resources	8/28/96 & 10/9/96	11/12/96
10	Department of Land and Natural Resources, State Historic Preservation Division	11/1/96	11/12/96
11	Department of Health, Environmental Management Division	9/16/96	11/12/96
12	Department of Health	None	Not Req'd
13	Office of Environmental Quality Control	9/10/96	11/12/96
14	Office of State Planning	None	11/12/96
15	Office of Hawaiian Affairs	10/30/96	11/12/96
16	University of Hawaii, Water Resources Research Center	None	Not req'd
17	University of Hawaii, Environmental Center	9/10/96	11/12/96
County Government			
18	Planning Department	9/3/96	11/12/96
19	Department of Parks and Recreation	8/28/96	11/12/96
20	Department of Public Works	9/4/96	11/12/96
21	Economic Development Agency	None	Not req'd
Private			
22	Mr. Isaac Davis Hall, Coalition to Protect East Maui Water	9/11/96	11/12/96
23	Mr. Randall Moore, Hawaiian Commercial and Sugar Company	None	Not Req'd
24	Maui Electric Company, Ltd.	9/10/96	11/12/96

VI. DETERMINATION

After completing an environmental assessment of the potential environmental impacts of the proposed project, it is believed that an Environmental Impact Statement is not required. Accordingly, this document constitutes a Negative Declaration.

VII. FINDINGS AND REASONS SUPPORTING THE DETERMINATION

Findings and reasons supporting the Negative Declaration determination are as follow, using the criteria, policies, guidelines and provision of Title 11, Chapter 200, Environmental Impact Statement Rules and Chapter 343, HRS. The proposed project will not:

A. Involve an irrevocable commitment to loss or destruction of any natural or cultural resource;

B. Curtail the range of beneficial uses of the environment;

C. Conflict with the State's long-term environmental policies or goals and guidelines as expressed in Chapter 344, Hawaii Revised Statutes, and revisions thereof and amendments thereto, court decisions or executive orders;

D. Substantially affect the economic or social welfare of the community or State;

E. Substantially affect public health;

F. Involve a substantial secondary impact, such as population changes or effects on Public facilities;

G. Involve substantial degradation of environmental quality;

H. Is individually limited but cumulatively has considerable effect upon the environment or involves a commitment for larger actions;

I. Substantially affect a rare threatened or endangered species, or its habitat;

J. Detrimentally affect air or water quality or ambient noise levels; or

K. Detrimentally affect an environmentally sensitive area, such as a flood plain tsunami zone, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal water. [Eff. Dec. 06, 1985](Auth: HRS Sec. 343-6)(Imp. HRS Sec. 343, 343-6).

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5. State of Hawaii, Department of Business, Economic Development and Tourism, The State of Hawaii Data Book: A Statistical Abstract, 1993-1994, November 1991.

6. State of Hawaii, Department of Land and Natural Resources, Commission on Water Resource Management, Hawaii Water Plan, Maui County Water Use and Development Plan, Review Draft, February 1992.

7. Stearns, Harold T., Geology of the Hawaiian Islands, Bulletin 8, Division of Hydrography, 1967.

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APPENDIX A - Hydrogeologic Analysis of Test Data for Haiku Well East Maui, Hawaii

HYDROGEOLOGIC ANALYSIS
of
TEST DATA FOR HAIKU WELL
East Maui, Hawaii

Prepared for
Fukunaga & Associates
Honolulu, Hawaii

Dan Lum
Water Resource Associates
Honolulu, Hawaii

June 1996

HYDROGEOLOGIC ANALYSIS
of
TEST DATA FOR HAIKU WELL
East Maui, Hawaii

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INTRODUCTION

The Haiku Well is an existing well that was drilled in 1979 by the State Department of Land and Natural Resources as a part of its state-wide exploratory well drilling program to study groundwater aquifers and locate new sources of municipal water supplies. The well is located on the east side of Maliko Gulch at an elevation of 828 feet within a Maui Department of Water Supply (DWS) tank site. The physical attributes of the well are as follows:

Diameter of Steel Casing: 12 inches
Depth of Solid Casing: 829 ft. (-1 ft., mean sea level)
Depth of Louvered Screen Casing: 859 ft. (-31 ft., msl)
Total Depth of Well: 870 ft. (-42 ft., msl)
Head: 4.35 ft., measured by USGS on June 9, 1979
Water Temperature (in 1979): 68°F
Latitude: 20 54′ 12"
Longitude: 156 19′ 38"

The development of the Haiku Well as a production well is proposed as a water improvement project for the Haiku Water System. As a proposed standby and supplemental source, the Haiku Well will improve the reliability of the Haiku Water System which supplies the current and future water needs of the Haiku community.

1979 Pumping Test

During May 21-24, 1979, the Haiku well was pump tested at a constant rate of 700 gpm for 73 hours by the State Department of Land and Natural Resources. Drawdown was stable at 1.05 to 1.02 ft. Minor fluctuations in water levels of less than 0.2 ft. (about 2 inches) were observed, but not clearly attributable to tidal effects within the basal aquifer because of infrequent and imprecise measurements of drawdown using the airline pressure method.

During the 73-hour test, the chloride content of the well rose from an initial 58 mg/l to a final 89 mg/l with an average increase of 5.38 mg/l per day in the last half of the test. Experience indicates that this upward trend in salinity probably is the result of localized upconing and that the Haiku Well cannot sustain a pumping rate of 700 gpm (1 mgd).

1995 Pumping Tests

This report presents the data and analytical results of pumping tests on the Haiku Well during 1995. Concurrent and related water level data from the nearby Hamakuapoko (H'poko) Wells 1 and 2 are also included and discussed. The pumping tests were performed by the Maui Department of Water Supply (DWS) and include a step-drawdown test on December 1, 1995 and a 7-day constant-rate test on December 15-22, 1995. Pressure-transducer driven dataloggers were used to record all water levels. A 7-day constant-rate test was performed on the Haiku Well on August 25-September 1, 1995, but drawdown measurements were invalidated by slippage of the pressure transducer cable; however, water samples were collected and a record of well salinity (chlorides) is presented in Appendix E.

GEOLOGY

Regional Geology

The project well is located on the lower slopes of the Northwest Rift zone of Haleakala Volcano, which comprises East Maui. The rift zone, a major geologic feature of East Maui, represents one of three regional fissures that radiate triaxially from the center of Haleakala. From the Northwest Rift Zone, innumerable lava flows erupted along two roughly parallel alignments of volcanic vents spaced approximately three miles apart (one lies near Maliko Gulch and the other near Peahi). Lava flows from these vents built up the northwestern slopes of East Maui

in two distinct phases. First, permeable thin-bedded basalt flows were erupted to form the core of East Maui during an initial period of volcanic activity that produced the *Honomanu volcanic series*. Subsequently, the permeable Honomanu basalts were veneered with a sequence of thicker, more massive, and less permeable andesitic lava flows which comprise the *Kula volcanic series*. The Kula volcanic activity was followed by a major period of quiescence and deep erosion of the East Maui dome, only to be followed by yet another period of volcanic activity that produced the overlying *Hana volcanic series* of chiefly permeable basalts. However, the Hana volcanics do not occur in the project area and are confined to the southern and eastern parts of East Maui.

The Honomanu basalts constitute the principal water-bearing aquifer of East Maui and are highly permeable, and yield water readily to wells. Exposures of Honomanu basalts in the Paia-Haiku area occur near the mouth of Maliko Gulch and possibly in the lowest parts of the stream channel.

Project Site Geology

The two alignments of cinder cones in the area roughly define the approximately three-mile wide Northwest Rift Zone. The occurrence of volcanic dikes in the subsurface are inferred from these surface structures. These dikes which presumably trend in a northwestward direction are hydrologically significant in that they are relatively impermeable vertical sheet-like structures that can impede and direct groundwater flow in the Haiku area.

The Haiku Well, located next to Maliko Gulch at an elevation of approximately 830 feet, lies directly on the inferred western boundary of the Northwest Rift zone and is underlain by some 200-300 feet of poorly permeable, andesitic Kula lavas, based upon interpolation of topographic contours on the USGS 1:24,000 scale Haiku quadrangle map. The Maliko stream channel directly below the Haiku Well, lies approximately 480 feet above the underlying basal aquifer. Maliko Gulch cuts into and possibly in some reaches, below the poorly permeable Kula formation. Near the coast, the older Honomanu basalts are exposed beneath Kula lavas, separated by an erosional unconformity of reddish brown Honomanu soil and saprolite layers.

HYDROLOGY

Rainfall

Median annual rainfall at the project site is about 60 inches. A mile and a half to the west, the area is arid with less than 40 inches of median annual rainfall. On the other hand, two miles eastward, median annual rainfall increases rapidly to 100 inches, coinciding with a rapidly rising topography (see Map 1).

Surface Water

All streams in the Haiku area, except Maliko Gulch, have shallow-to-moderate depths and, therefore, cut only into the poorly permeable andesitic lavas of the Kula formation. Interbedded layers of soil, weathered ash, and dense lavas within the Kula formation may locally perch ground water at high elevations and emerge as intermittent springs or seepages in the stream banks or channels, or in the face of the coastal sea cliff (see Figure 1). Especially during rainy periods and where annual rainfall is 100 inches or more. Streams in the rift zone, for the most part, have intermittent flows, depending upon the amount of rainfall and size of their drainage basin. Streams in the eastern part of the rift zone have more frequent and in some cases, perennial flows than those in the western part. The coast, the profiles of the stream channels lie several hundred feet or more above the basal aquifer. The streams serve as natural drains of direct infiltration of rainfall and seepages and springs of perched ground water originally in the Kula formation. The streams in the Haiku-Paia area do not drain any high-level dike or basal water bodies.

Ground Water

Paia and Haiku Aquifer Systems and Sustainable Yields. The Haiku Well essentially sits near the boundary (Maliko Gulch) between the Paia and Haiku Aquifer Systems designated by the State Commission on Water Resource

Management. The Haiku Aquifer System lies mostly within the 3-mile wide rift zone and covers an area of about 35 square miles. The system has an estimated groundwater recharge of 61 mgd (million gallons per day) and an estimated sustainable yield of 31 mgd (Commission on Water Resource Management, June 1990).

The Paia Aquifer System covers an area of about 60 square miles, but with much less rainfall, has an estimated natural groundwater recharge of 17 mgd. The sustainable yield of the Paia aquifer system is estimated to be about 8 mgd, or 47 percent of groundwater recharge (Commission on Water Resource Management, June 1990).

Groundwater Heads, Recharge, and Movement. An interpretive hydrogeologic cross section of the basal lens in the Haiku area is shown in Figure 3. In the Haiku Aquifer System, reported heads of 3.4 feet in the Pauwela Well (located less than a mile inland) and 5.0 feet in the Baldwin Manor Well (located about a mile inland), suggest that basal groundwater recharge within the Haiku system is greater than in the Paia system. This is expected, since the distribution of rainfall increases toward the east from Maliko Gulch. Ground water in the Haiku system presumably moves in a northwestward direction from areas of high rainfall toward the coast and discharges offshore chiefly as highly diffused and diluted ground water flow from the undersea, offshore basaltic slopes.

In the Paia Aquifer System, reported heads of 3.4 feet in the Maui High School Well (located 1.1 miles inland from the coast), 4.3 feet in H'poko Well 1 (located 2.5 miles inland), 4.7 feet in H'poko Well 2 (located 2.9 miles inland), indicate a basal water gradient that is less than that of the Haiku Aquifer System. This, in turn suggests that the Paia system has less groundwater recharge than the Haiku system. These findings are consistent with the CWRM water budget estimates of recharge in the two aquifer systems.

The Haiku well is geographically located in the Haiku Aquifer System.

Existing Wells. The Pauwela (Haiku School) and Baldwin Manor Wells are the only deep wells which tap and utilize the basal aquifer of the Haiku Aquifer System. They are located about a mile inland from the coast and yield ground water with a chloride content of 120 and 150 mg/l, respectively. Their reported

heads and chloride contents indicate that the western part of the Haiku basal aquifer is thin and unconfined. No other basal wells develop ground water in the eastern part of the system.

In the Paia Aquifer System, the nearest producing well is the Maui High School Well, located 1.2 miles downslope from the Haiku Well. It is reportedly used for irrigation purposes. Five other existing wells (Pumps 11, 12, 13, 17, and 18) belong to HC&S Co. and are used primarily for sugarcane irrigation. These wells are located approximately two miles downslope from the Haiku Well.

There are no municipal basal water wells in either the Paia or Haiku Aquifer System.

Two existing wells are located within a one-mile radius of the Haiku Well. They are the H'poko Wells 1 and 2 (see Map 1 and Table 1). These two wells were drilled in 1992 and 1993, respectively, by the Maui DWS as part of the East Maui Water Plan (EMPlan) and are currently unused.

Table 1. Well Record

Name or Location	State Well No.	Year Drilled	Ground Elev. (ft.)	Csg. Dia. (in.)	Csg. Depth (ft.)	Well Depth (ft.)	Static Head (ft.)	Pump Cap. (mgd)	Chl. (ppm)	Use
Baldwin Manor	5519-03	1986	446	8	480	480	5	0.5	150	Dom
Haiku (Behnke)	5519-02	1974	360	4		228	210			Dom
Haiku (5419-01)	5419-01	1979	828	12	859	869	4.3			Mun
Hamakuapoko 1	5420-02	1992	702	12	732	765	4.3		65	Unu
Hamakuapoko 2	5320-01	1993	780	12	780	812	4.7		49-58	Unu
Maliko Tunnel	5620-01		50							
Maui High School	5420-01	1964	349	8	370	371	3.4		82-93	Irr
Melia Park	5518-01		400	4		320				Irr
Pauwela (Haiku School)	5519-01	1967	365	8	382	400	3.4		120	Unu
Pump 11 (Maliko Sh 32)	5520-01	1898	30					6.81	350-975	

Source of Data: Commission on Water Resource Management.

Water Quality

The Haiku Well was designed and constructed to tap the basal aquifer lying 825 feet below the ground surface in highly permeable, thin-bedded Honomanu basalts. Any shallow perched groundwater sources that might exist in the poorly permeable, more massive Kula andesitic basalts have been cased off. Twelve-inch diameter solid steel casing extends 829 feet below the ground surface (1 ft. below mean sea level) such that basal ground water alone is developable. The soil fumigants EDB and DBCP were detected several or more years ago in the Maui High School Well located approximately 1.7 miles from the Haiku Well, hydrologically down-gradient (toward ocean). These two contaminants are believed to have originated from irrigation-derived groundwater percolation and perched water seepages in the Kula formation, down alongside the well casing and not from general contamination of the basal aquifer.

A representative water sample was collected from the Haiku Well during the seven-day constant-rate pumping test of August 24–September 1, 1995 and analyzed by Montgomery Laboratories of Pasadena, California. The results of the inorganic and organic chemical analyses were all within the limits for safe drinking water (see Appendix A, pgs A-1 to A-17). EDB was not detected, but DBCP was present at a level of 0.00001 mg/l (pg A-2), well below the limit of 0.00004 mg/l. Six months earlier, the well was pumped at 100 gpm and sampled twice (February 13 and 22, 1995) for EDB and DBCP analyses, with the following results (pgs A-18, A-19):

	EDB	DBCP
February 13 Sample	ND*	0.00001 mg/l
February 22 Sample	ND*	ND*

*Non-detectable

The Haiku Well was initially sampled for organic analyses two years earlier, on May 18, 1993. A static water sample was obtained with a bailer. EDB was not detected. However, DBCP was detected at a level of 0.00005 mg/l (pg A-20), slightly exceeding the DOH limit. The long-standing static condition of the well may account for the level detected.

The groundwater temperature in the Haiku Well measured 68°F in 1979 when the well was pumped at a rate of 700 gpm. This temperature indicates that ground water recharge reaching the well, originates some distance inland. The salinity of the well, during the 1979 constant-rate test (4 days at 700 gpm) rose from an initial 53 mg/l to a final 89 mg/l. The August 24–September 1, 1995 constant-rate test (7 days at 350 gpm) showed an increasing chloride range of 65 to 80 mg/l. The minimum reported water temperature was 69.8°F, slightly higher than in 1979, probably due to the lower pumping rate.

Results of 1995 Pumping Tests

In 1995, three pumping tests were performed on the Haiku Well. However, the results from only the last two tests were utilized in analyzing the hydraulic characteristics of the aquifer. Drawdown data from the first test was invalidated by inadvertent slippage of the transducer cable, but water samples collected for chloride analysis document the salinity of the well under pumping conditions (see Appendix E). The dates and types of tests performed were:

August 25-September 1:	Seven-Day Constant-Rate Test @ 350 gpm
December 1:	Step-Drawdown Test
December 15-22:	Seven-Day Constant-Rate Test @ 350 gpm

Data loggers were used to monitor water levels continuously before, during, and after the periods of pumping at the Haiku and H'poko Wells 1 and 2 located at a distance of 3,100 and 3,700 feet, respectively.

Step-Drawdown Test Analysis. The Drawdown vs Pumping Rate Curve shown in Figure 4 was derived from the December 1, 1995 step-drawdown test (see Appendix C for the record). Based upon Figure 4, the Haiku Well has a specific capacity of 580 gpm per foot of drawdown when pumped at the rate of 350 gpm. This capacity is lower than expected, when compared to other wells having specific capacities of 1,000 or more in similar highly permeable basalt aquifers. However, this lower value for the Haiku Well can be accounted for by its shallow aquifer penetration (46 feet).

Analysis of the step test data also reveals that the calculated drawdown in the aquifer (just outside of the well) is only 0.21 ft., or 49% of the observed 0.42 ft. drawdown at 300 gpm in the Haiku Well. This means that, for all practical purposes, drawdown effects in the nearby wells (H'poko 1 and 2, at 3,100 and 3,700 ft. distances) and other wells beyond, will be undetectable. Thus, pumping the Haiku Well will have no measurable effect on the water levels in any of the existing basal wells in the region.

Hydraulic Conductivity and Transmissivity. The use of step-drawdown test data has been proven reliable in determining two important aquifer characteristics, its hydraulic conductivity and the components of drawdown related to well and aquifer losses.

The hydraulic conductivity (K) of the basal aquifer tapped by the Haiku Well is 3,760 feet/day and the transmissivity (T) of the aquifer is 670,600 ft.^{2}/day. - Appendix C contains the step-drawdown record, the extrapolated values of drawdown and corresponding pumping rate, the s/Q curve for use in applying Jacob's (1947) equation for well and aquifer losses, and the calculations for K and T.

Constant-Rate Test Analysis. After the step-drawdown test on December 1, 1995, the Haiku Well was rested for two weeks and on December 15th a 7-day constant-rate test (350 gpm) was begun. From the graphical record of water levels in the Haiku Well (see Appendix D), a standard semi-log Time-Drawdown Curve was plotted as shown in Figure 5. Normally, this curve can be used to determine the transmissivity of the aquifer and the presence of hydrologic boundaries within the aquifer. However, such determinations are impractical, if not impossible, in this case. The reason is simply that drawdown trends in the well are obscured primarily by diurnal, but also lunar-caused fluctuations in water levels in the basal aquifer. Consequently, the graphical determination of "delta s" (change in drawdown per log cycle of time) which is used to calculate transmissivity, cannot be reliably made. Nevertheless, preliminary analysis of the time-drawdown curve indicate that higher values of hydraulic conductivity and transmissivity will be obtained, compared to those derived from the step test data.

The apparent change in slope observed after 3 to 4 days of pumping may or may not be indicative of a hydrologic boundary condition in the aquifer. One or

more such boundaries might be expected from inferred dikes associated with the Northwest Rift Zone, but probably should appear earlier in the record than 3 or 4 days. Finally, the apparent slow recovery of the well, following the end of the test, is not compatible with the reliable analysis of a highly permeable aquifer having a hydraulic conductivity of 3,760 ft./day. Diurnal and lunar-induced fluctuations in water levels are believed to be the cause.

The use of the time-drawdown curve for graphical analysis of aquifer characteristics is made difficult by the cyclical fluctuations in the record. Whereas the range of diurnal fluctuations is approximately 0.2 foot, the expected drawdown trend is less than 0.1 foot per log cycle of time. The constant-rate test record of water levels in the Haiku Well (graphical) is presented in Appendix D.

Tidal and Lunar Effects on Test Data. An excellent record (graphical) of the diurnal and lunar-induced fluctuations of water levels in the basal aquifer was obtained by Tom Nance in H'poko Wells 1 and 2, located 3,100 and 3,700 feet, respectively, from the Haiku Well. This record, which is presented in Figure 6, covers the period from December 1, 1995 to January 13, 1996, within which period the Haiku Well test was conducted. A somewhat similar record of water levels would have been obtained in the Haiku Well, had a record been made. The observed tidal efficiency (tidal range in well/ tidal range of ocean) is slightly greater in H'poko Well 1 than it is in H'poko Well 2, because H'poko Well 1 is closer to the ocean. H'poko Well 2 and the Haiku Well are located about the same distance from the ocean and they both have an estimated tidal (diurnal) range of 0.085 ft., whereas H'poko Well 1, located approximately 2,000 ft. closer to the ocean, has an estimated tidal range of 0.11 ft.

Figure 6, indicates no obvious effect on the H'poko wells due to pumping of the Haiku Well at a sustained rate of 350 gpm. Therefore, no effect on water levels can be expected in other existing basal wells in the region, all of which are more distantly located.

Surface Water/Ground Water Relationship

The occurrence of surface water and ground water in the Haiku-Paia region are distinctly separate, both geologically and hydrologically. Except for Maliko,

streams in the region are cut entirely within the Kula formation which consists predominantly of massive, poorly permeable andesitic lava flows. Except for Maliko Gulch, these streams typically have moderate depths of roughly 100 feet or so and derive their intermittent and sometimes perennial flows from direct percolation of rainfall and randomly occurring high-level ground water bodies perched hundreds of feet above sea level on interbedded layers of soil; weathered ash; and dense, poorly permeable lava flows within the Kula formation.

Ground water in the area, on the other hand, occurs basally at an elevation of about four feet in a distinctly different geological formation, called the Honomanu volcanic series. This formation comprises the core of East Maui and consists predominantly of highly permeable, thin-bedded basalt lava flows. In the Haiku-Paia region, the Honomanu formation lies some 200 feet or more beneath the ground surface and is overlain by the younger Kula formation which is typically 200 or more feet thick.

Deep percolation of rainfall and perched ground water in the Kula formation and the presumed seaward movement of ground water from interior groundwater sources (such as dike-confined water), together provide recharge to the basal aquifer in the Haiku-Paia area.

The development of basal water in the Haiku-Paia area will, therefore, have no effect on the overlying streamflows and percolating ground waters that occur hundreds of feet above the basal aquifer.

PROBABLE IMPACTS AND MITIGATION MEASURES

Geology

The development of the Haiku Well as a 0.5 mgd municipal water source is not expected to have any effect (such as subsidence) on the soils and subsurface formations in the Haiku-Paia area.

No mitigation measures are proposed or required.

Surface Water

The development of the basal Haiku Well is not expected to have any effect on the high-level streamflows in the Haiku-Paia region. Such flows occur in stream channels situated hundreds of feet above the basal aquifer and are characteristically intermittent. Such flows owe their existence to direct runoff and infiltration of rainfall and to percolating ground water which randomly emerge as seepages and springs in the walls and channels of narrow stream basins. By contributing some recharge to the underlying basal aquifer by means of deep percolation, such streamflows may have some effect on underlying basal water resources. However, the converse is not true, that is, basal water and its development cannot affect the streamflows in the region.

Furthermore, the Haiku Well was constructed with solid casing from the ground surface to a depth of 829 feet, or one foot below mean sea level. Therefore, any high-level perched ground water that may have been encountered by the Haiku Well has been isolated from the basal aquifer and, therefore, the development of the Haiku Well will have no effect on streamflows.

No mitigation measures are proposed or required.

Ground Water and Existing Wells

The development of the Haiku Well as a 0.5 mgd capacity source will have no measurable effect on the basal water resources in the area. Assuming that the Haiku Well will be pumped, on average, 16 hours a day (a DWS standard), the average withdrawal and use of 0.33 mgd is negligible when compared to the estimated 31 mgd sustainable yield of the Haiku Aquifer System. Furthermore, the Haiku Well's location and principal source of recharge is believed to be in the Haiku Aquifer, which is largely undeveloped.

No existing wells are expected to be affected by the development of the Haiku Well. Pumping the Haiku Well for seven days at a constant rate of 350 gpm (0.5 mgd) showed no effect on water levels in the nearest existing wells (H'poko Wells) located 3,100 to 3,700 ft. away and, therefore, no short-term effect on water levels can be expected in other existing wells which are more distantly located.

Furthermore, no long-term effect on water levels in existing wells is expected, based upon the hydrologic properties of the aquifer.

Some past concerns have been expressed by Mr. Hokoana about the possible effect of mauka well development on his well located in Maliko Gulch near the mouth. Obviously, from the analysis of drawdown data, development of the Haiku Well will produce an aquifer drawdown of approximately 0.2 ft. (see section on step-drawdown test analysis, page 8) and will have no effect on water levels in the Hokoana Well, located 2.4 miles away. Furthermore, hydrologic knowledge and experience of the writer indicate that no measurable short-term or long-term effect on the salinity of the Hokoana Well can be expected.

The salinity of the Hokoana Well was monitored daily during the August 24–September 1, 1995 constant-rate test of the Haiku Well and no trend was observed in the data. The chloride content of the well was essentially steady at 70 mg/l (see Appendix E).

No mitigation measures relative to the Hokoana Well are proposed or required.

Water Quality

The Haiku Well develops basal water from a depth of 825 feet below ground surface with solid steel casing extending to one foot below mean sea level, or about five feet below the groundwater table. The basal aquifer has a head of 4.3 feet and yields ground water with a chloride content ranging between approximately 50 to 90 mg/l and a cool temperature of 69.8° Fahrenheit.

The Haiku Well was first sampled for organic analyses on May 18, 1993, under static conditions. The soil fumigant, EDB (ethylene dibromide), was not detected, but DBCP (dibromochloropropane) was found at a level of 0.00005 mg/l, slightly exceeding the Department of Health (DOH) limit of 0.00004 mg/l. The long-standing static condition of the well may have accounted for the presence of the contaminant in the bailed sample. Two years later, the well was sampled twice (on February 13 and 22, 1995) under pumping conditions (100 gpm) and analyzed for EDB and DBCP. EDB was not detected. However, DBCP was detected at a level of 0.00001 mg/l, well within the DOH limit for safe drinking water. And, finally, during a seven-day constant-rate pumping test (at 350 gpm) from August 24-September 1, 1995, a representative water sample was collected on August 28th.

The results of the inorganic and organic analyses were all within the DOH limits for safe drinking water. Again, EDB was not detected and DBCP was detected at a level of 0.00001 mg/l, well within the DOH limit of 0.00004 mg/l.

Because DBCP was detected, albeit within DOH limits, the Haiku Well when converted into a production well will be monitored for DBCP and EDB periodically to assure that DBCP is either non-detectable or within the safe drinking water limit. Because the soil fumigants EDB and DBCP are no longer used, it is expected that DBCP will eventually not be detected.

No other mitigation measures are proposed or required.

EMPlan

The Haiku Well is to be developed completely separate from the EMPlan (East Maui Water Development Plan). The well which is located within an existing tank site and will be equipped with a pump and controls and connected directly into the existing storage tank. This storage tank feeds the Haiku Water System which serves the Haiku area, east of Maliko Gulch.

No mitigation measures relative to the EMPlan are proposed or required.

REFERENCES

Maui County Department of Water Supply, February 1991, Central Maui Water Study, Part II. Prepared by Norman Saito Engineering Consultants, Inc.

Maui County Department of Water Supply, East Maui Water Development Plan, Final Environmental Impact Statement. Prepared by Norman Saito Engineering Consultants, Inc. and Parametrix, Inc.

State of Hawaii, Commission on Water Resource Management, Department of Land and Natural Resources, June 1990, State Water Resources Protection Plan, v. I & II. Prepared by George A.L. Yuen & Associates, Inc.

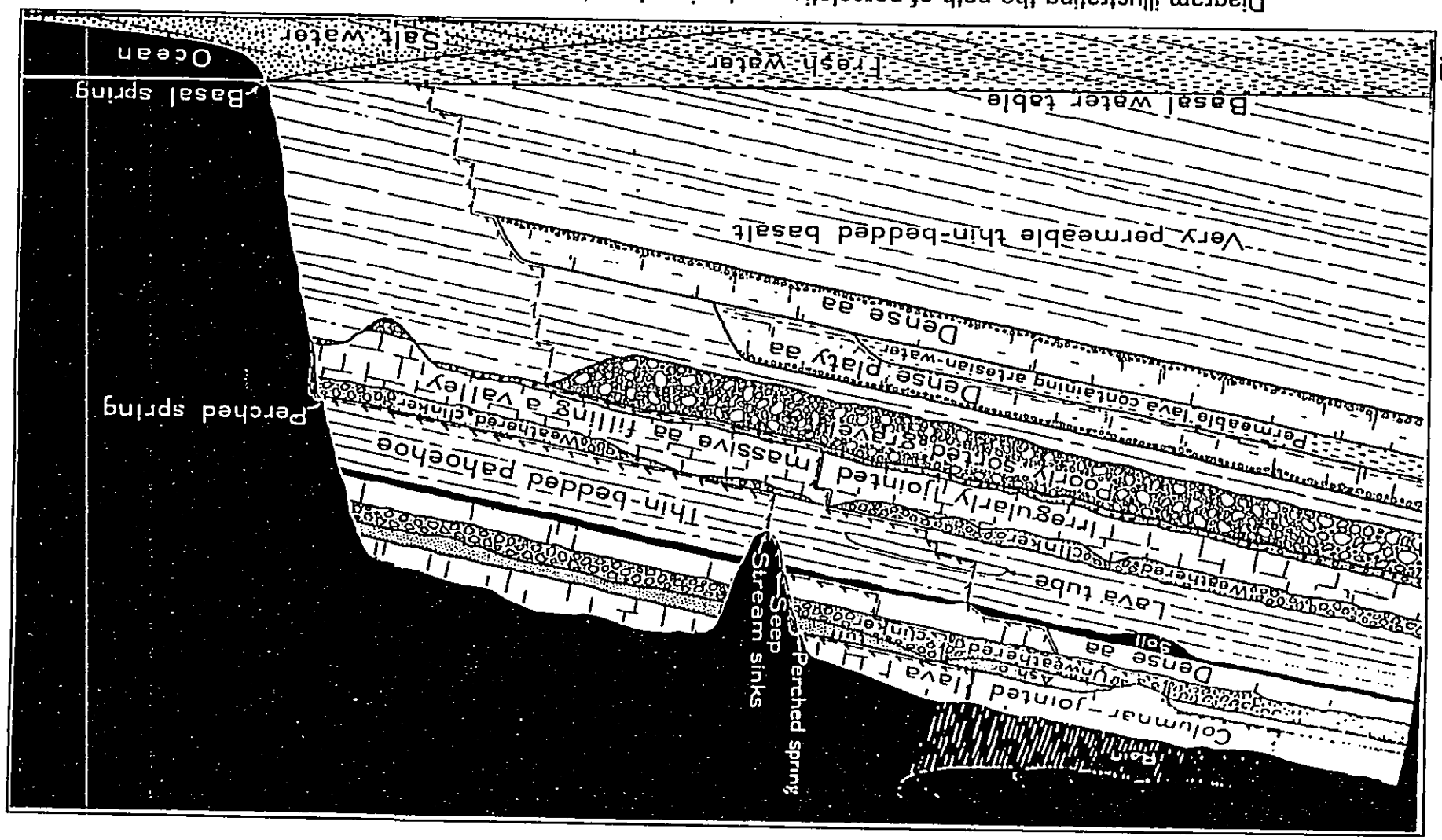


Figure 1

Diagram illustrating the path of percolating water in a lava terrane containing various types of interbedded perching structures, typical of the Kula volcanic series (after Stearns & Macdonald, 1942).

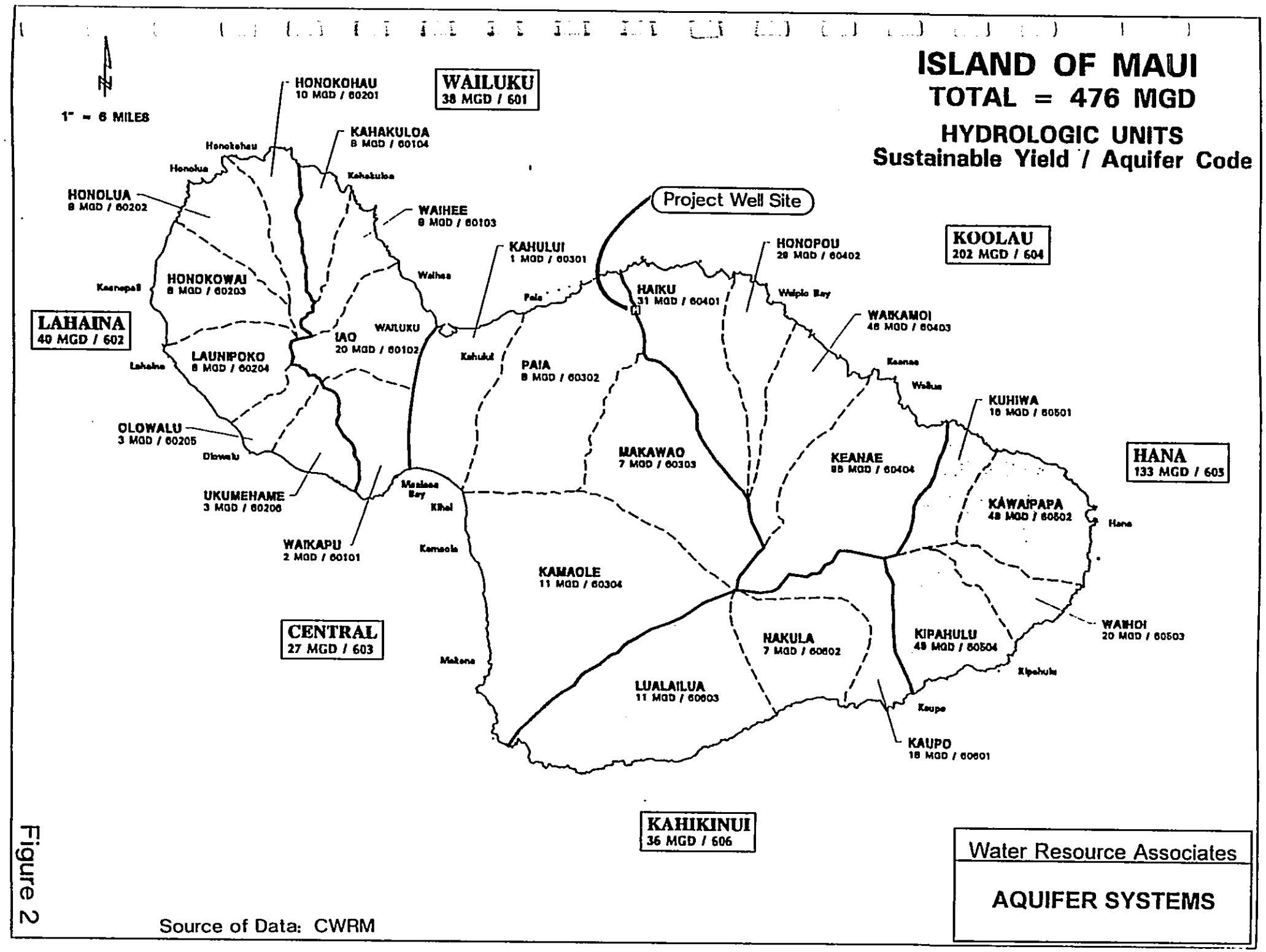


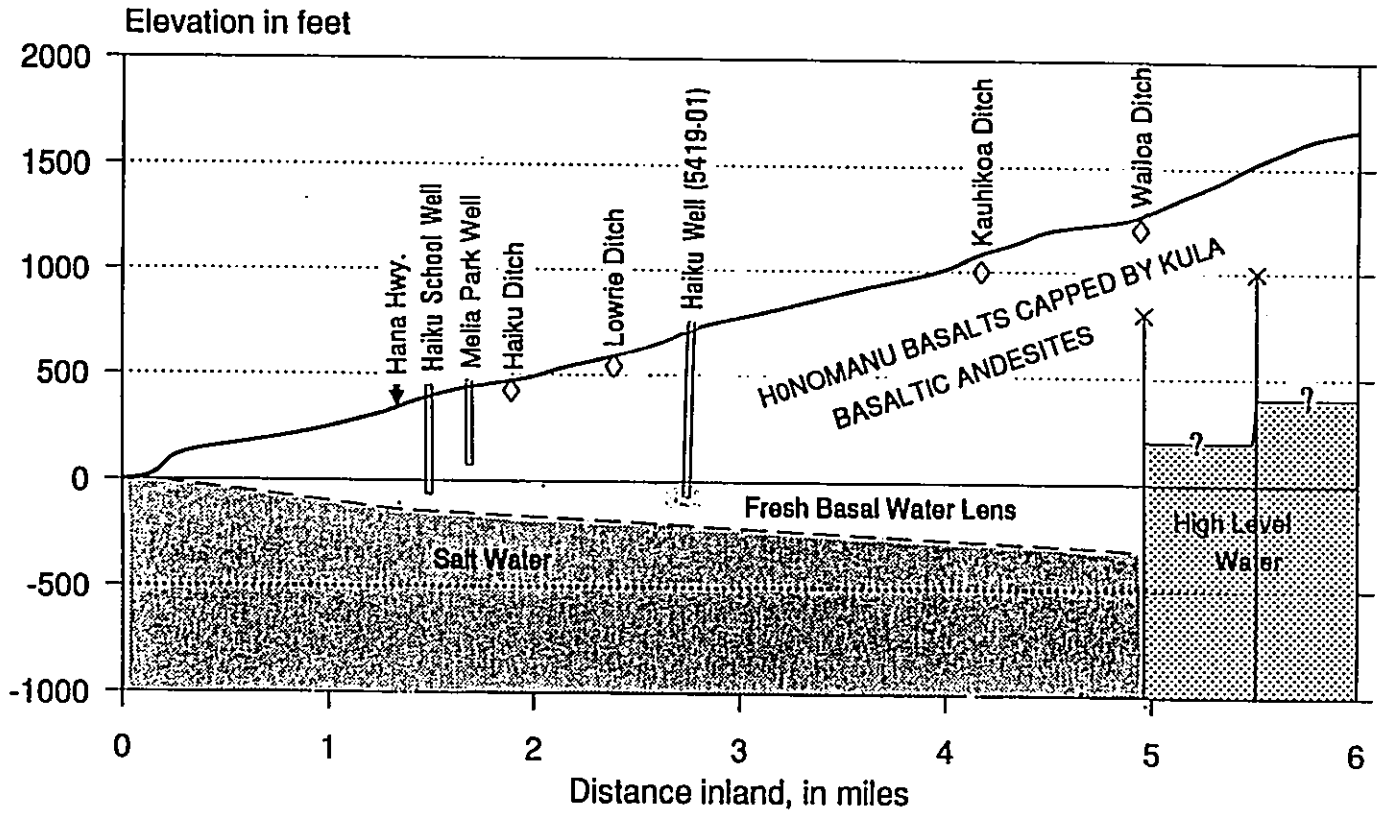
Figure 2

Source of Data: CWRM

INTERPRETIVE HYDROGEOLOGIC SECTION

Haiku area

East Maui



Water Resource Associates
089

Figure 3

DRAWDOWN-PUMPING RATE CURVE
Haiku Well
Date of Step-test: December 1, 1995

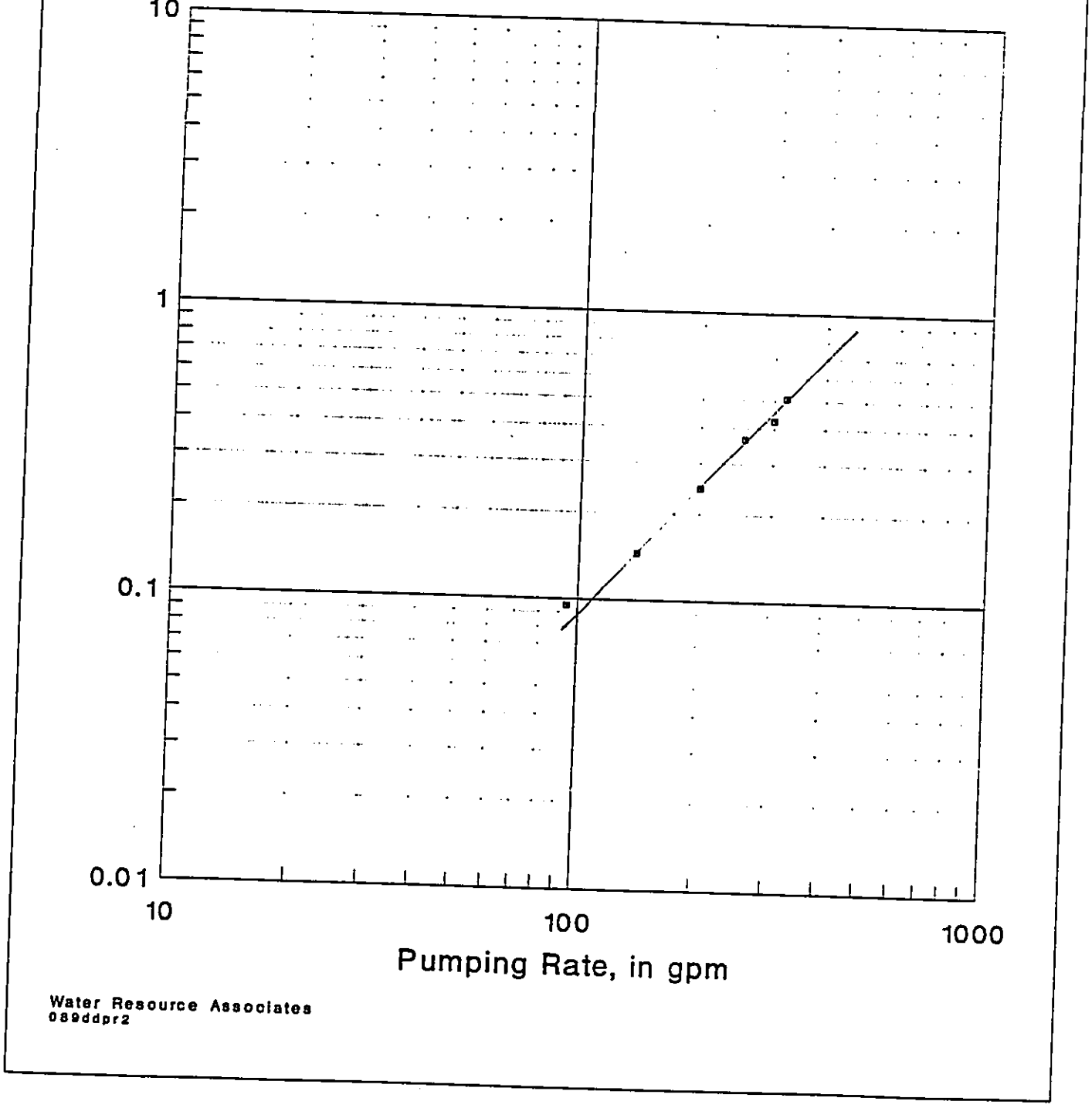


Figure 4

TIME-DRAWDOWN CURVE
Haiku Well (5419-01), Maui
Date of Test: Dec. 15-22, 1995

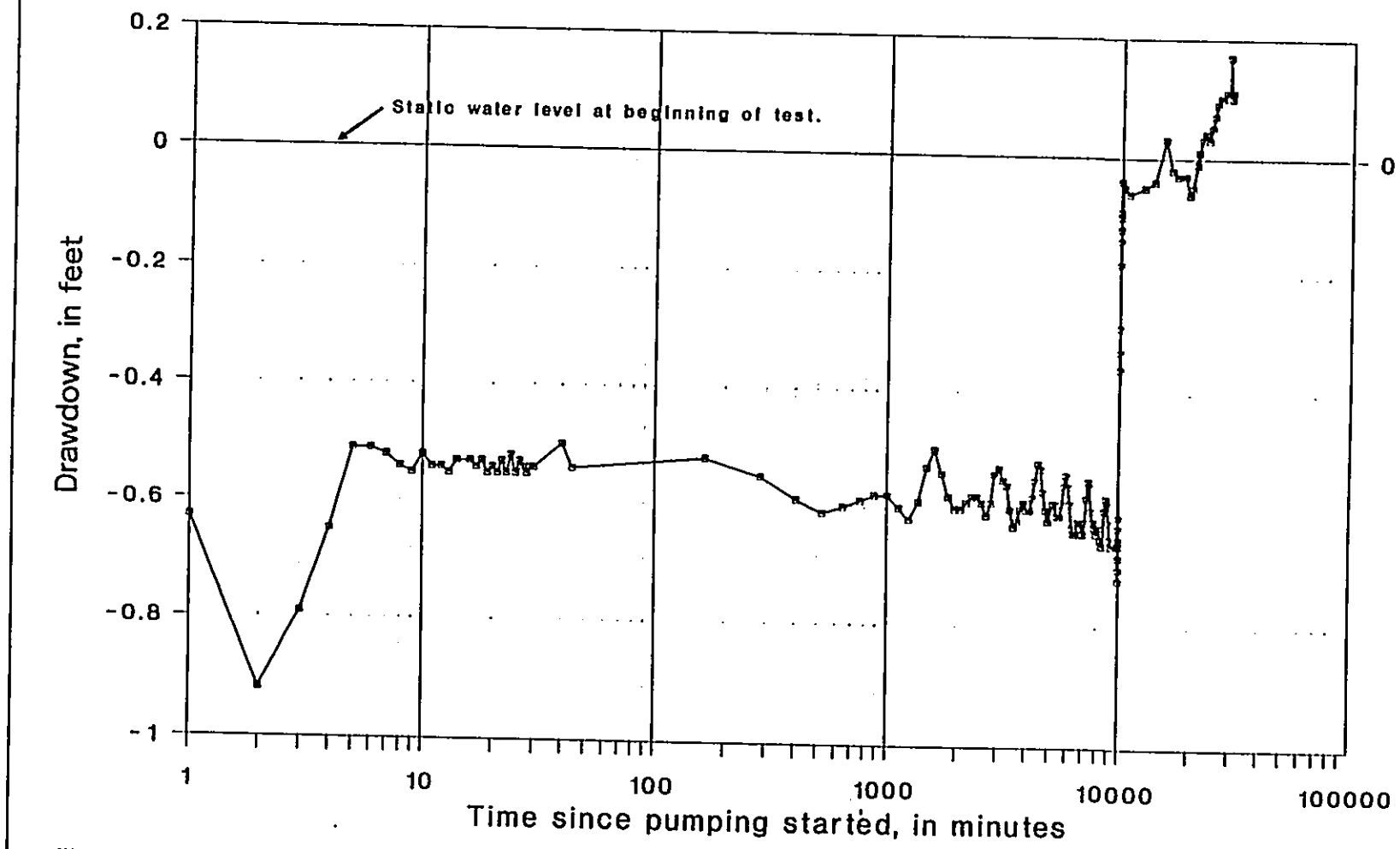


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Figure 5

DATA FILES: POKO1A.PRN AND POKO2A.PRN (DEC 1, 1995 to JAN 13, 1996)

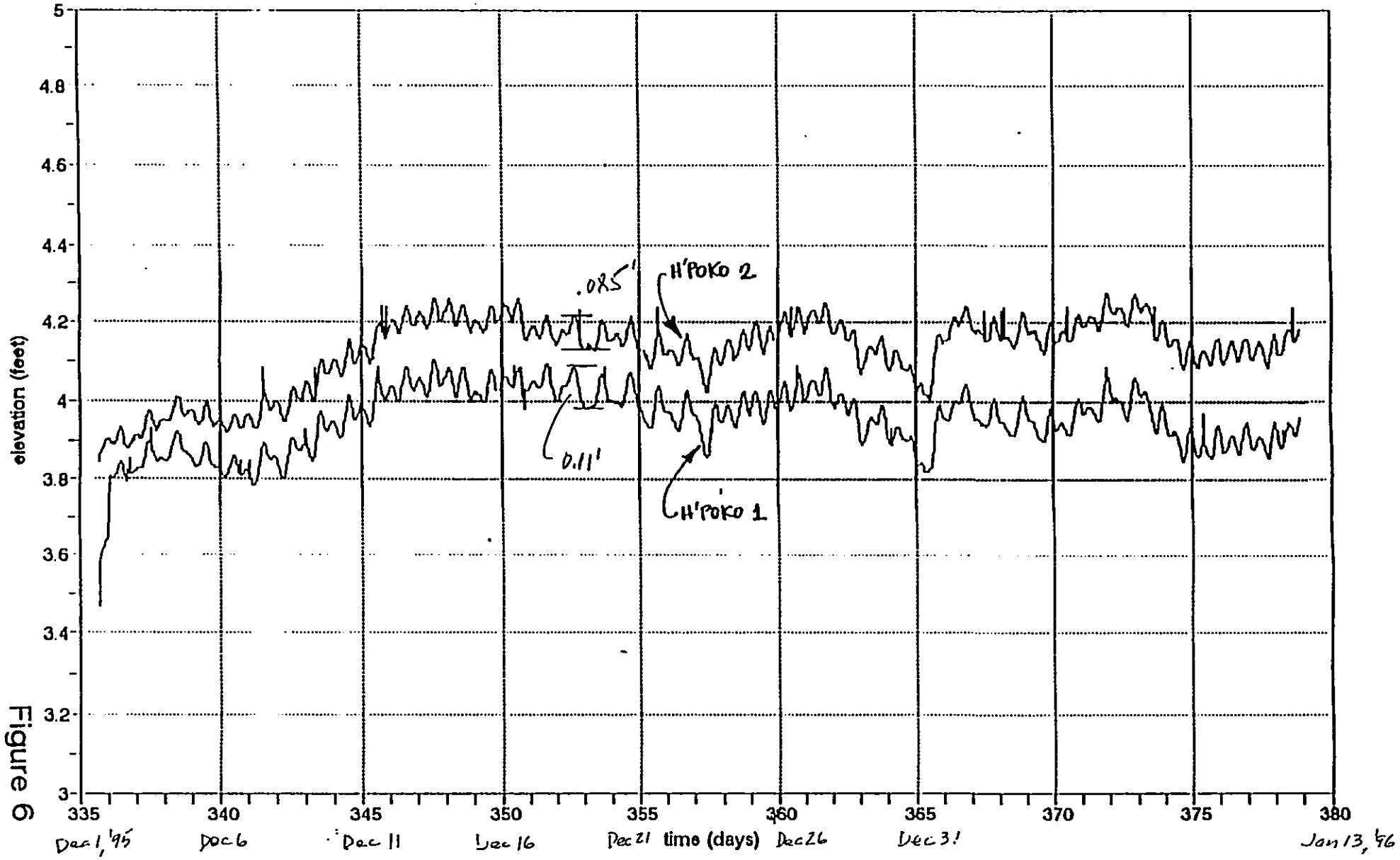
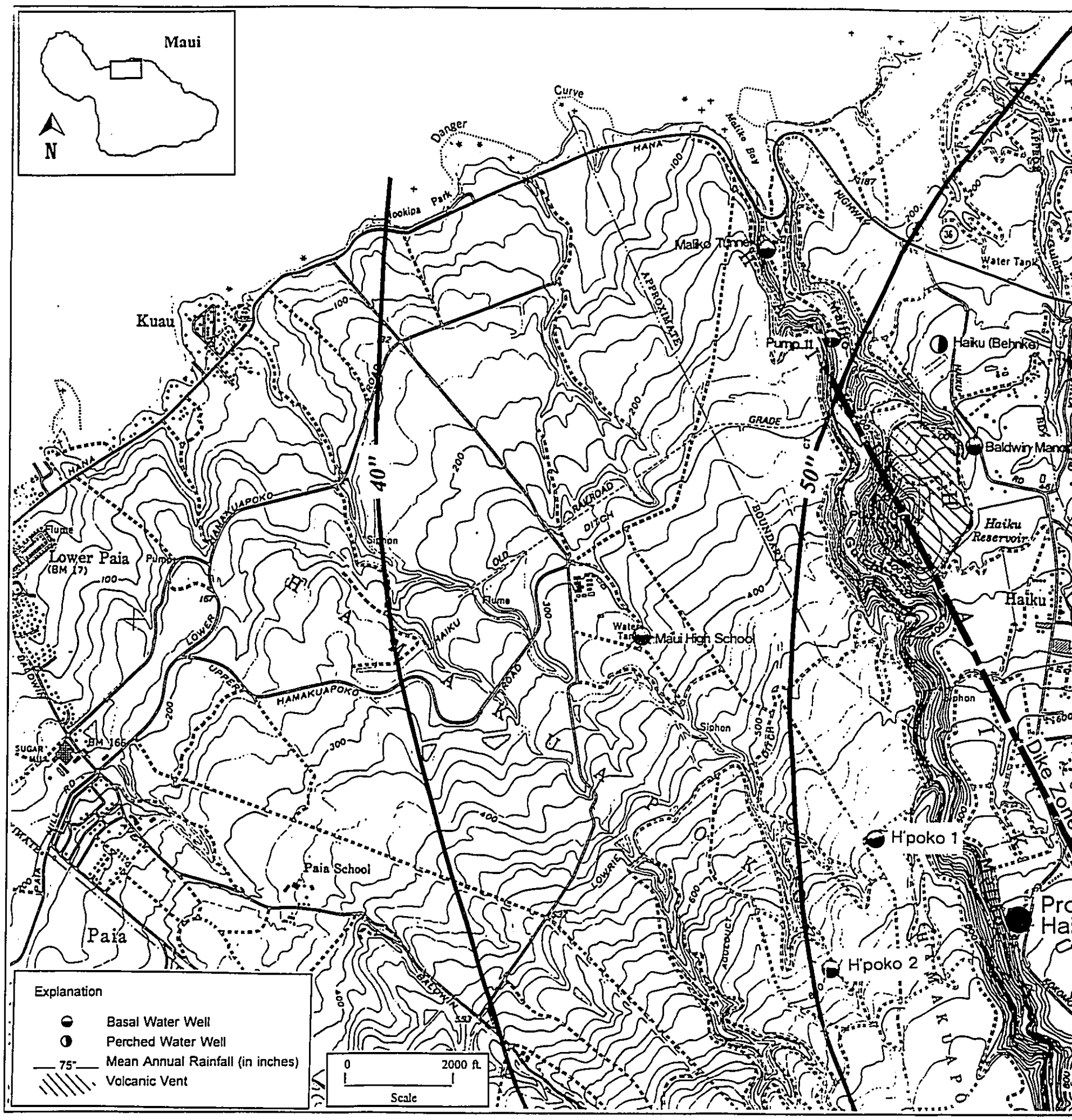


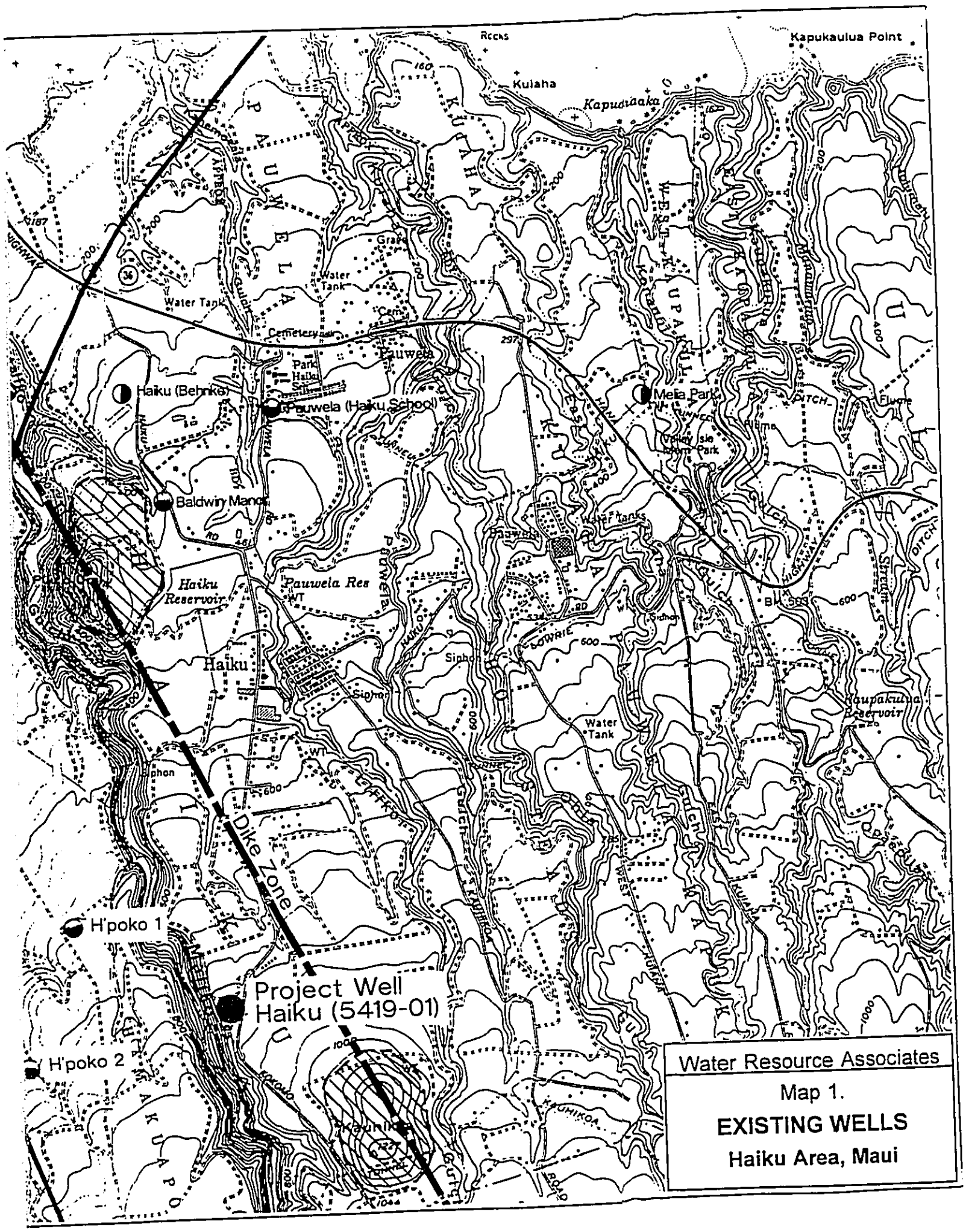
Figure 6

Water Levels in H'poko Wells 1 and 2
(December 1, 1995 - January 13, 1996)

DOCUMENT CAPTURED AS RECEIVED



DOCUMENT CAPTURED AS RECEIVED



Appendix A

Water Quality Analyses of Haiku Well (5419-01) by Montgomery Laboratories

Appendix A. Water Quality Analyses of Haiku Well (5419-01)
by Montgomery Laboratories

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Maui, County of, Department of
Water Supply
Cari Cerizo
614 Palapala Dr
Kahului , HI 96732

Samples Received
30-aug-1995 14:49:11

IKU WELL (950830203) Sampled on 08/28/95

Anal	Method	Analyte	Result	Units	MDL
09/15/95	(EPA/ML 200.7)	Calcium, Total, ICAP	14	mg/l	5.0
9/11/95	(ML/SM 4500-CNF)	Cyanide	ND	mg/l	0.025
09/14/95	(ML/EPA 548.1)	Endothall	ND	ug/l	5.0
09/05/95	(EPA/ML 340.2)	Fluoride	0.10	mg/l	0.10
09/05/95	(ML/EPA 547)	Glyphosate	ND	ug/l	6.0
09/01/95	(EPA/ML 245.1)	Mercury	ND	ug/l	0.20
08/30/95	(ML/EPA 300.0)	Nitrite, Nitrogen by IC	ND	mg/l	0.10
09/16/95	(1613)	2,3,7,8 - Dioxin	ND	PGL	2.2
		525 Semivolatiles by GC/MS			
09/20/95	(ML/EPA 525.2)	2,4-Dinitrotoluene	ND	ug/l	0.10
09/20/95	(ML/EPA 525.2)	alpha-Chlordane	ND	ug/l	0.050
09/20/95	(ML/EPA 525.2)	Acenaphthylene	ND	ug/l	0.10
09/20/95	(ML/EPA 525.2)	Alachlor	ND	ug/l	0.050
09/20/95	(ML/EPA 525.2)	Aldrin	ND	ug/l	0.050
09/20/95	(ML/EPA 525.2)	Anthracene	ND	ug/l	0.020
09/20/95	(ML/EPA 525.2)	Atrazine	ND	ug/l	0.050
09/20/95	(ML/EPA 525.2)	Benz(a)Anthracene	ND	ug/l	0.050
09/20/95	(ML/EPA 525.2)	Benzo(a)pyrene	ND	ug/l	0.020
09/20/95	(ML/EPA 525.2)	Benzo(b)Fluoranthene	ND	ug/l	0.020
09/20/95	(ML/EPA 525.2)	Benzo(g,h,i)Perylene	ND	ug/l	0.050
09/20/95	(ML/EPA 525.2)	Benzo(k)Fluoranthene	ND	ug/l	0.020
09/20/95	(ML/EPA 525.2)	Di(2-Ethylhexyl)phthalate	ND	ug/l	0.60
09/20/95	(ML/EPA 525.2)	Butylbenzylphthalate	ND	ug/l	0.50
09/20/95	(ML/EPA 525.2)	Bromacil	ND	ug/l	2.0
09/20/95	(ML/EPA 525.2)	Butachlor	ND	ug/l	0.050
09/20/95	(ML/EPA 525.2)	Caffeine	ND	ug/l	0.020
09/20/95	(ML/EPA 525.2)	Chrysene	ND	ug/l	0.020
09/20/95	(ML/EPA 525.2)	Dibenz(a,h)Anthracene	ND	ug/l	0.050
09/20/95	(ML/EPA 525.2)	Di-(2-Ethylhexyl)adipate	ND	ug/l	0.60
09/20/95	(ML/EPA 525.2)	Diethylphthalate	ND	ug/l	0.50

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$mg/l = \frac{ug/l}{1000}$

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(continued)

IKU WELL (950830203) Sampled on 08/28/95

Anal	Method	Analyte	Result	Units	MDL
09/20/95	(ML/EPA 525.2)	Dieldrin	ND	ug/l	0.20
09/20/95	(ML/EPA 525.2)	Dimethylphthalate	ND	ug/l	0.50
09/20/95	(ML/EPA 525.2)	Dimethoate	ND	ug/l	10
09/20/95	(ML/EPA 525.2)	Di-n-Butylphthalate	ND	ug/l	0.50
09/20/95	(ML/EPA 525.2)	Endrin	ND	ug/l	0.10
09/20/95	(ML/EPA 525.2)	Fluorene	ND	ug/l	-0.050
09/20/95	(ML/EPA 525.2)	gamma-Chlordane	ND	ug/l	0.050
09/20/95	(ML/EPA 525.2)	Hexachlorobenzene	ND	ug/l	0.050
09/20/95	(ML/EPA 525.2)	Hexachlorocyclopentadiene	ND	ug/l	0.050
09/20/95	(ML/EPA 525.2)	Heptachlor	ND	ug/l	0.040
09/20/95	(ML/EPA 525.2)	Heptachlor Epoxide	ND	ug/l	0.020
09/20/95	(ML/EPA 525.2)	Indeno(1,2,3,c,d)Pyrene	ND	ug/l	0.050
09/20/95	(ML/EPA 525.2)	Isophorone	ND	ug/l	0.50
09/20/95	(ML/EPA 525.2)	Lindane	ND	ug/l	0.020
09/20/95	(ML/EPA 525.2)	Methoxychlor	ND	ug/l	0.050
09/20/95	(ML/EPA 525.2)	Metribuzin	ND	ug/l	0.050
09/20/95	(ML/EPA 525.2)	Molinate	ND	ug/l	0.20
09/20/95	(ML/EPA 525.2)	Metolachlor	ND	ug/l	0.050
09/20/95	(ML/EPA 525.2)	trans-Nonachlor	ND	ug/l	0.050
09/20/95	(ML/EPA 525.2)	Pentachlorophenol	ND	ug/l	1.0
09/20/95	(ML/EPA 525.2)	Phenanthrene	ND	ug/l	0.020
09/20/95	(ML/EPA 525.2)	Prometryn	ND	ug/l	0.50
09/20/95	(ML/EPA 525.2)	Propachlor	ND	ug/l	0.050
09/20/95	(ML/EPA 525.2)	Pyrene	ND	ug/l	0.050
09/20/95	(ML/EPA 525.2)	Simazine	ND	ug/l	0.050
09/20/95	(ML/EPA 525.2)	Thiobencarb	ND	ug/l	0.20
09/20/95	(ML/EPA 525.2)	Trifluralin	ND	ug/l	0.10
		AB1803 - EDB and DBCP			
09/06/95	(ML/EPA 504)	Dibromochloropropane (DBCP)	0.01	ug/l	0.010
09/06/95	(ML/EPA 504)	Ethylene Dibromide (EDB)	ND	ug/l	0.010
		Aldicarbs			
09/06/95	(ML/EPA 531.1)	3-Hydroxycarbofuran	ND	ug/l	2.0

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IKU WELL (950830203) Sampled on 08/28/95

Anal	Method	Analyte	Result	Units	MDL
09/06/95	(ML/EPA 531.1)	Aldicarb (Temik)	ND	ug/l	0.50
09/06/95	(ML/EPA 531.1)	Aldicarb sulfone	ND	ug/l	0.80
09/06/95	(ML/EPA 531.1)	Aldicarb sulfoxide	ND	ug/l	0.50
09/06/95	(ML/EPA 531.1)	Baygon	ND	ug/l	2.0
09/06/95	(ML/EPA 531.1)	Carbofuran (Furadan)	ND	ug/l	0.90
09/06/95	(ML/EPA 531.1)	Carbaryl	ND	ug/l	2.0
09/06/95	(ML/EPA 531.1)	Methiocarb	ND	ug/l	2.0
09/06/95	(ML/EPA 531.1)	Methomyl	ND	ug/l	2.0
09/06/95	(ML/EPA 531.1)	Oxamyl (Vydate)	ND	ug/l	2.0
		Diquat and Paraquat			
09/07/95	(ML/EPA 549)	Diquat	ND	ug/l	0.40
09/07/95	(EPA 549)	Paraquat	ND	ug/l	2.0
		Herbicides by 515.1			
09/18/95	(ML/EPA 515.1)	2,4,5-T	ND	ug/l	0.20
09/18/95	(ML/EPA 515.1)	2,4,5-TP (Silvex)	ND	ug/l	0.20
09/18/95	(ML/EPA 515.1)	2,4-D	ND	ug/l	0.10
09/18/95	(ML/EPA 515.1)	2,4-DB	ND	ug/l	2.0
09/18/95	(ML/EPA 515.1)	Dichlorprop	ND	ug/l	0.50
09/18/95	(ML/EPA 515.1)	5-Hydroxydicamba	ND	ug/l	0.20
09/18/95	(ML/EPA 515.1)	Acifluorfen (qualitative)	ND	ug/l	0.20
09/18/95	(ML/EPA 515.1)	Bentazon	ND	ug/l	0.50
09/18/95	(ML/EPA 515.1)	Chloramben (qualitative)	ND	ug/l	0.50
09/18/95	(ML/EPA 515.1)	Dalapon (qualitative)	ND	ug/l	1.0
09/18/95	(ML/EPA 515.1)	3,5-Dichlorobenzoic acid	ND	ug/l	0.60
09/18/95	(ML/EPA 515.1)	DCPA	ND	ug/l	0.20
09/18/95	(ML/EPA 515.1)	Dicamba	ND	ug/l	0.20
09/18/95	(ML/EPA 515.1)	Dinoseb	ND	ug/l	0.20
09/18/95	(ML/EPA 515.1)	Pentachlorophenol	ND	ug/l	0.040
09/18/95	(ML/EPA 515.1)	Picloram	ND	ug/l	0.10
09/18/95	(ML/EPA 515.1)	4-Nitrophenol (qualitative)	ND	ug/l	5.0
		Nitrate by IC as NO3 & N			

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IKU WELL (950830203) Sampled on 08/28/95

Anal	Method	Analyte	Result	Units	MDL
08/30/95	(EPA/ML 300.0)	Nitrate-N by IC	1.9	mg/l	0.10
08/30/95	(ML/EPA 300)	Nitrate	8.4	mg/l	0.44
		Regulated VOCs plus Lists 1&3			
09/11/95	(ML/EPA 524.2)	1,1,1,2-Tetrachloroethane	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	1,1,1-Trichloroethane	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	1,1,2,2-Tetrachloroethane	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	1,1,2-Trichloroethane	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	1,1-Dichloroethane	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	1,1-Dichloroethylene	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	1,1-Dichloropropene	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	1,2,3-Trichlorobenzene	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	1,2,3-Trichloropropane	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	1,2,4-Trichlorobenzene	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	1,2,4-Trimethylbenzene	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	1,2-Dichloroethane	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	1,2-Dichloropropane	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	1,3,5-Trimethylbenzene	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	1,3-Dichloropropane	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	p-Dichlorobenzene (1,4-DCB)	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	2,2-Dichloropropane	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	2-Butanone (MEK)	ND	ug/l	0.50
09/11/95	(ML/SW 8240)	2-Chloroethylvinylether	ND	ug/l	5.0
09/11/95	(ML/EPA 524.2)	o-Chlorotoluene	ND	ug/l	1.0
09/11/95	(ML/EPA 524.2)	p-Chlorotoluene	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	4-Methyl-2-Pentanone (MIBK)	ND	ug/l	0.50
09/11/95	(EPA/SW 524.2)	Benzene	ND	ug/l	5.0
09/11/95	(ML/EPA 524.2)	Bromobenzene	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	Bromomethane (Methyl Bromide)	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	cis-1,2-Dichloroethylene	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	Chlorobenzene	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	Carbon Tetrachloride	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	cis-1,3-Dichloropropene	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	Bromoform	ND	ug/l	0.50

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IKU WELL (950830203) Sampled on 08/28/95

Anal	Method	Analyte	Result	Units	MDL
09/11/95	(ML/EPA 524.2)	Chloroform (Trichloromethane)	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	Bromochloromethane	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	Chloroethane	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	Chloromethane(Methyl Chloride)	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	Chlorodibromomethane	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	Dibromomethane	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	Bromodichloromethane	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	Dichloromethane	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	Ethyl benzene	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	Dichlorodifluoromethane	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	Fluorotrichloromethane(Freon1)	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	Hexachlorobutadiene	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	Isopropylbenzene	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	m-Dichlorobenzene (1,3-DCB)	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	m,p-Xylenes	ND	ug/l	0.50
09/11/95	(ML/SW 8240)	Methyl Tert-butyl ether (MTBE)	ND	ug/l	5.0
09/11/95	(ML/EPA 524.2)	Naphthalene	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	n-Butylbenzene	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	n-Propylbenzene	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	o-Xylene	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	o-Dichlorobenzene (1,2-DCB)	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	Tetrachloroethylene (PCE)	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	p-Isopropyltoluene	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	sec-Butylbenzene	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	Styrene	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	trans-1,2-Dichloroethylene	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	tert-Butylbenzene	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	Trichloroethylene (TCE)	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	Trichlorotrifluoroethane(Freon	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	trans-1,3-Dichloropropene	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	Toluene	ND	ug/l	0.50
09/11/95	(ML/EPA 524.2)	Vinyl chloride (VC)	ND	ug/l	0.50

SDWA Pesticides

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Maui, County of, Department of
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(continued)

IKU WELL (950830203) Sampled on 08/28/95

Anal	Method	Analyte	Result	Units	MDL
09/07/95	(ML/EPA 508)	PCB 1016 Aroclor	ND	ug/l	0.10
09/07/95	(ML/EPA 508)	PCB 1221 Aroclor	ND	ug/l	0.10
09/07/95	(ML/EPA 508)	PCB 1232 Aroclor	ND	ug/l	0.10
09/07/95	(ML/EPA 508)	PCB 1242 Aroclor	ND	ug/l	0.10
09/07/95	(ML/EPA 508)	PCB 1248 Aroclor	ND	ug/l	0.10
09/07/95	(ML/EPA 508)	PCB 1254 Aroclor	ND	ug/l	0.10
09/07/95	(ML/EPA 508)	PCB 1260 Aroclor	ND	ug/l	0.10
09/07/95	(ML/EPA 508)	Alpha-BHC	ND	ug/l	0.010
09/07/95	(ML/EPA 508)	Alachlor (Alanex)	ND	ug/l	0.050
09/07/95	(ML/EPA 508)	Aldrin	ND	ug/l	0.010
09/07/95	(ML/EPA 508)	Beta-BHC	ND	ug/l	0.010
09/07/95	(ML/EPA 508)	Chlordane	ND	ug/l	0.10
09/07/95	(ML/EPA 508)	Chlorthalonil (Drconil, Bravo)	ND	ug/l	0.010
09/07/95	(ML/EPA 508)	Delta-BHC	ND	ug/l	0.010
09/07/95	(ML/EPA 508)	p,p' DDD	ND	ug/l	0.010
09/07/95	(ML/EPA 508)	p,p' DDE	ND	ug/l	0.010
09/07/95	(ML/EPA 508)	p,p' DDT	ND	ug/l	0.010
09/07/95	(ML/EPA 508)	Dieldrin	ND	ug/l	0.010
09/07/95	(ML/EPA 508)	Endrin Aldehyde	ND	ug/l	0.010
09/07/95	(ML/EPA 508)	Endrin	ND	ug/l	0.010
09/07/95	(ML/EPA 508)	Endosulfan I (alpha)	ND	ug/l	0.010
09/07/95	(ML/EPA 508)	Endosulfan II (beta)	ND	ug/l	0.010
09/07/95	(ML/EPA 508)	Endosulfan sulfate	ND	ug/l	0.010
09/07/95	(ML/EPA 508)	Heptachlor	ND	ug/l	0.010
09/07/95	(ML/EPA 508)	Heptachlor Epoxide	ND	ug/l	0.010
09/07/95	(ML/EPA 508)	Lindane (gamma-BHC)	ND	ug/l	0.010
09/07/95	(ML/EPA 508)	Methoxychlor	ND	ug/l	0.050
09/07/95	(ML/EPA 508)	Toxaphene	ND	ug/l	0.50
		T-22 Inorg+Gen Min ICPMS Mets			
09/11/95	(EPA/ML 200.8)	Silver, Total, ICAP/MS	ND	ug/l	0.50
09/11/95	(EPA/ML 200.8)	Aluminum, Total, ICAP/MS	ND	ug/l	25
09/11/95	(EPA/ML 200.8)	Arsenic, Total, ICAP/MS	7.1	ug/l	1.0
09/11/95	(EPA/ML 200.8)	Barium, Total, ICAP/MS	3.1	ug/l	2.0

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(continued)

AIKU WELL (950830203) Sampled on 08/28/95

Anal	Method	Analyte	Result	Units	MDL
09/11/95	(EPA/ML 200.8)	Beryllium, Total, ICAP/MS	ND	ug/l	1.0
09/11/95	(EPA/ML 200.8)	Cadmium, Total, ICAP/MS	ND	ug/l	0.50
09/11/95	(EPA/MS 200.8)	Chromium, Total, ICAP/MS	7.7	ug/l	2.0
09/11/95	(EPA/ML 200.8)	Copper, Total, ICAP/MS	ND	ug/l	2.0
09/11/95	(EPA/ML 200.8)	Iron, Total, ICAP/MS	ND	ug/l	50
09/11/95	(EPA/ML 200.8)	Manganese, Total, ICAP/MS	ND	ug/l	2.0
09/11/95	(EPA/ML 200.8)	Nickel, Total, ICAP/MS	ND	ug/l	5.0
09/11/95	(EPA/ML 200.8)	Lead, Total, ICAP/MS	1.4	ug/l	0.50
09/11/95	(EPA/ML 200.8)	Antimony, Total, ICAP/MS	ND	ug/l	1.0
09/11/95	(EPA/ML 200.8)	Selenium, Total, ICAP/MS	ND	ug/l	5.0
09/11/95	(EPA/ML 200.8)	Thallium, Total, ICAP/MS	ND	ug/l	1.0
09/11/95	(EPA/ML 200.8)	Zinc, Total, ICAP/MS	98	ug/l	5.0

AIKU WELL (950830242) Sampled on 08/29/95

Anal	Method	Analyte	Result	Units	MDL
	(ML/EPA 100.1)	Asbestos		MFL	0.0000

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#22600

Maui, County of, Department of
Water Supply
Cari Cerizo
614 Palapala Dr
Kahului , HI 96732

Samples Received

31-aug-1995 14:20:12

IKU WELL DUP (950831256) Sampled on 08/28/95

Anal	Method	Analyte	Result	Units	MDL
09/15/95	(EPA/ML 200.7)	Calcium, Total, ICAP	14	mg/l	5.0
09/11/95	(ML/SM 4500-CNF)	Cyanide	ND	mg/l	0.025
09/14/95	(ML/EPA 548.1)	Endothall	ND	ug/l	5.0
09/05/95	(EPA/ML 340.2)	Fluoride	0.10	mg/l	0.10
09/05/95	(ML/EPA 547)	Glyphosate	ND	ug/l	6.0
09/12/95	(EPA/ML 245.1)	Mercury	ND	ug/l	0.20
08/30/95	(ML/EPA 300.0)	Nitrite, Nitrogen by IC	ND	mg/l	0.10
09/16/95	(1613)	2,3,7,8 - Dioxin	ND	PGL	1.4
		525 Semivolatiles by GC/MS			
09/20/95	(ML/EPA 525.2)	2,4-Dinitrotoluene	ND	ug/l	0.10
09/20/95	(ML/EPA 525.2)	alpha-Chlordane	ND	ug/l	0.050
09/20/95	(ML/EPA 525.2)	Acenaphthylene	ND	ug/l	0.10
09/20/95	(ML/EPA 525.2)	Alachlor	ND	ug/l	0.050
09/20/95	(ML/EPA 525.2)	Aldrin	ND	ug/l	0.050
09/20/95	(ML/EPA 525.2)	Anthracene	ND	ug/l	0.020
09/20/95	(ML/EPA 525.2)	Atrazine	ND	ug/l	0.050
09/20/95	(ML/EPA 525.2)	Benz(a)Anthracene	ND	ug/l	0.050
09/20/95	(ML/EPA 525.2)	Benzo(a)pyrene	ND	ug/l	0.020
09/20/95	(ML/EPA 525.2)	Benzo(b)Fluoranthene	ND	ug/l	0.020
09/20/95	(ML/EPA 525.2)	Benzo(g,h,i)Perylene	ND	ug/l	0.050
09/20/95	(ML/EPA 525.2)	Benzo(k)Fluoranthene	ND	ug/l	0.020
09/20/95	(ML/EPA 525.2)	Di(2-Ethylhexyl)phthalate	ND	ug/l	0.60
09/20/95	(ML/EPA 525.2)	Butylbenzylphthalate	ND	ug/l	0.50
09/20/95	(ML/EPA 525.2)	Bromacil	ND	ug/l	2.0
09/20/95	(ML/EPA 525.2)	Butachlor	ND	ug/l	0.050
09/20/95	(ML/EPA 525.2)	Caffeine	ND	ug/l	0.020
09/20/95	(ML/EPA 525.2)	Chrysene	ND	ug/l	0.020
09/20/95	(ML/EPA 525.2)	Dibenz(a,h)Anthracene	ND	ug/l	0.050
09/20/95	(ML/EPA 525.2)	Di-(2-Ethylhexyl)adipate	ND	ug/l	0.60
09/20/95	(ML/EPA 525.2)	Diethylphthalate	ND	ug/l	0.50

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Maui, County of, Department of
Water Supply
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IKU WELL DUP (950831256) Sampled on 08/28/95

Anal	Method	Analyte	Result	Units	MDL
09/20/95	(ML/EPA 525.2)	Dieldrin	ND	ug/l	0.20
09/20/95	(ML/EPA 525.2)	Dimethylphthalate	ND	ug/l	0.50
09/20/95	(ML/EPA 525.2)	Dimethoate	ND	ug/l	10
09/20/95	(ML/EPA 525.2)	Di-n-Butylphthalate	0.5 B	ug/l	0.50
09/20/95	(ML/EPA 525.2)	Endrin	ND	ug/l	0.10
09/20/95	(ML/EPA 525.2)	Fluorene	ND	ug/l	0.050
09/20/95	(ML/EPA 525.2)	gamma-Chlordane	ND	ug/l	0.050
09/20/95	(ML/EPA 525.2)	Hexachlorobenzene	ND	ug/l	0.050
09/20/95	(ML/EPA 525.2)	Hexachlorocyclopentadiene	ND	ug/l	0.050
09/20/95	(ML/EPA 525.2)	Heptachlor	ND	ug/l	0.040
09/20/95	(ML/EPA 525.2)	Heptachlor Epoxide	ND	ug/l	0.020
09/20/95	(ML/EPA 525.2)	Indeno(1,2,3,c,d)Pyrene	ND	ug/l	0.050
09/20/95	(ML/EPA 525.2)	Isophorone	ND	ug/l	0.50
09/20/95	(ML/EPA 525.2)	Lindane	ND	ug/l	0.020
09/20/95	(ML/EPA 525.2)	Methoxychlor	ND	ug/l	0.050
09/20/95	(ML/EPA 525.2)	Metribuzin	ND	ug/l	0.050
09/20/95	(ML/EPA 525.2)	Molinate	ND	ug/l	0.20
09/20/95	(ML/EPA 525.2)	Metolachlor	ND	ug/l	0.050
09/20/95	(ML/EPA 525.2)	trans-Nonachlor	ND	ug/l	0.050
09/20/95	(ML/EPA 525.2)	Pentachlorophenol	ND	ug/l	1.0
09/20/95	(ML/EPA 525.2)	Phenanthrene	ND	ug/l	0.020
09/20/95	(ML/EPA 525.2)	Prometryn	ND	ug/l	0.50
09/20/95	(ML/EPA 525.2)	Propachlor	ND	ug/l	0.050
09/20/95	(ML/EPA 525.2)	Pyrene	ND	ug/l	0.050
09/20/95	(ML/EPA 525.2)	Simazine	ND	ug/l	0.050
09/20/95	(ML/EPA 525.2)	Thiobencarb	ND	ug/l	0.20
09/20/95	(ML/EPA 525.2)	Trifluralin	ND	ug/l	0.10
		AB1803 - EDB and DBCP			
09/06/95	(ML/EPA 504)	Dibromochloropropane (DBCP)	ND	ug/l	0.010
09/06/95	(ML/EPA 504)	Ethylene Dibromide (EDB)	ND	ug/l	0.010
		Aldicarbs			
09/06/95	(ML/EPA 531.1)	3-Hydroxycarbofuran	ND	ug/l	2.0

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Maui, County of, Department of
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KU WELL DUP (950831256) Sampled on 08/28/95

Anal	Method	Analyte	Result	Units	MDL
09/06/95	(ML/EPA 531.1)	Aldicarb (Temik)	ND	ug/l	0.50
09/06/95	(ML/EPA 531.1)	Aldicarb sulfone	ND	ug/l	0.80
09/06/95	(ML/EPA 531.1)	Aldicarb sulfoxide	ND	ug/l	0.50
09/06/95	(ML/EPA 531.1)	Baygon	ND	ug/l	2.0
09/06/95	(ML/EPA 531.1)	Carbofuran (Furadan)	ND	ug/l	0.90
09/06/95	(ML/EPA 531.1)	Carbaryl	ND	ug/l	2.0
09/06/95	(ML/EPA 531.1)	Methiocarb	ND	ug/l	2.0
09/06/95	(ML/EPA 531.1)	Methomyl	ND	ug/l	2.0
09/06/95	(ML/EPA 531.1)	Oxamyl (Vydate)	ND	ug/l	2.0
		Diquat and Paraquat			
09/07/95	(ML/EPA 549)	Diquat	ND	ug/l	0.40
09/07/95	(EPA 549)	Paraquat	ND	ug/l	2.0
		Herbicides by 515.1			
09/18/95	(ML/EPA 515.1)	2,4,5-T	ND	ug/l	0.20
09/18/95	(ML/EPA 515.1)	2,4,5-TP (Silvex)	ND	ug/l	0.20
09/18/95	(ML/EPA 515.1)	2,4-D	ND	ug/l	0.10
09/18/95	(ML/EPA 515.1)	2,4-DB	ND	ug/l	2.0
09/18/95	(ML/EPA 515.1)	Dichlorprop	ND	ug/l	0.50
09/18/95	(ML/EPA 515.1)	5-Hydroxydicamba	ND	ug/l	0.20
09/18/95	(ML/EPA 515.1)	Acifluorfen (qualitative)	ND	ug/l	0.20
09/18/95	(ML/EPA 515.1)	Bentazon	ND	ug/l	0.50
09/18/95	(ML/EPA 515.1)	Chloramben (qualitative)	ND	ug/l	0.50
09/18/95	(ML/EPA 515.1)	Dalapon (qualitative)	ND	ug/l	1.0
09/18/95	(ML/EPA 515.1)	3,5-Dichlorobenzoic acid	ND	ug/l	0.60
09/18/95	(ML/EPA 515.1)	DCPA	ND	ug/l	0.20
09/18/95	(ML/EPA 515.1)	Dicamba	ND	ug/l	0.20
09/18/95	(ML/EPA 515.1)	Dinoseb	ND	ug/l	0.20
09/18/95	(ML/EPA 515.1)	Pentachlorophenol	ND	ug/l	0.040
09/18/95	(ML/EPA 515.1)	Picloram	ND	ug/l	0.10
09/18/95	(ML/EPA 515.1)	4-Nitrophenol (qualitative)	ND	ug/l	5.0
		Nitrate by IC as NO3 & N			

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Maui, County of, Department of
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IKU WELL DUP (950831256) Sampled on 08/28/95

Anal	Method	Analyte	Result	Units	MDL
08/30/95	(EPA/ML 300.0)	Nitrate-N by IC	1.9	mg/l	0.10
08/30/95	(ML/EPA 300)	Nitrate	8.4	mg/l	0.44
		Regulated VOCs plus Lists 1&3			
09/05/95	(ML/EPA 524.2)	1,1,1,2-Tetrachloroethane	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	1,1,1-Trichloroethane	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	1,1,2,2-Tetrachloroethane	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	1,1,2-Trichloroethane	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	1,1-Dichloroethane	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	1,1-Dichloroethylene	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	1,1-Dichloropropene	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	1,2,3-Trichlorobenzene	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	1,2,3-Trichloropropane	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	1,2,4-Trichlorobenzene	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	1,2,4-Trimethylbenzene	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	1,2-Dichloroethane	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	1,2-Dichloropropane	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	1,3,5-Trimethylbenzene	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	1,3-Dichloropropane	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	p-Dichlorobenzene (1,4-DCB)	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	2,2-Dichloropropane	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	2-Butanone (MEK)	ND	ug/l	0.50
09/05/95	(ML/SW 8240)	2-Chloroethylvinylether	ND	ug/l	5.0
09/05/95	(ML/EPA 524.2)	o-Chlorotoluene	ND	ug/l	1.0
09/05/95	(ML/EPA 524.2)	p-Chlorotoluene	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	4-Methyl-2-Pentanone (MIBK)	ND	ug/l	0.50
09/05/95	(EPA/SM 524.2)	Benzene	ND	ug/l	5.0
09/05/95	(ML/EPA 524.2)	Bromobenzene	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	Bromomethane (Methyl Bromide)	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	cis-1,2-Dichloroethylene	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	Chlorobenzene	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	Carbon Tetrachloride	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	cis-1,3-Dichloropropene	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	Bromoform	ND	ug/l	0.50

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Maui, County of, Department of
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IKU WELL DUP (950831256) Sampled on 08/28/95

Anal	Method	Analyte	Result	Units	MDL
09/05/95	(ML/EPA 524.2)	Chloroform (Trichloromethane)	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	Bromochloromethane	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	Chloroethane	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	Chloromethane(Methyl Chloride)	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	Chlorodibromomethane	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	Dibromomethane	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	Bromodichloromethane	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	Dichloromethane	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	Ethyl benzene	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	Dichlorodifluoromethane	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	Fluorotrichloromethane(Freon1)	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	Hexachlorobutadiene	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	Isopropylbenzene	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	m-Dichlorobenzene (1,3-DCB)	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	m,p-Xylenes	ND	ug/l	0.50
09/05/95	(ML/SW 8240)	Methyl Tert-butyl ether (MTBE)	ND	ug/l	5.0
09/05/95	(ML/EPA 524.2)	Naphthalene	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	n-Butylbenzene	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	n-Propylbenzene	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	o-Xylene	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	o-Dichlorobenzene (1,2-DCB)	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	Tetrachloroethylene (PCE)	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	p-Isopropyltoluene	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	sec-Butylbenzene	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	Styrene	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	trans-1,2-Dichloroethylene	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	tert-Butylbenzene	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	Trichloroethylene (TCE)	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	Trichlorotrifluoroethane(Freon	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	trans-1,3-Dichloropropene	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	Toluene	ND	ug/l	0.50
09/05/95	(ML/EPA 524.2)	Vinyl chloride (VC)	ND	ug/l	0.50

SDWA Pesticides

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AIKU WELL DUP (950831256) Sampled on 08/28/95

Anal	Method	Analyte	Result	Units	MDL
09/07/95	(ML/EPA 508)	PCB 1016 Aroclor	ND	ug/l	0.10
09/07/95	(ML/EPA 508)	PCB 1221 Aroclor	ND	ug/l	0.10
09/07/95	(ML/EPA 508)	PCB 1232 Aroclor	ND	ug/l	0.10
09/07/95	(ML/EPA 508)	PCB 1242 Aroclor	ND	ug/l	0.10
09/07/95	(ML/EPA 508)	PCB 1248 Aroclor	ND	ug/l	0.10
09/07/95	(ML/EPA 508)	PCB 1254 Aroclor	ND	ug/l	0.10
09/07/95	(ML/EPA 508)	PCB 1260 Aroclor	ND	ug/l	0.10
09/07/95	(ML/EPA 508)	Alpha-BHC	ND	ug/l	0.010
09/07/95	(ML/EPA 508)	Alachlor (Alanex)	ND	ug/l	0.050
09/07/95	(ML/EPA 508)	Aldrin	ND	ug/l	0.010
09/07/95	(ML/EPA 508)	Beta-BHC	ND	ug/l	0.010
09/07/95	(ML/EPA 508)	Chlordane	ND	ug/l	0.10
09/07/95	(ML/EPA 508)	Chlorthalonil (Drconil, Bravo)	ND	ug/l	0.010
09/07/95	(ML/EPA 508)	Delta-BHC	ND	ug/l	0.010
09/07/95	(ML/EPA 508)	p,p' DDD	ND	ug/l	0.010
09/07/95	(ML/EPA 508)	p,p' DDE	ND	ug/l	0.010
09/07/95	(ML/EPA 508)	p,p' DDT	ND	ug/l	0.010
09/07/95	(ML/EPA 508)	Dieldrin	ND	ug/l	0.010
09/07/95	(ML/EPA 508)	Endrin Aldehyde	ND	ug/l	0.010
09/07/95	(ML/EPA 508)	Endrin	ND	ug/l	0.010
09/07/95	(ML/EPA 508)	Endosulfan I (alpha)	ND	ug/l	0.010
09/07/95	(ML/EPA 508)	Endosulfan II (beta)	ND	ug/l	0.010
09/07/95	(ML/EPA 508)	Endosulfan sulfate	ND	ug/l	0.010
09/07/95	(ML/EPA 508)	Heptachlor	ND	ug/l	0.010
09/07/95	(ML/EPA 508)	Heptachlor Epoxide	ND	ug/l	0.010
09/07/95	(ML/EPA 508)	Lindane (gamma-BHC)	ND	ug/l	0.010
09/07/95	(ML/EPA 508)	Methoxychlor	ND	ug/l	0.050
09/07/95	(ML/EPA 508)	Toxaphene	ND	ug/l	0.50
		T-22 Inorg+Gen Min ICPMS Mets			
09/11/95	(EPA/ML 200.8)	Silver, Total, ICAP/MS	ND	ug/l	0.50
09/11/95	(EPA/ML 200.8)	Aluminum, Total, ICAP/MS	ND	ug/l	25
09/11/95	(EPA/ML 200.8)	Arsenic, Total, ICAP/MS	8.2	ug/l	1.0
09/11/95	(EPA/ML 200.8)	Barium, Total, ICAP/MS	2.9	ug/l	2.0

MONTGOMERY LABORATORIES
555 East Walnut Street
Pasadena, California 91101
818 568 8400; FAX 818 568 6324;
1 800 566 LABS (1 800 566 5227)

Laboratory
Report
#22600

Maui, County of, Department of
Water Supply
(continued)

IKU WELL DUP (950831256) Sampled on 08/28/95

Anal	Method	Analyte	Result	Units	MDL
09/11/95	(EPA/ML 200.8)	Beryllium, Total, ICAP/MS	ND	ug/l	1.0
09/11/95	(EPA/ML 200.8)	Cadmium, Total, ICAP/MS	ND	ug/l	0.50
09/11/95	(EPA/ML 200.8)	Chromium, Total, ICAP/MS	8.5	ug/l	2.0
09/11/95	(EPA/ML 200.8)	Copper, Total, ICAP/MS	ND	ug/l	2.0
09/11/95	(EPA/ML 200.8)	Iron, Total, ICAP/MS	ND	ug/l	50
09/11/95	(EPA/ML 200.8)	Manganese, Total, ICAP/MS	ND	ug/l	2.0
09/11/95	(EPA/ML 200.8)	Nickel, Total, ICAP/MS	ND	ug/l	5.0
09/11/95	(EPA/ML 200.8)	Lead, Total, ICAP/MS	0.85	ug/l	0.50
09/11/95	(EPA/ML 200.8)	Antimony, Total, ICAP/MS	ND	ug/l	1.0
09/11/95	(EPA/ML 200.8)	Selenium, Total, ICAP/MS	ND	ug/l	5.0
09/11/95	(EPA/ML 200.8)	Thallium, Total, ICAP/MS	ND	ug/l	1.0
09/11/95	(EPA/ML 200.8)	Zinc, Total, ICAP/MS	98	ug/l	5.0

AIKU WELL DUP (950831257) Sampled on 08/29/95

Anal	Method	Analyte	Result	Units	MDL
	(ML/EPA 100.1)	Asbestos		MFL	0.0000

DOCUMENT CAPTURED AS RECEIVED

Audited by ______ on ______

COUNTY OF MAUI • DEPARTMENT OF WATER SUPPLY
Microbiological Laboratory Daily Sampling, Processing and Analyses Record
Membrane Filtration Method for the Detection of Total Coliform Bacteria • Fecal Coliform Test (EC Medium), and Heterotrophic Plate Count

Date 8-9-95

Total coliform Verification (LTB/BGB) Legend: ○ = No gas at 24 hours; + = Gas at 24 hours; ⊖ = No gas at 48 hours; ⊕ = Gas at 48 hours

	Lab Number	State I D Number	Site Description	Time Collected	Residual Chlorine T/F	Sample Type	Membrane Filter Sheen	Membrane Filter Non Coli	Verification 1–10	FC Verification (EC) Pos/Neg	Total Coliform Excess (No./100ml)	HPC 0.1 A/B	HPC 1.0 A/B	CFU per 1.0 ml
1														
2	S-E25		Haiku Well	1210	C	S	41A+	141	+	Neg	2	[illegible]	[illegible]	[illegible]
3								AT	[illegible]					
4														
5														
6														
7														
8														
9														
10														
11														
12														
13			P/A Positive - No Fluorescence											
14			[illegible] 8-11-95											
15														
16														
17														
18														
19														
20														

Collected by [illegible] on 08.09.95 at 1210
Relinquished by [illegible] on 08.09.95 at 1249
Received by [illegible] on 08.09.95 at 1245
Temp Control Initial 3.5 °C Final ____ °C
Temp Control Initial ____ °C Final ____ °C
Temp Control Initial ____ °C Final ____ °C

Sample Type Codes: R - Routine RPL - Replacement RPT - Repeat S - Special

MF:
Processed by A.K[illegible] on 8-9-95 at 1440
[illegible] on [illegible] at 1446
Analysis
Read by [illegible] on [illegible] at 1215
Controls: (SC) 1 [illegible] 2 [illegible] 3 __ 4 __ 5 __ 6 __ 7 __
E. coli [illegible]
Reported by ______ to ______ on ______ at ______

Verification:
Inoculated by [illegible] on 08.10.95 at 1305
Read at 24 hrs by [illegible] on [illegible] at [illegible]
Read at 48 hrs by [illegible] on [illegible] at [illegible]
Controls: LTB (E coli) [illegible] LTB (S aureus) [illegible]
BGB (E coli) [illegible] BGB (S aureus) [illegible]
EC (E coli) [illegible] EC (E aerogenes) [illegible]
Reported by ______ to ______ on ______ at ______
Reported by ______ to ______ on ______ at ______

HPC [illegible]
Pipet [illegible] on [illegible] at [illegible]
Plate [illegible] on [illegible] at [illegible]

System	Number of Samples Collected

Read by [illegible]
Agar ster.
sc1 sc2 sc3
sc4 sc5 sc6
sc7 sc8 sc9
sc10 sc11 sc12
sc13 sc14 sc15

REV 6/91

Date 8-9-95

COUNTY OF MAUI • DEPARTMENT OF WATER SUPPLY

Microbiological Laboratory Daily Sampling, Processing and Analyses Record

Membrane Filtration Method for the Detection of Total Coliform Bacteria • Fecal Coliform Test (EC Medium), and Heterotrophic Plate Count

Audited by ______ on ______

Total coliform Verification (LTB/BGB) Legend: ○ = No gas at 24 hours; • = Gas at 24 hours; ⊖ = No gas at 48 hours; ⊕ = Gas at 48 hours

	Lab Number	State I D Number	Site Description	Time Collected	Residual Chlorine T/F	Sample Type	Membrane Filter Sheen	Membrane Filter Non Coli	1	2	3	4	5	6	7	8	9	10	FC Verification (EC) Pos/Neg	Total Coliform Bacteria (No/100ml)	HPC 01 A/B	HPC 10 A/B	CFU per 10 ml
1																							
2	S-E25		Haiku Well	1210	C	S	TNTC	141	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Neg.	2	[illegible]	[illegible]	[illegible]
3																							
4																							
5																							
6																				[illegible]	[illegible]	[illegible]	[illegible]
7																				[illegible]			
8																				[illegible]			
9																							
10																							
11																							
12																							
13			P/A Positive - No Fluorescence																				
14			[illegible] 8-11-95																				
15																							
16																							
17																							
18																							
19																							
20																							

Collected by [illegible] on 08.09.95 at 1210
Relinquished by [illegible] on 08.09.95 at 1244
Received by [illegible] on 08.09.95 at 1245
Temp Control Initial 35 °C Final ____ °C
Temp Control Initial ____ °C Final ____ °C
Temp Control Initial ____ °C Final ____ °C
Sample Type Codes: R - Routine RPL - Replacement RPT - Repeat S - Special

MF:
Processed by A KIDC [illegible] on 8-9-95 at 1440 on [illegible] at 1446
Analysis
Read by [illegible] on 081195 at 1215
Controls: [SC] 1 [illegible] 2 [illegible] 3 ___ 4 ___ 5 ___ 6 ___ 7 ___
E. coli [illegible]
Reported by ______ to ______ on ______ at ______

Verification:
Inoculated by [illegible] on 081095 at 1305
Read at 24 hrs by [illegible] on 081195 at 132[illegible]
Read at 48 hrs by [illegible] on 081295 at 1445
Controls: LTB (E. coli) [illegible] LTB (S. aureus) [illegible]
BGB (E. coli) [illegible] BGB (S. aureus) [illegible]
EC (E. coli) [illegible] EC (E. aerogenes) [illegible]
Reported by ______ to ______ on ______ at ______
Reported by ______ to ______ on ______ at ______

HPC [illegible]
Pipet [illegible] on [illegible] at [illegible]
Plate [illegible] on [illegible] at [illegible]

System	Number of Samples Collected

Read by [illegible] on [illegible] at [illegible]
Agar ster.
sc1 [illegible] sc2 sc3
sc4 sc5 sc6
sc7 sc9 sc9
sc10 sc11 sc12
sc13 sc14 sc15

REV 6/93

Audited by ______ on ______

COUNTY OF MAUI • DEPARTMENT OF WATER SUPPLY

Microbiological Laboratory Daily Sampling, Processing and Analysis Record

Membrane Filtration Method for the Detection of Total Coliform Bacteria • Fecal Coliform Test (EC Medium), and Heterotrophic Plate Count

Date 8-25-95

Total coliform Verification (LTB/BGB) Legend: O = No gas at 24 hours; + = Gas at 24 hours; ⊖ = No gas at 48 hours; ⊕ = Gas at 48 hours

	Lab Number	State ID Number	Site Description	Time Collected	Residual Chlorine T/F	Sample Type	Membrane Filter Sheen	Membrane Filter Non Coli	Verif. 1	2	3	4	5	6	7	8	9	10	FC Verification (EC) Positive	Total Coliform Bacteria (/100 ml)	HPC 0.1 A/B	HPC 1.0 A/B	CFU /ml
1	5866		Haiku Well	0933		5	TNTC AT		[illegible]		[illegible]									neg TNTC [illegible]	53/54	TNTC	54
2																							
3																							
4																							
5																							
6																							
7																							
8																							
9																							
10																							
11																							
12																							
13																							
14																							
15																							
16																							
17																							
18																							
19																							
20																							

Collected by [illegible] on 8-25-95 at 0933
Relinquished by [illegible] on 8-25-95 at 1200
Received by [illegible] on 082595 at 1201
Temp Control Initial [illegible] °C Final 1.3 °C
Temp Control Initial ____ °C Final ____ °C
Temp. Control Initial ____ °C Final ____ °C

Sample Type Codes: R - Routine RPL - Replacement RPT - Repeat S - Special

MF:
Processed by [illegible] on 8-25-95 at 1110
______ on ______ at ______
Analysis
Read by [illegible] on 8-26-95 at 1357
Controls: [SC] 1 [illegible] 2 __ 3 __ 4 __ 5 __ 6 __ 7 __
E coli [illegible]
Reported by ______ to ______ on ______ at ______

Verification:
Inoculated by [illegible] on 082695 at 1410
Read at 24 hrs by [illegible] on 082795 at 1140
Read at 48 hrs by [illegible] on 082895 at 1030
Controls: LTB (E. coli) [illegible] LTB (S. aureus) [illegible]
BGB (E. coli) [illegible] BGB (S. aureus) [illegible]
EC (E. coli) [illegible] EC (E. aerogenes) [illegible]
Reported by ______ to ______ on ______ at ______
Reported by ______ to ______ on ______ at ______

HPC
Pipet ____ on ____ at ____
Plate ____ on ____ at ____

System	Number of Samples Collected

Read by [illegible] on [illegible] at [illegible]
Agar ster
sc1 sc2 sc3
sc4 sc5 sc6
sc7 sc8 sc9
sc10 sc11 sc12
sc13 sc14 sc15

REV 6-93

Labo... ...bry ...por

MONTGOMERY LABORATORIES
555 East Walnut Street
Pasadena, California 91101
818 568 6400; FAX 818 568 6324;
1 800 566 LABS (1 800 566 5227)

Maui, County of, Department of Water S
614 Palapala Dr

Kahului , HI 96732
ATTN: Earl Cerizo

Sample # 950215143 Sample ID HAIKU WELL Project ______
Sample Type Water Sampled 13-feb-1995 Received 15-feb-1995 Reported 22-feb-1995

AB1803 - EDB and DBCP (ML/EPA 504)

Parameter	Units	Result	Conc.	%Rec	Dilution	Det.Limit	Prepared	By
Dibromochloropropane (DBCP)	ug/l	[illegible]			[illegible]	0.01	17-feb-1995	mer
Ethylene Dibromide (EDB)	ug/l	ND				0.01	17-feb-1995	mer
[illegible]								

Report #: 18362

1

DBCP and EDB Results for Haiku Well (5419-01), 2/13/95 sample.

JUN 19 '95 13:19 FUKUNAGA & ASSOC (808) 946-9339X NO. 1 P.4/03
JUN-19-95 WED 12:19 COUNTY MAUI WATER SUPPLY

Laboratory Report

…OMERY LABORATORIES
…t Walnut Street
…na, California 91101
…6400; FAX 818 568 6324;
…6 LABS (1 800 566 5227)

Maui, County of, Department of Water Supply
614 Palapala Dr

Kahului , HI 96732
ATTN: Ceri Cerizo

…11026 Sample ID HAIKU WELL Project ______
…ater Sampled 22-feb-1995 Received 01-mar-1995 Reported 17-mar-1995

03 - EDB and DBCP (MBL/EPA 504)

	Units	Result	Conc.	%Rec	Dilution	Det.Limit	Prepared	By	Analyzed	By
…ropane (DBCP)	ug/l	ND				0.01	03-mar-1995	dym	16-mar-1995	mer
…mide (EDB)	ug/l	ND				0.01	03-mar-1995	dym	16-mar-1995	mer

6

1

DBCP and EDB Results for Haiku Well (5419-01), 2/22/95 sample.

DBCP and EDB Results for Haiku Well (5419-01), 5/18/93 sample.

MONTGOMERY LABORATORIES

555 East Walnut Street, P.O. Box 7009
Pasadena, California 91109-7009
(818) 796-9141

Laboratory Report

Haui, County of, Department of Water Supply
614 Palapala Dr

Kahului , HI 96732
ATTN: Cari Cerizo

Sample # 930521127 Sample ID HAIKU WELL Project
Sample Type Water Sampled 18-may-1993 Received 21-may-1993 Reported 16-jun-1993

AB1803 - EDB and DBCP (ML/EPA 504)

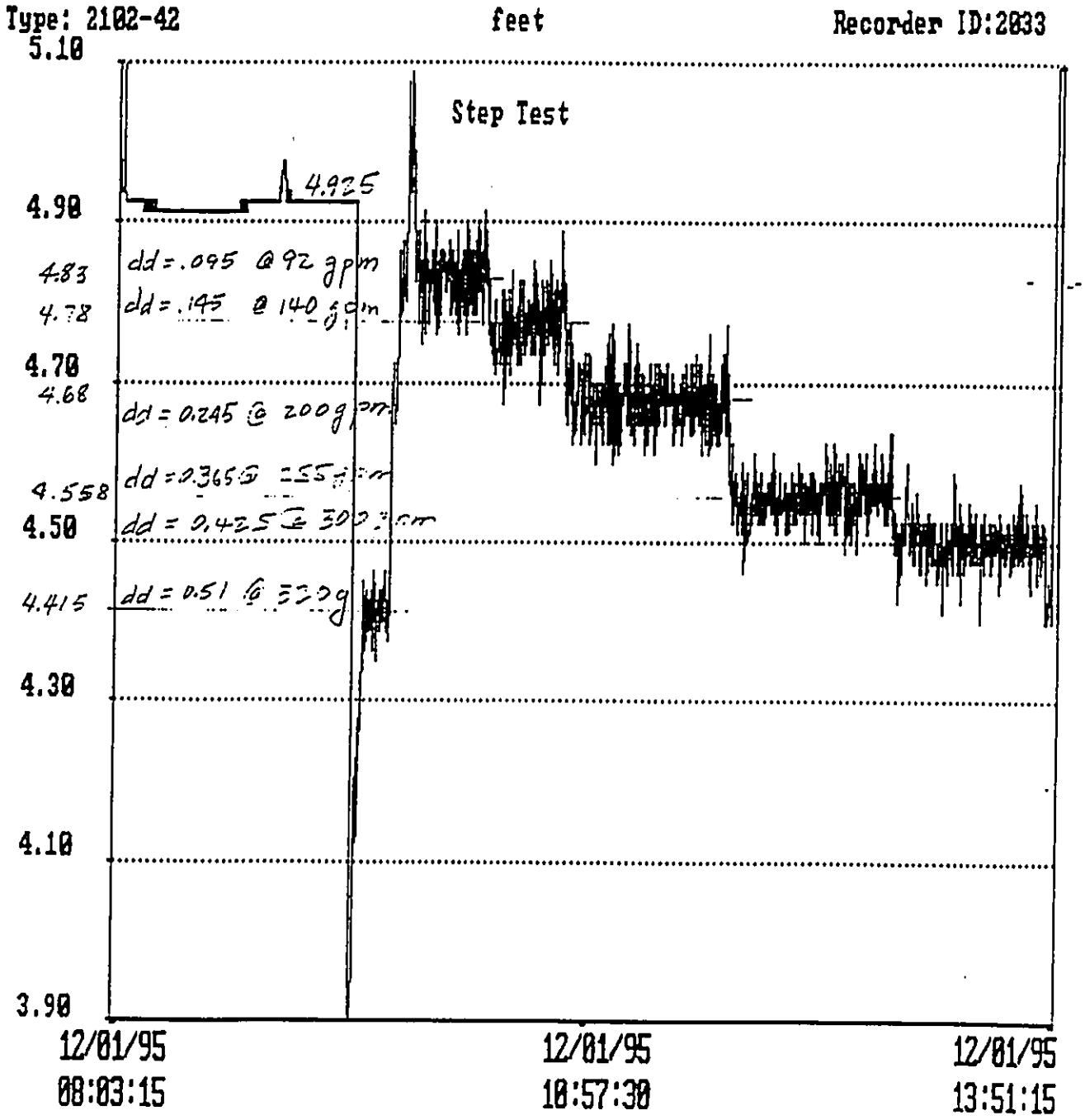
Parameter	Units	Result	%Rec	Conc.	Dilution	Det.Limit	Prepared	By	Analyzed	By
Dibromochloropropane (DBCP)	ug/l	0.05				0.01	22-may-1993	chd	22-may-1993	chd
Ethylene Dibromide (EDB)	ug/l	ND				0.02	22-may-1993	chd	22-may-1993	chd

Report #: 7098

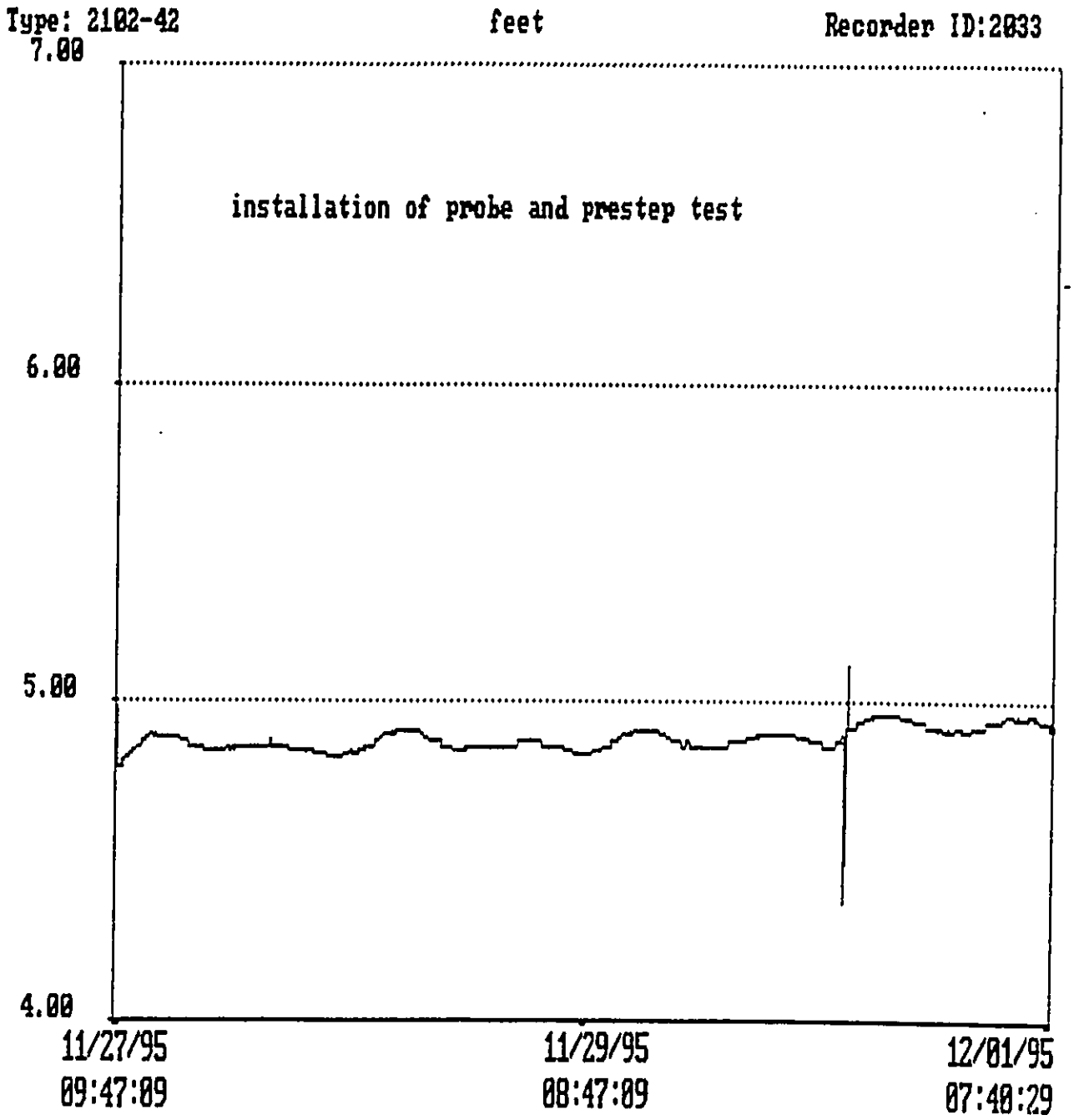
Appendix B

Step-Drawdown Test Record Data
Haiku Well (5419-01)
December 1, 1995

Haiku Well (5419-01)
Step-Drawdown Test
December 1, 1995



Haiku Well (5419-01)
Step-Drawdown Test Data
December 1,1995



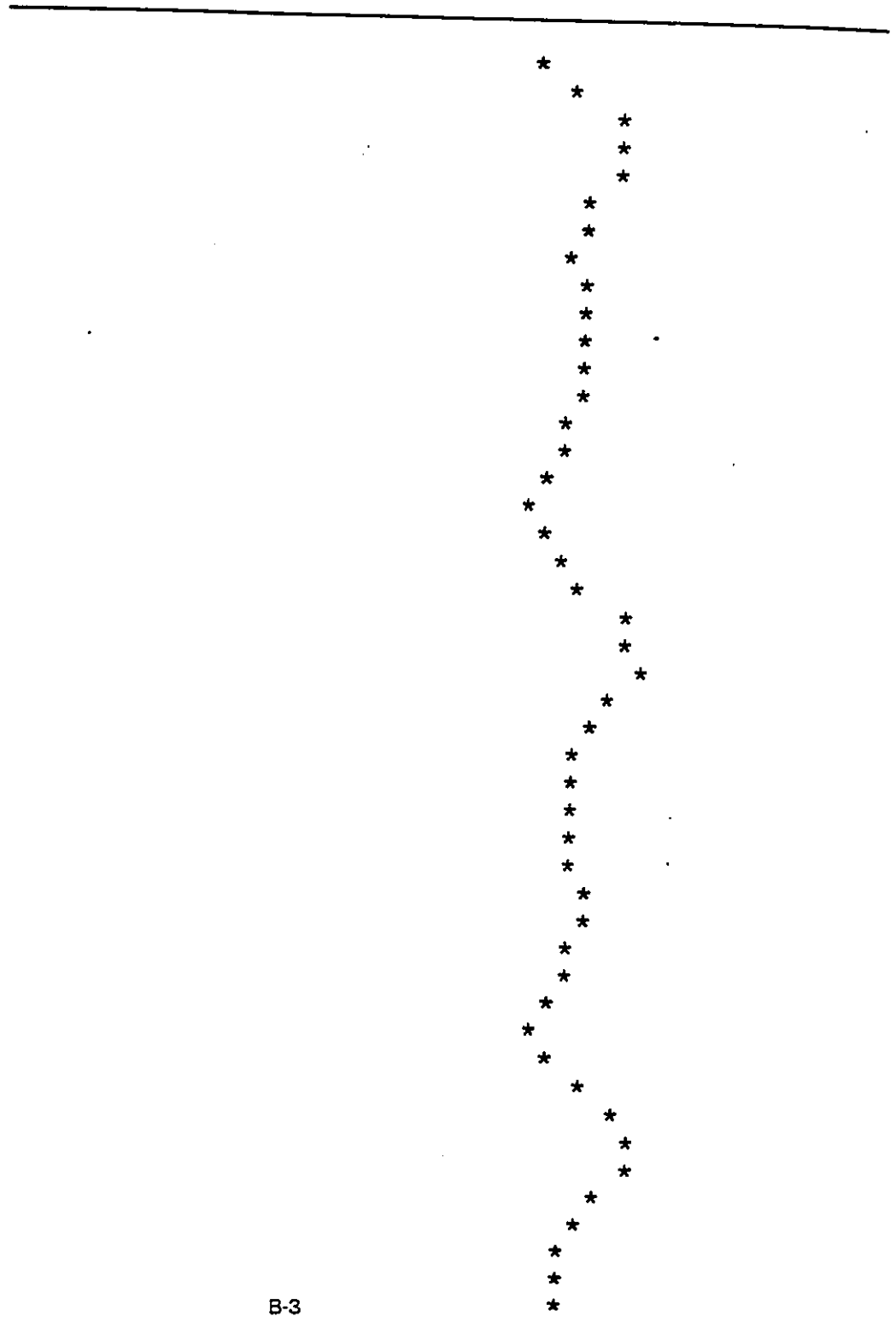
Saved Recorder Status

e: 2102-42 Range:-2.50 -► 10.29 feet Recorder ID: 2033
Time at Recorder: 12/01/95 07:58:19 Last Update: 11/27/95 09:47:09
Signal process: Not Applicable
Values being saved: averages
Alarm status: Low alarm @ -2.45 is OFF Upper alarm @ 10.25 is OFF

Averaging period: 00:06:40 Amount of data recorded: 3 days 22:06:40

Storage Capacity: 1600 values records: 7 days 09:46:40
ut compressed by a factor of 12

te	Time	Avg
11/27/95		
7/95	09:47:09	4.83
7/95	11:07:09	4.85
.7/95	12:27:09	4.89
.7/95	13:47:09	4.89
.7/95	15:07:09	4.89
.7/95	16:27:09	4.87
:7/95	17:47:09	4.86
:7/95	19:07:09	4.85
:7/95	20:27:09	4.86
.7/95	21:47:09	4.86
.7/95	23:07:09	4.86
.8/95	00:27:09	4.86
.8/95	01:47:09	4.86
:8/95	03:07:09	4.85
:8/95	04:27:09	4.85
:8/95	05:47:09	4.84
:8/95	07:07:09	4.82
:8/95	08:27:09	4.84
:8/95	09:47:09	4.85
:8/95	11:07:09	4.87
:8/95	12:27:09	4.90
:8/95	13:47:09	4.91
:8/95	15:07:09	4.91
:8/95	16:27:09	4.89
:8/95	17:47:09	4.87
:8/95	19:07:09	4.86
:8/95	20:27:09	4.86
:8/95	21:47:09	4.86
:8/95	23:07:09	4.86
:9/95	00:27:09	4.86
:9/95	01:47:09	4.87
:9/95	03:07:09	4.88
:9/95	04:27:09	4.86
:9/95	05:47:09	4.86
:9/95	07:07:09	4.84
:9/95	08:27:09	4.84
:9/95	09:47:09	4.85
:9/95	11:07:09	4.87
:9/95	12:27:09	4.90
:9/95	13:47:09	4.91
:9/95	15:07:09	4.91
:9/95	16:27:09	4.89
:9/95	17:47:09	4.87
:9/95	19:07:09	4.86
:9/95	20:27:09	4.86
:9/95	21:47:09	4.86
11/29/95		



11/29/95

9/95	23:07:09	4.87
0/95	00:27:09	4.88
0/95	01:47:09	4.90
0/95	03:07:09	4.90
0/95	04:27:09	4.90
0/95	05:47:09	4.89
0/95	07:07:09	4.88
0/95	08:27:09	4.87
0/95	09:47:09	4.88
0/95	11:07:09	4.89
0/95	12:27:09	4.95
0/95	13:47:09	4.96
0/95	15:07:09	4.96
0/95	16:27:09	4.95
0/95	17:47:09	4.94
0/95	19:07:09	4.92
0/95	20:27:09	4.92
0/95	21:47:09	4.92
0/95	23:07:09	4.92
1/95	00:27:09	4.93
1/95	01:47:09	4.95
1/95	03:07:09	4.96
1/95	04:27:09	4.96
1/95	05:47:09	4.94

12/01/95

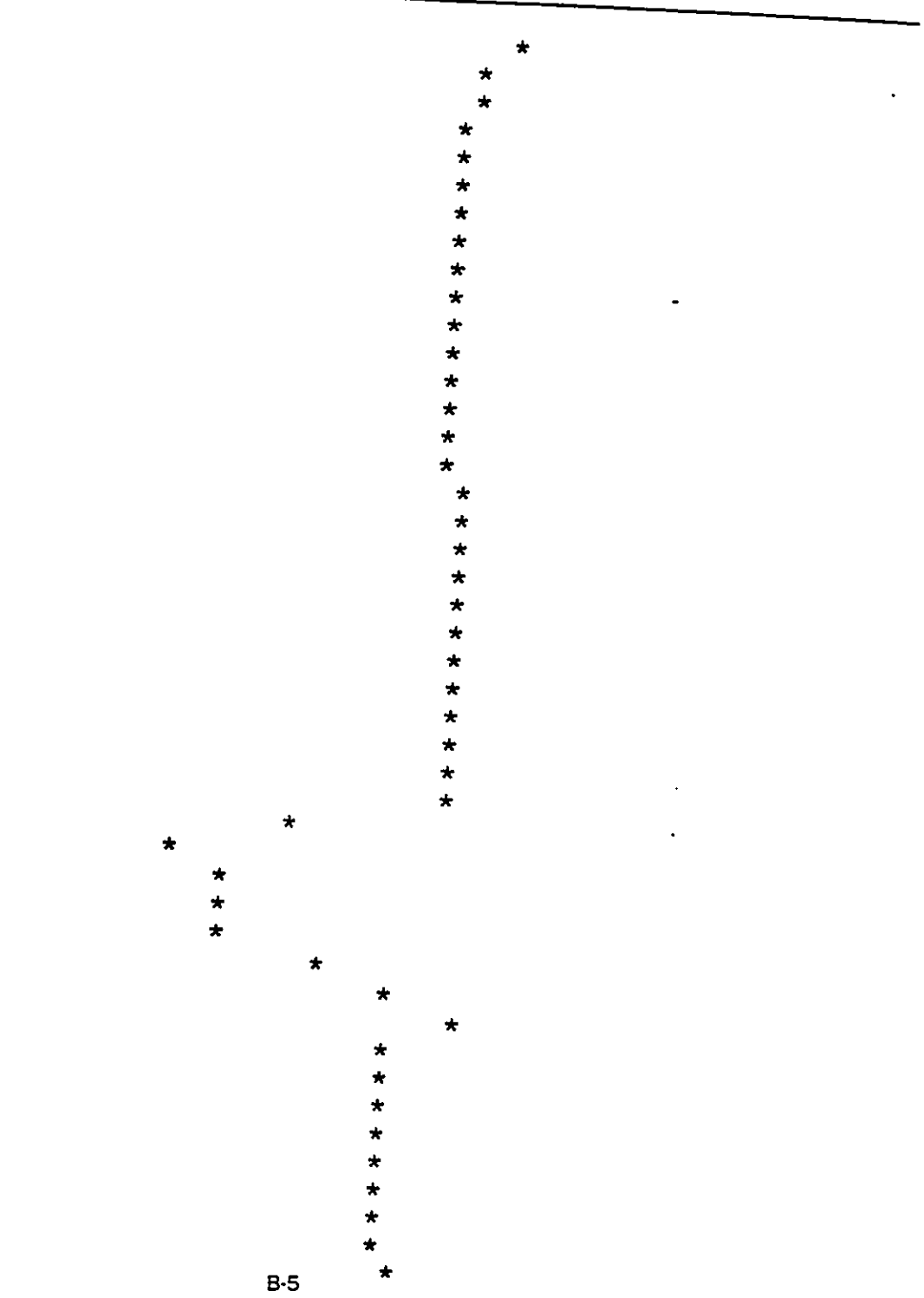
Saved Recorder Status

e: 2102-42 Range:-2.50 -► 10.29 feet Recorder ID: 2033
Time at Recorder: 12/01/95 13:51:48 Last Update: 12/01/95 08:04:56
Signal process: Not Applicable
Values being saved: averages
Alarm status: Low alarm @ -2.45 is OFF Upper alarm @ 10.25 is OFF

Averaging period: 00:00:15 Amount of data recorded: 05:48:30

Storage Capacity: 1600 values records: 06:40:00
ut compressed by a factor of 12

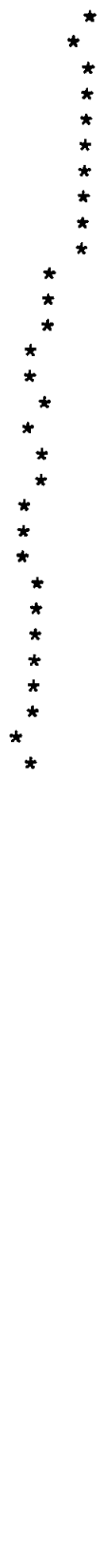
te	Time	Avg
12/01/95		
1/95	08:03:15	5.03
1/95	08:06:15	4.93
1/95	08:09:15	4.92
1/95	08:12:15	4.92
1/95	08:15:15	4.91
1/95	08:18:15	4.91
1/95	08:21:15	4.91
1/95	08:24:15	4.91
1/95	08:27:15	4.91
1/95	08:30:15	4.91
1/95	08:33:15	4.91
1/95	08:36:15	4.91
1/95	08:39:15	4.91
1/95	08:42:15	4.91
1/95	08:45:15	4.92
1/95	08:48:15	4.92
1/95	08:51:15	4.93
1/95	08:54:15	4.93
1/95	08:57:15	4.93
1/95	09:00:15	4.95
1/95	09:03:15	4.93
1/95	09:06:15	4.93
1/95	09:09:15	4.93
1/95	09:12:15	4.93
1/95	09:15:15	4.93
1/95	09:18:15	4.93
1/95	09:21:15	4.93
1/95	09:24:15	4.93
1/95	09:27:15	4.55
1/95	09:30:15	4.26
1/95	09:33:15	4.40
1/95	09:36:15	4.40
1/95	09:39:15	4.42
1/95	09:42:15	4.65
1/95	09:45:15	4.82
1/95	09:48:15	4.99
1/95	09:51:15	4.83
1/95	09:54:15	4.82
1/95	09:57:15	4.82
1/95	10:00:15	4.84
1/95	10:03:15	4.83
1/95	10:06:15	4.82
1/95	10:09:15	4.83
1/95	10:12:15	4.83
1/95	10:15:15	4.85
12/01/95		



12/01/95

)1/95	10:18:15	4.79
)1/95	10:21:15	4.75
)1/95	10:24:15	4.76
)1/95	10:27:15	4.78
)1/95	10:30:15	4.76
)1/95	10:33:15	4.77
)1/95	10:36:15	4.78
)1/95	10:39:15	4.78
)1/95	10:42:15	4.79
)1/95	10:45:15	4.79
)1/95	10:48:15	4.71
)1/95	10:51:15	4.68
)1/95	10:54:15	4.68
)1/95	10:57:15	4.66
)1/95	11:00:15	4.67
)1/95	11:03:15	4.69
)1/95	11:06:15	4.66
)1/95	11:09:15	4.70
)1/95	11:12:15	4.69
)1/95	11:15:15	4.67
)1/95	11:18:15	4.66
)1/95	11:21:15	4.67
)1/95	11:24:15	4.69
)1/95	11:27:15	4.67
)1/95	11:30:15	4.68
)1/95	11:33:15	4.68
)1/95	11:36:15	4.67
)1/95	11:39:15	4.68
)1/95	11:42:15	4.66
)1/95	11:45:15	4.70
)1/95	11:48:15	4.58
)1/95	11:51:15	4.55
)1/95	11:54:15	4.53
)1/95	11:57:15	4.56
)1/95	12:00:15	4.55
)1/95	12:03:15	4.56
)1/95	12:06:15	4.55
)1/95	12:09:15	4.55
)1/95	12:12:15	4.55
)1/95	12:15:15	4.55
)1/95	12:18:15	4.56
)1/95	12:21:15	4.56
)1/95	12:24:15	4.56
)1/95	12:27:15	4.56
)1/95	12:30:15	4.55
)1/95	12:33:15	4.54
)1/95	12:36:15	4.57
)1/95	12:39:15	4.56
)1/95	12:42:15	4.56
)1/95	12:45:15	4.57
)1/95	12:48:15	4.50
)1/95	12:51:15	4.52
)1/95	12:54:15	4.51
)1/95	12:57:15	4.51
)1/95	13:00:15	4.50
)1/95	13:03:15	4.48
)1/95	13:06:15	4.48
)1/95	13:09:15	4.51
)1/95	13:12:15	4.49
)1/95	13:15:15	4.51

12/01/95



12/01/95

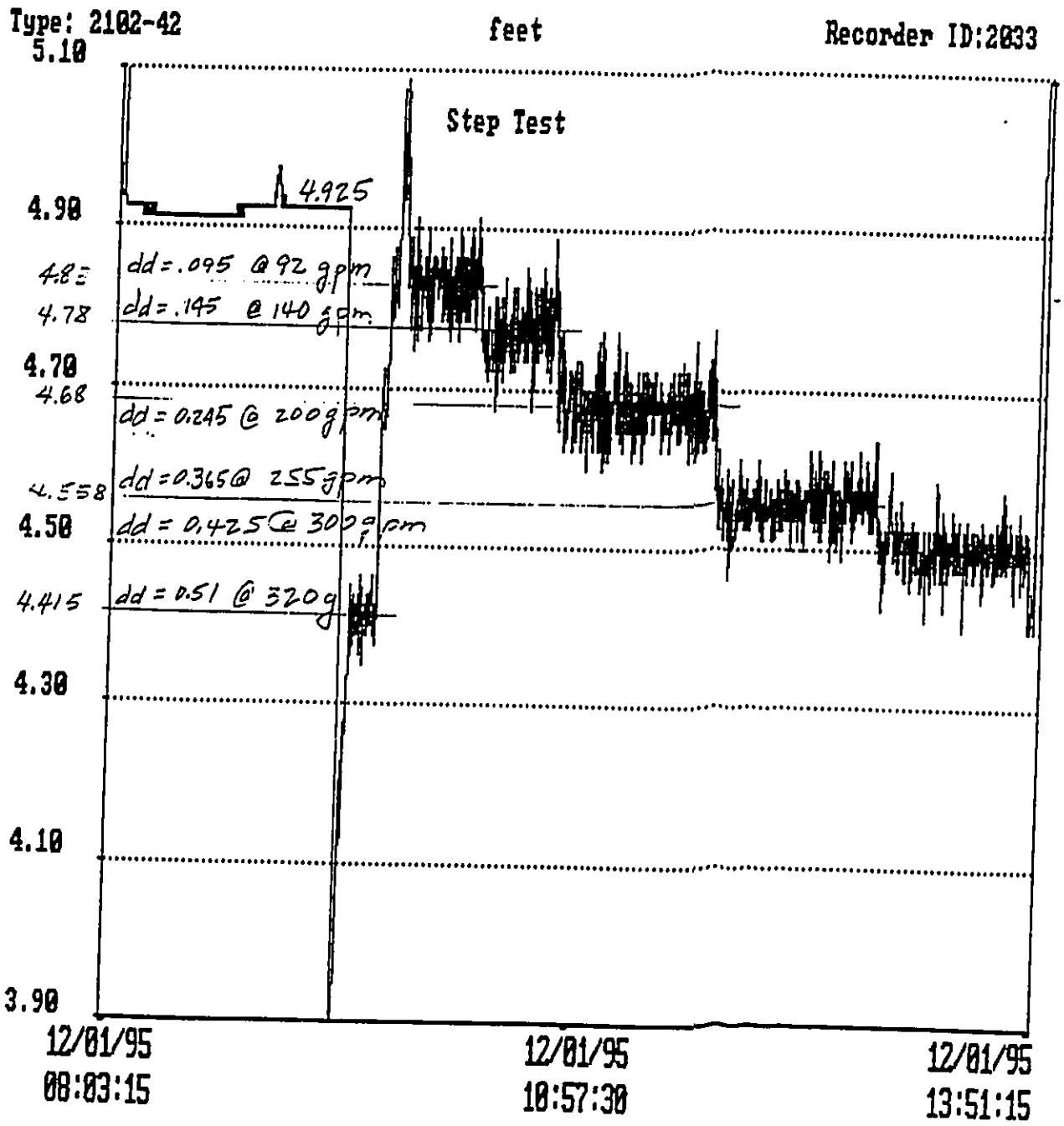
```
1/95 13:18:15   4.49
1/95 13:21:15   4.50
1/95 13:24:15   4.50
1/95 13:27:15   4.50
1/95 13:30:15   4.49
1/95 13:33:15   4.51
1/95 13:36:15   4.51
1/95 13:39:15   4.49
1/95 13:42:15   4.50
1/95 13:45:15   4.45
1/95 13:48:15   5.24
```

12/01/95

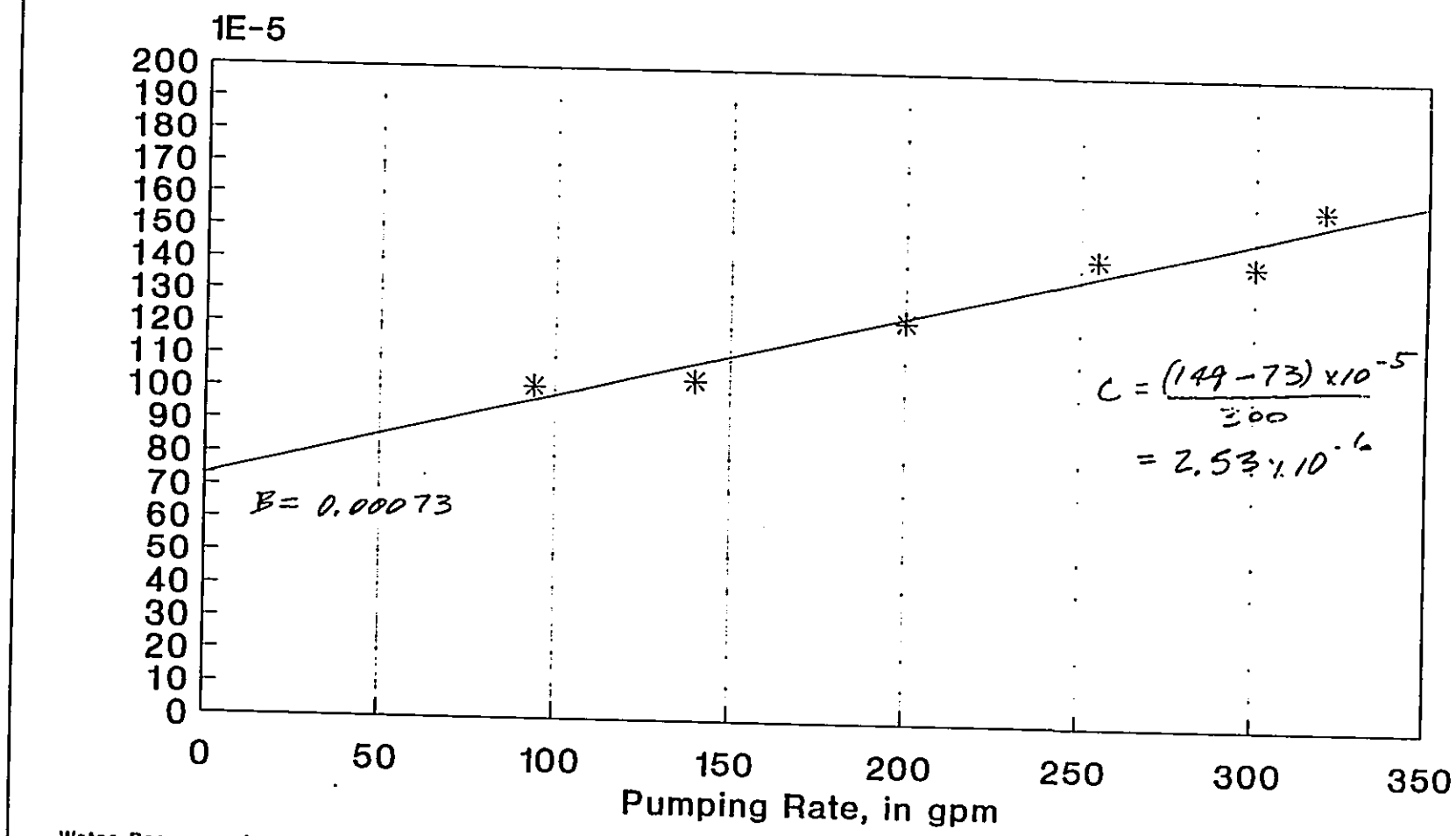
Appendix C

Calculation of Hydraulic Conductivity and Transmissivity for Haiku Well (5419-01)

Haiku Well (5419-01)
Step-Drawdown Test
December 1, 1995



s/Q Curve
Haiku Well (5419-01)
Step Test Date: December 1, 1995



Water Resource Associates
069sq2

HAIKU WELL (5419-01)

CALCULATION OF HYDRAULIC CONDUCTIVITY, K :

From Dec. 1, 1995 & graphical plot of s/Q vs Q :

$B = 0.00073$

$C = 2.53 \times 10^{-6}$

$s_{total} = s_{aq} + s_{well}$

$= BQ + CQ^2$

Solve for s_{aq}, for $Q = 300$ gpm

$s_{aq} = BQ = 0.00073 \times 300 = 0.219$ ft

$s_{well} = CQ^2 = 2.53 \times 10^{-6}(300)^2 = 0.228$ ft

$s_{total} = 0.219 + 0.228 = 0.447$ ft (Compares w/ 0.425 ft. obsd)

$r_d = r_{well} = \frac{18''}{12''} \times 1/2 = 0.75$ ft, radius of well

$r_h = \frac{D}{\ln\left(\frac{D}{r_d}\right)}$ where D = active length of well

$= 4 + 42 = 46$ ft

$= \frac{46}{\ln\left(\frac{46}{0.75}\right)} = \frac{46}{\ln 61.33} = 11.16$ ft

$K = \frac{Q}{2\pi r_h s_{aq}}$, $Q = 300 \text{ gpm} \times \frac{1440}{\text{day}} \times \frac{\text{ft}^3}{7.48 \text{ gal}} = 57,754 \text{ ft}^3$

$= \frac{5.775 \times 10^4}{2\pi \times 11.16 \times 0.219} = 3,759$ say, **3,760 ft/day**

$T = Kb = 3760 \times 41 \times 4.35 =$ **670,600 ft²/day**

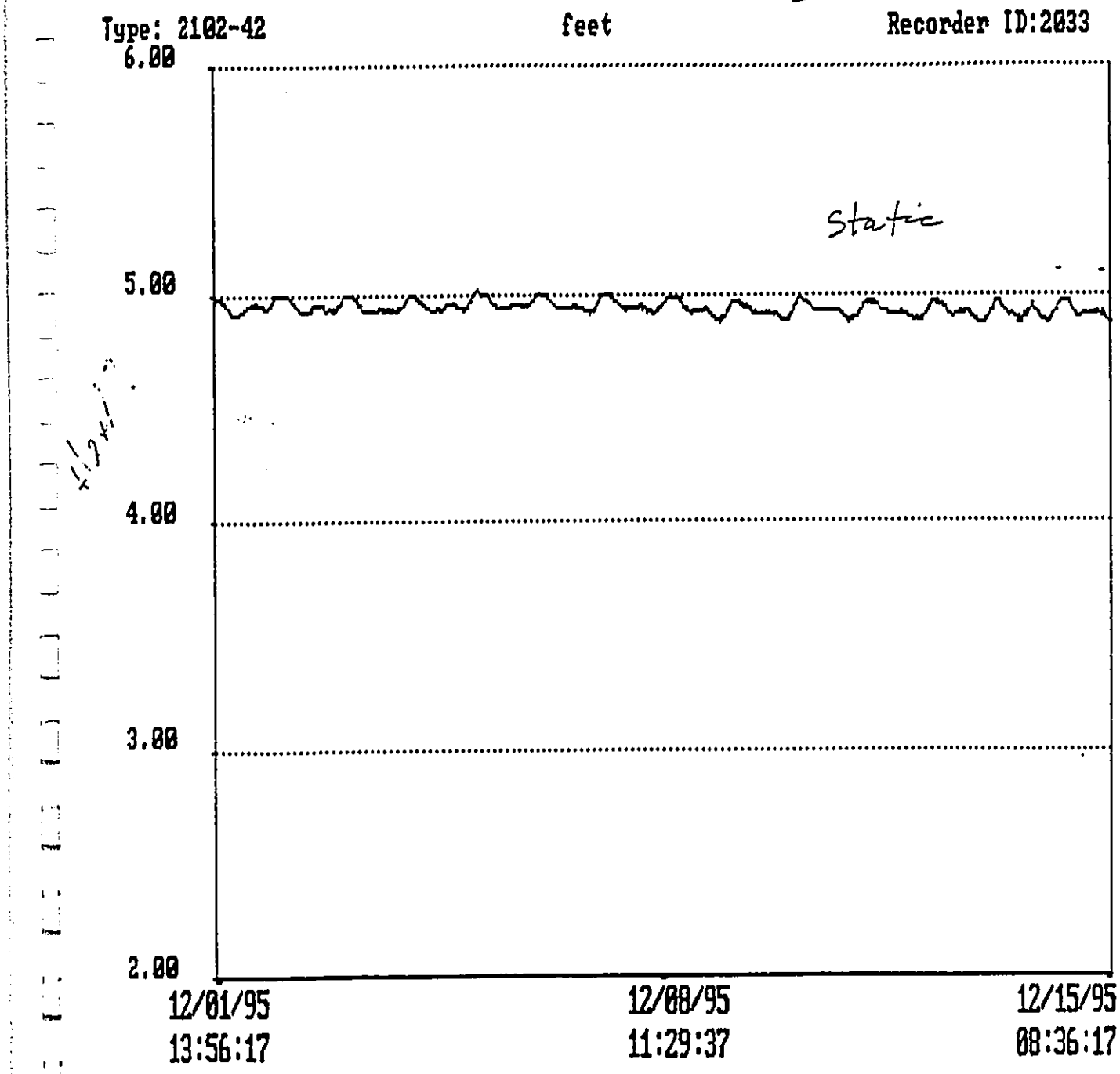
Appendix D

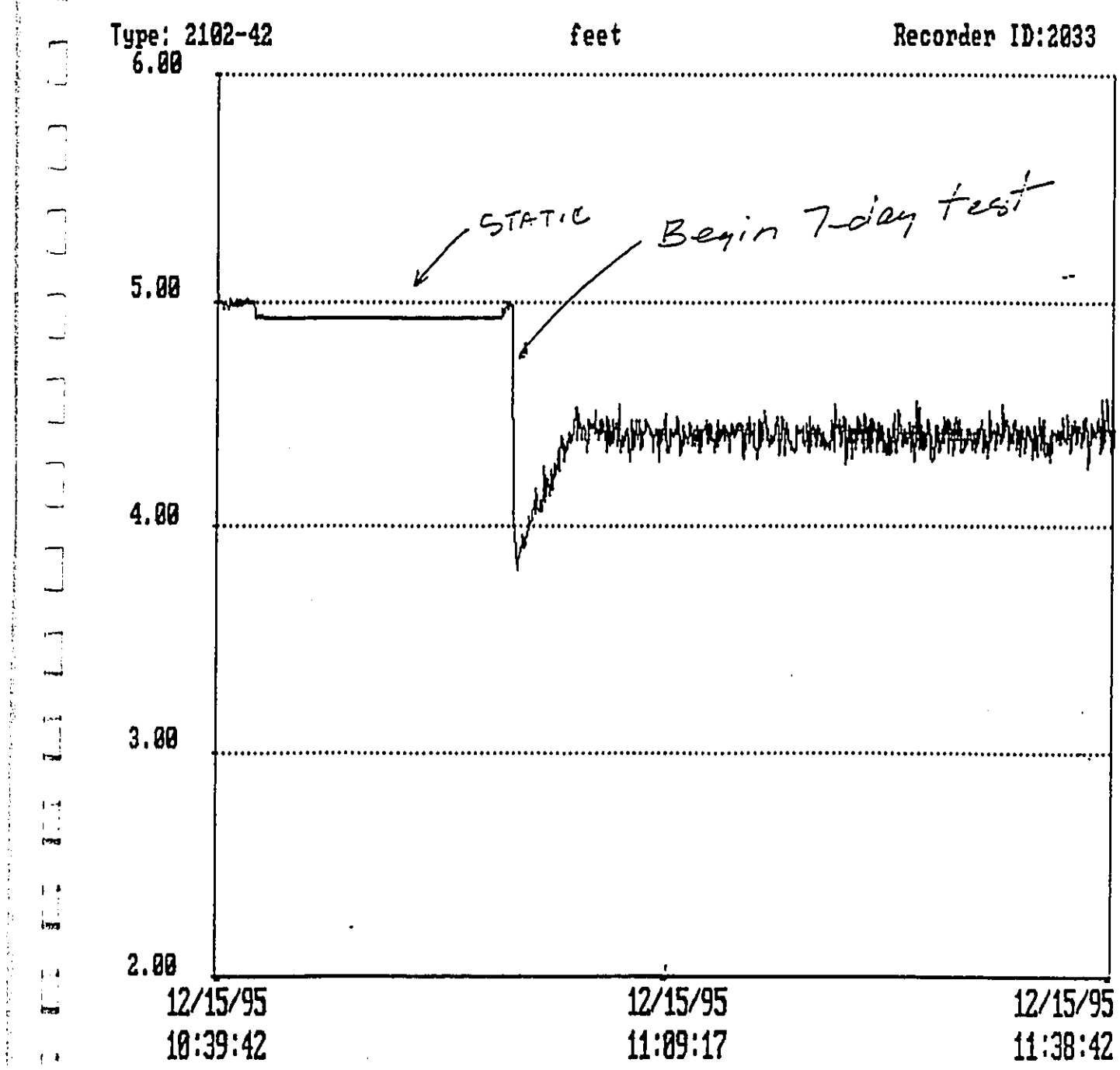
Constant-Rate Test Record
(December 15-22, 1995)
Haiku Well (5419-02)

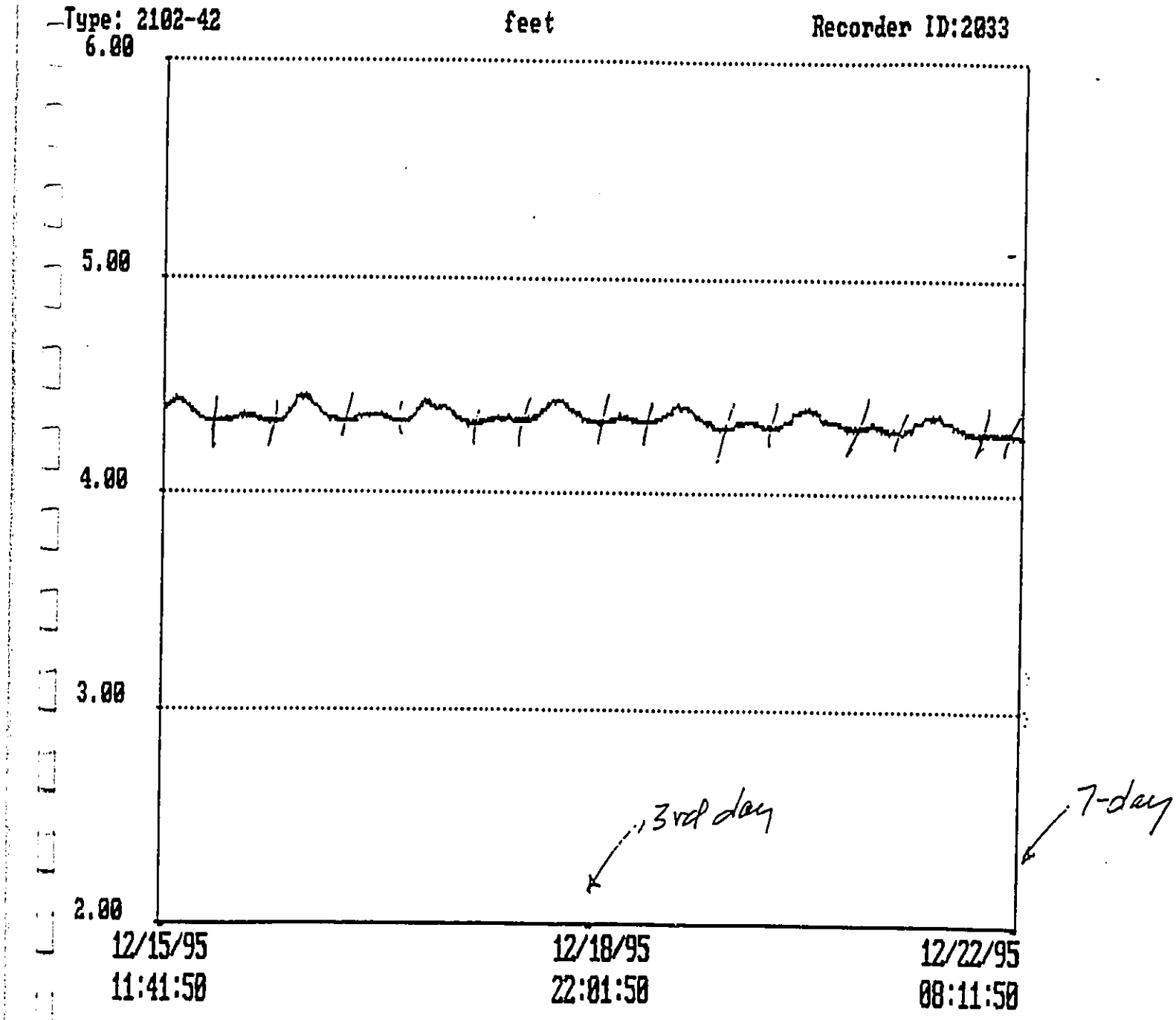
HAIKU WELL CONTINUOUS TEST

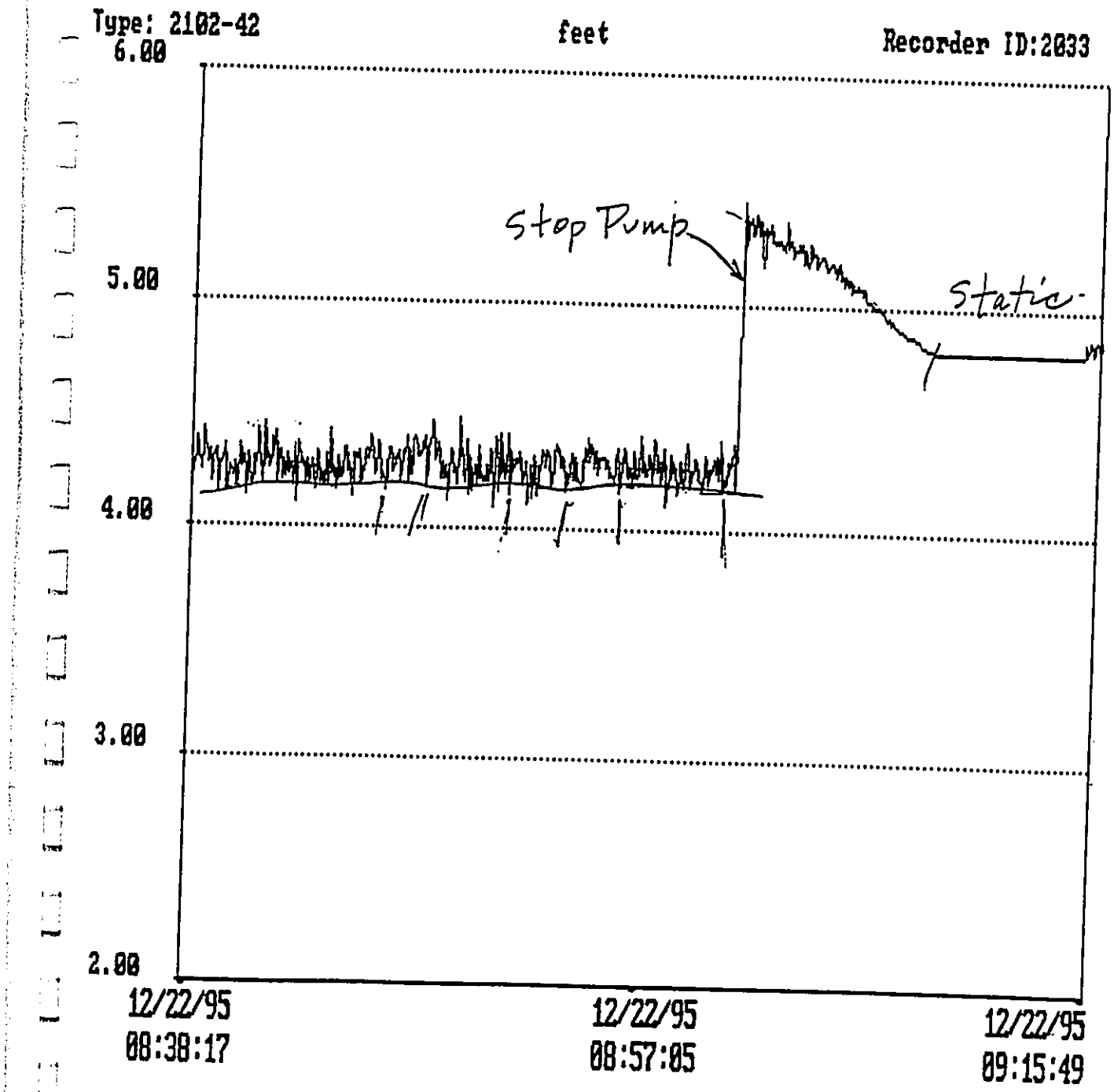
(Pumping Rate, 350gpm)

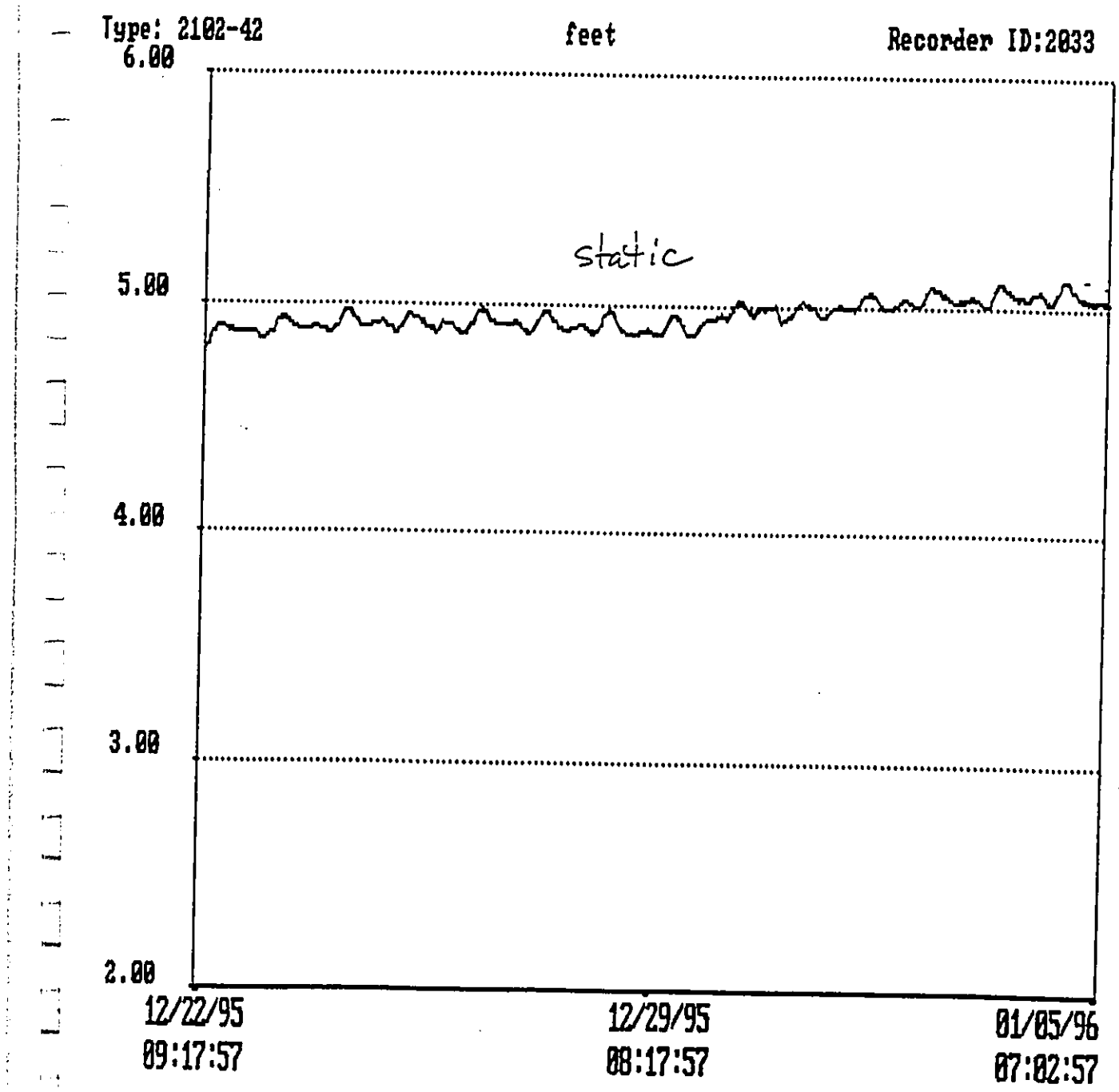
Rested Well after step test on 12/1/95
Begin 7-day test on 12/15/95
End on 12/22/95

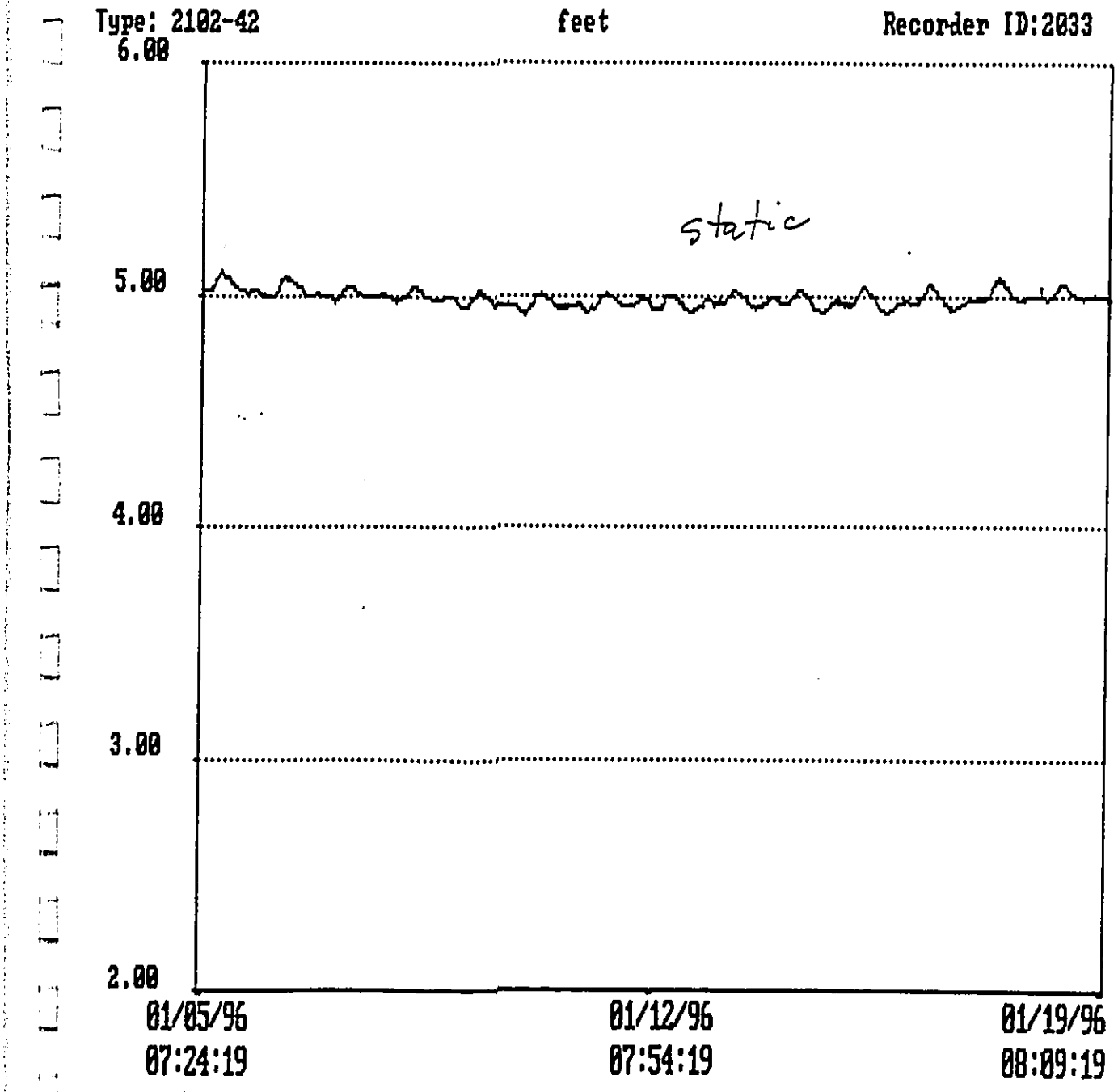


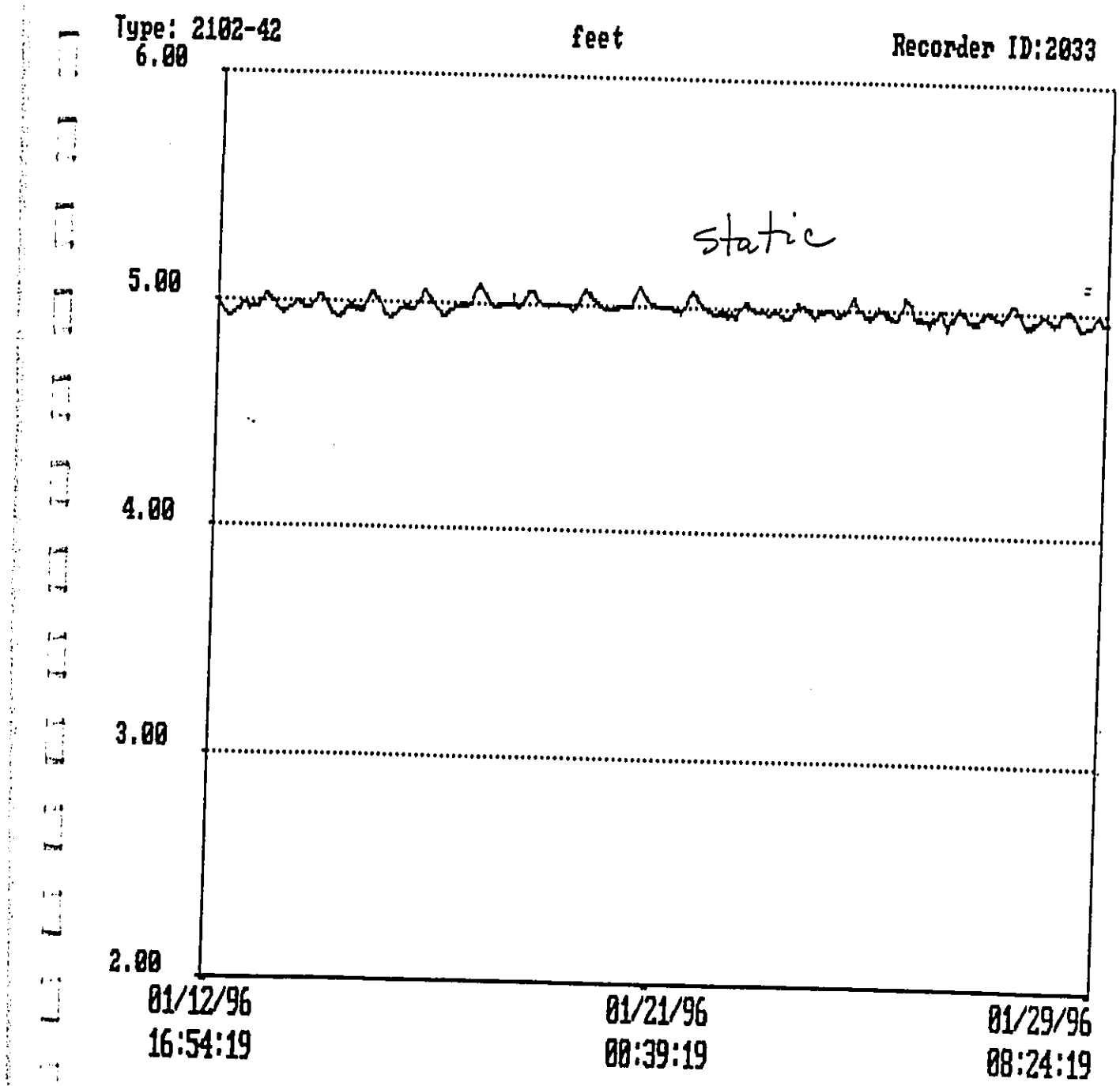

Type: 2102-42
feet
Recorder ID:2033
6.00
5.00
4.00
3.00
2.00
STATIC
Begin 7-day test
12/15/95
10:39:42
12/15/95
11:09:17
12/15/95
11:38:42


Type: 2102-42
feet
Recorder ID:2033
6.00
5.00
4.00
3.00
2.00
12/15/95
11:41:50
12/18/95
22:01:50
12/22/95
08:11:50
3rd day
7-day


Type: 2102-42
feet
Recorder ID:2033
6.00
5.00
4.00
3.00
2.00
Stop Pump
Static
12/22/95
08:38:17
12/22/95
08:57:05
12/22/95
09:15:49


Type: 2102-42
feet
Recorder ID:2033
6.00
5.00
4.00
3.00
2.00
static
12/22/95
09:17:57
12/29/95
08:17:57
01/05/96
07:02:57


Type: 2102-42
feet
Recorder ID:2033
6.00
5.00
4.00
3.00
2.00
static
01/05/96
07:24:19
01/12/96
07:54:19
01/19/96
08:09:19


Type: 2102-42
feet
Recorder ID:2033
6.00
5.00
4.00
3.00
2.00
static
01/12/96
16:54:19
01/21/96
00:39:19
01/29/96
08:24:19

Appendix E

Salinity Records (chlorides) for Haiku Well (5419-01)

HAIKU WELL

DATE	TIME	GPM	TEMP C	Cl MG/L
8/24/95	11:19 am	-	25	65
	12:7 pm	150	27	65
	1:16 pm	200	24	65
	2:15 pm	250	24	70
	3:15 pm	275	25	75
8/25/95	9:33 am	-	23	55
	12:00 pm	-	21	55
	6:00 pm	-	23	55
8/26/95	12:00 am	-	21	65
	6:00 am	-	21	55
	12:00 pm	-	21	60
	6:00 pm	-	22	65
8/27/95	12:00 am	-	22	65
	6:00 am	-	21	65
	12:00 pm	-	22	60
	6:00 pm	-	23	70
8/28/95	12:00 am	-	22	65
	6:00 am	-	20	70
	12:00 pm	-	21	65
	6:00 pm	-	22	65
8/29/95	12:00 am	-	21	70
	6:00 am	-	21	70
	6:00 pm	-	22	70
8/30/95	6:00 am	-	21	75
	6:00 pm	-	23	70
8/31/95	6:00 am	-	21	75
	6:00 pm	-	22	75
9/1/95	6:00 a-	-	2:	75
	12:00 pm	-	22	80

HAIKU WELL PUMP TEST
Recd 9/20/95

HAIKU WELL

DATE	TIME	GPM	TEMP C°	Chloride mg/L
12-1-95	0935	320	22	56
12-1-95	1015	92	23	55
12-1-95	1043	140	23.2	56
12-1-95	1145	200	23.5	57
12-1-95	1245	255	24.2	59
12-1-95	1347	300	23.8	61

HOKOANA RESIDENCE

DATE	TIME	Cl MG/L
8/25/95	6:30 pm	90
8/26/95	12:14 pm	25
"	5:35 pm	90
8/27/95	11:42 am	65
"	6:40 pm	75
8/28/95	12:15 pm	70
"	5:45 pm	70
8/29/95	6:00 pm	70
8/30/95	6:00 pm	65
8/31/95	6:00 pm	80
9/1/95	12:00 pm	70

APPENDIX B - Comments and Replies to Agencies and Organizations Consulted During the Environmental Assessment Process

DEPARTMENT OF THE ARMY
PACIFIC OCEAN DIVISION, CORPS OF ENGINEERS
FORT SHAFTER, HAWAII 96858-5440

REPLY TO ATTENTION OF

August 28, 1996

received
8/28/96

Planning and Operations Division

Ms. Valerie Suzuki
Fukunaga and Associates, Inc.
1388 Kapiolani Boulevard, 2nd Floor
Honolulu, Hawaii 96814

Dear Ms. Suzuki:

Thank you for the opportunity to review and comment on the Draft Environmental Assessment (DEA) for the Haiku Well Pump Station Project located at Haiku, Maui (TMK 2-7-33: 1). The following comments are provided pursuant to Corps of Engineers authorities to disseminate flood hazard information under the Flood Control Act of 1960 and to issue Department of the Army (DA) permits under the Clean Water Act; the Rivers and Harbors Act of 1899; and the Marine Protection, Research and Sanctuaries Act.

a. Based on the information provided, a DA permit will not be required for the project as long as fill or excavation activities associated with the project are not located in any waters of the U.S. such as Maliko Gulch. Please contact our Regulatory Section at 438-9258 for further information and refer to file number 960000348.

b. The flood hazard information provided on page 8 of the DEA is correct.

Sincerely,

Lawrence O. Muraoka, P.E.
Acting Chief, Planning
and Operations Division

BOARD OF WATER SUPPLY
COUNTY OF MAUI
P.O. BOX 1109
WAILUKU, MAUI, HAWAII 96793-7109
Telephone (808) 243-7816 • Fax (808) 243-7833

November 12, 1996

Mr. Lawrence O. Muraoka, P.E., Acting Chief
Planning and Operations Division
Department of the Army
Pacific Oceans Division
Corps of Engineers
Fort Shafter, Hawaii 96858-5440

Dear Mr. Muraoka:

Subject: HAIKU WELL PUMP STATION
DRAFT ENVIRONMENTAL ASSESSMENT (DEA)

We are in receipt of your agency's comments dated August 28, 1996 on the DEA. We appreciate the information provided by your agency that a Department of the Army (DA) permit is not required for the project and that the flood hazard information in the DEA is correct.

Thank you for taking the time to review the environmental documents.

Sincerely,

David R. Craddick
Director

/HC:sc

cc: Valerie Suzuki - Fukunaga & Associates, Inc.

nited States
epartment of
griculture

atural
esources
onservation
ervice

O Box 50004
onolulu, HI
6850

USDA

Our People...Our Islands...In Harmony

September 3, 1996

Ms. Valerie Suzuki
Fukunaga & Associates, Inc.
1388 Kapiolani Boulevard, 2nd Floor
Honolulu, Hawaii 96814

received
9-6-96

Dear Ms. Suzuki:

Subject: Draft Environmental Assessment (DEA) - Haiku Well Pump Station, Haiku, Hawaii

We have reviewed the above subject matter and have no comments to offer at this time.

Thank you for the opportunity to review this document.

Sincerely,

KENNETH M. KANESHIRO
State Conservationist

cc:
Mr. David Craddick, Director, Department of Water Supply, County of Maui, 200 South High Street, Wailuku, HI 96793

BOARD OF WATER SUPPLY
COUNTY OF MAUI
P.O. BOX 1109
WAILUKU, MAUI, HAWAII 96793-7109
Telephone (808) 243-7816 • Fax (808) 243-7833

November 12, 1996

Mr. Kenneth M. Kaneshiro, State Conservationist
U.S. Department of Agriculture
Natural Resources Conservation Service
P. O. Box 50004
Honolulu, Hawaii 96850

Dear Mr. Kaneshiro:

Subject: HAIKU WELL PUMP STATION
DRAFT ENVIRONMENTAL ASSESSMENT (DEA)

We are in receipt of your agency's comments dated September 3, 1996 on the DEA offering no comments.

Thank you for taking the time to review the environmental documents.

Sincerely,

David R. Craddick
Director

/HC.sc

cc: Valerie Suzuki - Fukunaga & Associates, Inc.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
PACIFIC ISLANDS ECOREGION
300 ALA MOANA BOULEVARD, ROOM 3108
BOX 50088
HONOLULU, HAWAII 96850
PHONE: (808) 541-3441 FAX: (808) 541-3470

received
10-7-96

OCT 04 1996

In Reply Refer To: AAP

Valerie Suzuki
Fukunaga & Associates, Inc.
1388 Kapiolani Blvd. 2nd Floor
Honolulu, Hawaii 96814

Re: July 1996 Draft Environment Assessment (DEA) for the Haiku Well Pump Station, Haiku, Maui, Hawaii

Dear Ms. Suzuki:

The U.S. Fish and Wildlife Service (Service) has reviewed the July 1996 Draft Environmental Assessment (DEA) for the Haiku Well Pump Station, Haiku, Maui. The project sponsor is the County of Maui, Department of Water Supply, and the DEA was prepared by Fukunaga & Associates, Inc. The Service offers the following comments for your consideration.

The project sponsor proposes to withdraw 500,000 gallons per day (gpd) of potable water from the Haiku well (Well No. 5419-1) for the nearby Haiku community. In December 1995, several pump tests were conducted on the Haiku well and the 350 gallons per minute pump, installed at the well in 1994, to assess impacts to surface and ground water levels from the operation of the pump. Results from the pump tests and a hydrogeologic analsyis were included in the DEA.

The Service does not anticipate signficant adverse impacts to fish and wildlife resources to result from the proposed water withdrawal. Federal trust resources such as endangered species and migratory birds do not reside in the vicinity of the pump station, and the hydrology of the wetland within the Maliko Gulch will not be altered.

DEA
Haiku Well Pump Station
Haiku, Maui, Hawaii

We appreciate the opportunity to provide these comments. If you have questions regarding these comments, please contact Fish and Wildlife Biologist Arlene Pangelinan at 808/541-3441.

Sincerely,

Brooks Harper
Field Supervisor
Ecological Services

CC: Maui Planning Department

BOARD OF WATER SUPPLY
COUNTY OF MAUI
P.O. BOX 1109
WAILUKU, MAUI, HAWAII 96793-7109
Telephone (808) 243-7816 • Fax (808) 243-7833

November 12, 1996

Mr. Brooks Harper, Field Supervisor
U.S. Department of the Interior
Fish and Wild Life Service, Pacific Islands Ecoregion
300 Ala Moana Boulevard, Room 3108
Box 50088
Honolulu, Hawaii 96850

Dear Mr. Harper:

Subject: **HAIKU WELL PUMP STATION**
DRAFT ENVIRONMENTAL ASSESSMENT (DEA)

We are in receipt of your agency's comments dated October 4, 1996 on the DEA. We appreciate the information provided by your agency that there are no Federal trust resources, such as migratory birds, endangered or threatened species in the vicinity of the pump station. Accordingly, the service does not anticipate significant adverse impacts to fish and wildlife resources to result from the proposed water withdrawal.

Thank you for taking the time to review the environmental documents.

Sincerely,

David R. Craddick
Director

/HC:sc

cc: Valerie Suzuki - Fukunaga & Associates, Inc.

BENJAMIN J. CAYETANO
GOVERNOR

ESTHER UEDA
EXECUTIVE OFFICER

STATE OF HAWAII
DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM
LAND USE COMMISSION
PO Box 2359
Honolulu, HI 96804-2359
Telephone 808-587-3822
Fax 808-587-3827

August 21, 1996

received
8/22/96

Ms. Valerie Suzuki
Fukunaga & Associates, Inc.
1388 Kapiolani Boulevard, 2nd Floor
Honolulu, Hawaii 96814

Dear Ms. Suzuki:

Subject: Haiku Well Pump Station - Draft Environmental Assessment

We have reviewed the subject draft environmental assessment as transmitted with your letter dated August 12, 1996, and confirm that the subject parcel, consisting of approximately 1.000 acres, and further identified as TMK: 2-7-33: 1, is within the State Land Use Agricultural District.

We have no further comments to offer at this time.

Thank you for the opportunity to provide comments on the draft environmental assessment.

If you should have any questions in regards to this matter, please feel free to contact me or Leo Asuncion of my staff at 587-3822.

Sincerely,

ESTHER UEDA
Executive Officer

EU:la

BOARD OF WATER SUPPLY
COUNTY OF MAUI
P.O. BOX 1109
WAILUKU, MAUI, HAWAII 96793-7109
Telephone (808) 243-7816 • Fax (808) 243-7833

November 12, 1996

Ms. Esther Ueda, Executive Officer
Department of Business, Economic Development and Tourism
Land Use Commission
P. O. Box 2359
Honolulu, Hawaii 96804-2359

Dear Ms. Ueda:

Subject: HAIKU WELL PUMP STATION
DRAFT ENVIRONMENTAL ASSESSMENT (DEA)

We are in receipt of your agency's comments dated August 21, 1996 on the DEA confirming that the site is located within the State Land Use Agricultural District.

Thank you for taking the time to review the environmental documents.

Sincerely,

David R. Craddick
Director

/HC:sc

cc: Valerie Suzuki - Fukunaga & Associates, Inc.

BENJAMIN J. CAYETANO
GOVERNOR
STATE OF HAWAII

KALI WATSON
CHAIRMAN
HAWAIIAN HOMES COMMISSION

JOBIE M. K. M. YAMAGUCHI
DEPUTY TO THE CHAIRMAN

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

September 12, 1996

received
9-13-96

Ms. Valerie Suzuki
Fukunaga and Associates, Inc.
1388 Kapiolani Boulevard, 2nd Floor
Honolulu, Hawaii 96814

Dear Ms. Suzuki:

Subject: Haiku Well Pump Station, TMK: 2-7-33:01
Draft Environmental Assessment

The Department of Hawaiian Home Lands (DHHL) has reviewed the Environmental Assessment for the Haiku Well Pump Station.

Because of its location, this project does not appear to impact our homestead areas located in Keokea and Waiohuli north of the proposed pump site.

The Environmental Assessment states that no existing wells are expected to be affected by the development of the Haiku Well. Prior pump tests show no effect on water levels in the nearest existing wells or in other more distantly located wells. As long as this project does not impact wells at Waiakamoi, Piiholo, or Kamole which serve Hawaiian home lands, we have no objections.

If you have any questions regarding our comments, please contact Keoni K. Agard of our Planning Office at 586-3848.

Warmest aloha,

Kali Watson

Kali Watson, Chairman
Hawaiian Homes Commission

/4145L

BOARD OF WATER SUPPLY
COUNTY OF MAUI
P.O. BOX 1109
WAILUKU, MAUI, HAWAII 96793-7109
Telephone (808) 243-7816 • Fax (808) 243-7833

November 12, 1996

Mr. Kali Watson, Chairman Hawaiian Homes Commission
Department of Hawaiian Homes Lands
P. O. Box 1879
Honolulu, Hawaii 96805

Dear Mr. Watson:

Subject: HAIKU WELL PUMP STATION
DRAFT ENVIRONMENTAL ASSESSMENT (DEA)

We are in receipt of your agency's comments dated September 12, 1996 on the DEA. We note that you have no objections to DEA as long as the subject project does not impact wells at Waiakamoi, Piiholo, or Kamole which serve Hawaiian home lands.

Thank you for taking the time to review the environmental documents.

Sincerely,

David R. Craddick
Director

/HC:sc

cc: Valerie Suzuki - Fukunaga & Associates, Inc.

BENJAMIN J CAYETANO
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P. O. BOX 621
HONOLULU, HAWAII 96809

MICHAEL D. WILSON
CHAIRPERSON

ROBERT G. GIRALD
DAVID A. NOBRIGA
LAWRENCE H. MIKE
RICHARD H. COX
HERBERT M. RICHARDS, JR.

RAE M. LOUI, P.E.
DEPUTY

AUG 27 1996

received
8/28/96

Ms. Valerie Suzuki
Fukunaga & Associates, Inc.
1388 Kapiolani Blvd., 2nd Floor
Honolulu, HI 96814

Dear Ms. Suzuki:

Pump Station EA
Haiku Well (Well No. 5419-01)

Thank you for the opportunity to review the subject document. Our comments related to water resources are marked below.

In general, the CWRM strongly promotes the efficient use of our water resources through conservation measures and use of alternative non-potable water resources whenever available, feasible, and there are no harmful effects to the ecosystem. Also, the CWRM encourages the protection of water recharge areas which are important for the maintenance of streams and the replenishment of aquifers.

[X] We recommend coordination with the county government to incorporate this project into the county's Water Use and Development Plan.

[X] We are concerned about the potential for ground or surface water degradation/contamination and recommend that approvals for this project be conditioned upon a review by the State Department of Health and the developer's acceptance of any resulting requirements related to water quality.

[X] A Well Completion Report to the CWRM and a Pump Installation Permit from the CWRM would be required before ground water is developed as a source of supply for the project.

[ ] The proposed water supply source for the project is located in a designated water management area, and a Water Use Permit from the CWRM would be required prior to use of this source.

[X] Groundwater withdrawals from this project may affect streamflows. This may require an instream flow standard amendment.

[ ] We recommend that no development take place affecting highly erodible slopes which drain into streams within or adjacent to the project.

[ ] If the proposed project diverts additional water from streams or if new or modified stream diversions are planned, the project may need to obtain a stream diversion works permit and petition to amend the interim instream flow standard for the affected stream(s).

[ ] Based on the information provided, it appears that a Stream Channel Alteration Permit pursuant to Section 13-169-50, HAR will be required before the project can be implemented.

[X] Based on the information provided, it does not appear that a Stream Channel Alteration Permit pursuant to Section 13-169-50, HAR will be required before the project can be implemented.

[ ] An amendment to the instream flow standard from the CWRM would be required before any streamwater is diverted.

[ ] Any new development that is permitted along a stream that is not yet channelized should be based on the express condition that no streams will be channelized to prevent flooding of the development. Development in the open floodplain should not be allowed; other economic uses of the floodplain should be encouraged.

[X] OTHER:

A Well Construction Permit issued for this well requires a Well Completion Report, which has never been filed. A Pump Installation Permit issued for this well expired with no completion documentation filed. Failure to comply with permit conditions could result in revocation of the permits and fines up to $1000 per day per violation.

Test data in the EA meet the requirements for analysis of the impacts of the well on ground water and surface water resources.

If there are any questions, please contact Charley Ice at 587-0251.

Sincerely,

for RAE M. LOUI
Deputy Director

Cl:ss

BENJAMIN J CAYETANO
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P. O. BOX 621
HONOLULU, HAWAII 96809

MICHAEL D. WILSON
CHAIRPERSON

ROBERT G. GIRALD
DAVID A. NOBRIGA
LAWRENCE H. MIKE
RICHARD H. COX
HERBERT M. RICHARDS, JR.

RAE M. LOUI, P.E.
DEPUTY

OCT - 8 1996

Ms. Valerie Suzuki
Fukunaga & Associates, Inc.
1388 Kapiolani Boulevard, 2nd Floor
Honolulu, Hawaii 96814

received
10-9-96

Dear Ms. Suzuki:

Haiku Well Pump Station Draft EA
(Well No. 5419-01)

This letter responds to your phone request for clarification of our August 27, 1996 form response concerning the Draft Environmental Assessment for Haiku Well Pump Station, as well as water level and long-term aquifer test data collected at the Hamakuapoko Wells 1 and 2 (Well Nos. 5420-02 and 5320-01) and at the Haiku Well.

In cooperation with Mr. Charles Hunt of the U. S. Geological Survey, our geologist has reviewed the information provided. From the data supplied the following observations and conclusions can be made:

1) The long-term test pumping rate averaged 350 gpm. Drawdown in the pumping well after 10 minutes was 0.52 feet, and after 7 days was 0.60 feet. There was no measurable effect on water levels in the Hamakuapoko wells located about 0.6 miles west and across Maliko Gulch. Mr. Hunt indicated that even with filtering out tidal and barometric influences on the water level data collected in the Hamakuapoko wells, the practicability of confirming any effect from pumpage is nil. Therefore, there appears to be no impact at the Hamakuapoko Wells at this pumpage rate, nor does this test suggest that future impacts will occur.

2) The ground-water levels in the Hamakuapoko and Haiku wells are about 4 feet above msl, far below the adjacent streambed elevation of approximately 450 feet above msl. Pump tests did not show a recharge boundary, which would appear if pumping affected streamflow. We thus do not see any evidence of Ha'iku Well impact on Maliko Gulch streamflow based on the pump test.

To clarify our comments on the Draft EA (Item "Other"), we still have not received a well completion report (attachment) and no simple as-built drawing of the well; the pump test results provided are not in the form specified in the Aquifer Pump Test Procedures, but our analysis have been able to rework the data to make the determinations above and is therefore adequate. The information required in the Well Completion Report are not included in the EA.

The report is required within 30 days of completing work, and the permits are intended to provide sufficient time to complete work by their expiration. The BWS did request and the Commission approved a six-month extension for the Haiku Well pump installation permit, specifically to conduct new pump tests. This extension expired December 14, 1995.

If you have any questions, please call Charley Ice at 587-0251.

Sincerely,

RAE M. LOUI
Deputy Director

Cl:ss
Attachment

BOARD OF WATER SUPPLY
COUNTY OF MAUI
P.O. BOX 1109
WAILUKU, MAUI, HAWAII 96793-7109
Telephone (808) 243-7816 • Fax (808) 243-7833

November 12, 1996

Ms. Rae M. Loui, Deputy Director
Commission on Water Resource Management
Department of Land and Natural Resources
State of Hawaii
P.O. Box 621
Honolulu, Hawaii 96809

Dear Ms. Loui:

Subject: HAIKU WELL PUMP STATION
DRAFT ENVIRONMENTAL ASSESSMENT (DEA)

We are in receipt of your agency's comments dated August 27, and October 8, 1996 on the DEA. The technical assistance provided by Mr. Hunt of the U.S. Geological Survey and your staff geologist in reviewing the pump test data is greatly appreciated. Based on the pump test, they concluded that the subject project appears to have no impact at the Hamakuapoko Wells and on Maliko Gulch streamflow.

The County of Maui, Department of Water Supply is in the process of completing the Well Completion Report, which was enclosed with your October 8th letter.

Thank you for your time and continued cooperation.

Sincerely,

David R Craddick
Director

/HC:sc

cc: Valerie Suzuki - Fukunaga & Associates, Inc.

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
33 SOUTH KING STREET, 6TH FLOOR
HONOLULU, HAWAII 96813

MICHAEL D. WILSON, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTY
ALLEST COLOMA-AGARAN

AQUACULTURE DEVELOPMENT PROGRAM
AQUATIC RESOURCES
CONSERVATION AND ENVIRONMENTAL AFFAIRS
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION DIVISION
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

October 18, 1996

received
11-1-96

LOG NO: 18315
DOC NO: 9610K14

Ms. Valerie Suzuki
Fukunaga & Associates, Inc.
1388 Kapiolani Boulevard, 2nd Floor
Honolulu, Hawaii 96814

Dear Ms. Suzuki:

SUBJECT: **Chapter 6E-8 Historic Preservation Review of the County of Maui Ha'iku Well Pump Station Project,**
Ha'iku, Makawao District, Island of Maui
TMK: 2-7-33: 1

Thank you for submitting for our review the draft Environmental Assessment (EA) for the Ha'iku well pump station, which is located between Maliko Gulch and Kokomo Road, one mile south of Ha'iku town. The pump station is located on a one acre parcel owned by the County of Maui. An existing well, a 250,000 gallon storage tank, paved roadway and a drainage system are present on the parcel.

The draft EA addresses environmental impacts of a 350 gpm pump that was installed in the well in 1994. Based on information provided in the document, it does not appear that new construction is to occur at this time.

Our office reviewed the draft EA for this pump station in 1993, and determined at that time that historic sites are not likely to be present due to the previous land alterations that have occurred on this property (letter to David Craddick April 23, 1993). We concur with our prior letter which stated that this project will have "no effect" on historic sites.

Please contact Ms. Theresa K. Donham at 243-5169 if you have any questions.

Aloha,

DON HIBBARD, Administrator
State Historic Preservation Division

KD:jen

BOARD OF WATER SUPPLY
COUNTY OF MAUI
P.O. BOX 1109
WAILUKU, MAUI, HAWAII 96793-7109
Telephone (808) 243-7816 • Fax (808) 243-7833

November 12, 1996

Mr. Don Hibbard, Administrator
State Historic Preservation Division
Department of Land and Natural Resources
State of Hawaii
33 South King Street, 6th Floor
Honolulu, Hawaii 96813

Dear Mr. Hibbard:

Subject: HAIKU WELL PUMP STATION
DRAFT ENVIRONMENTAL ASSESSMENT (DEA)

We are in receipt of your agency's comments dated October 18, 1996 on the DEA. Your review of the DEA and conclusion that the project will have "no effect" on historic sites are appreciated.

Sincerely,

David R. Craddick
Director

/HC:sc

cc: Valerie Suzuki - Fukunaga & Associates, Inc

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

LAWRENCE MIKE
DIRECTOR OF HEALTH

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

In reply, please refer to
EMD / SDWB

September 3, 1996

received
9-16-96

Ms. Valerie Suzuki
Fukunaga & Associates, Inc.
1388 Kapiolani Boulevard, 2nd Floor
Honolulu, Hawaii 96814

Dear Ms. Suzuki:

SUBJECT: HAIKU WELL
STATE WELL NO. 5419-01
HAKAWAO, MAUI

Thank you for the opportunity to review and comment on the Draft Environmental Assessment (EA) for the Haiku Well Pump Station. We have completed our review and have the following comments to offer:

1. Federal and state regulations define a public water system as a system that serves 25 or more individuals at least 60 days per year or has at least 15 service connections. All public water system owners and operators are required to comply with Hawaii Administrative Rules, Title 11, Chapter 20, "Rules Relating to Potable Water Systems."

2. The draft EA indicates that the project will include the development of a new potable water source, Haiku Well, State Well No. 5419-01. Section 11-20-29 of Chapter 20 requires that all new sources of potable water serving a public water system be approved by the Director of Health prior to its use. Such an approval is based primarily upon the submission of a satisfactory engineering report which addresses the requirements set in Section 11-20-29.

3. The water quality analyses for dibromochloropropane (DBCP) performed by Montgomery Laboratory on 5/18/93, 2/13/95, 2/22/95, and 8/28/95 were 0.05 ug/L, 0.01 ug/L, non-detected, and 0.01 ug/L, respectively. Since these results confirmed the presence of DBCP, the engineering report must identify the alternative control measures which could be implemented to reduce or eliminate the DBCP contamination, including treatment of the water source.

4. In addition, the 8/28/95 water quality analyses indicate positive readings for Arsenic, Barium, Chromium, Fluoride, Lead, and Nitrate. Additional tests will be required to confirm the presence of these contaminants. Water quality analyses must be performed by a laboratory certified in the State of Hawaii, using EPA approved drinking water methods.

5. Section 11-20-30 requires that new or substantially modified distribution systems for public water systems be approved by the Director. However, if the water system is under the jurisdiction of the County of Maui, the Maui Department of Water Supply will be responsible for the review and approval of the plans.

If you should have any questions, please contact Ms. Queenie Tan of the Safe Drinking Water Branch at 586-4258.

Sincerely,

William Wong

WILLIAM WONG, P.E., Chief
Safe Drinking Water Branch
Environmental Management Division

QT:chl

BOARD OF WATER SUPPLY
COUNTY OF MAUI
P.O. BOX 1109
WAILUKU, MAUI, HAWAII 96793-7109
Telephone (808) 243-7816 • Fax (808) 243-7833

November 12, 1996

Mr. William Wong, Chief
Safe Drinking Water Branch, Environmental Division
Department of Health, State of Hawaii
P. O. Box 3378
Honolulu, Hawaii 96801

Dear Mr. Wong:

Subject: HAIKU WELL PUMP STATION
DRAFT ENVIRONMENTAL ASSESSMENT (DEA)

We are in receipt of your agency's comments dated September 3 1996 on the DEA. It is the Department of Water Supply's (DWS) intent to comply with the Hawaii Administrative Rules, Title 11, Chapter 20 "Rules Relating to Portable Water Systems" as stated in Item 1 of your comments.

As indicated in Items 2, and 3 of your letter, the DWS has prepared an Engineering Report in accordance with Section 11-20-29. The report proposes to use granular activated carbon as a means of treating the well water should DBCP levels exceed the minimal contaminant level. Also, as required by Item 4 of your letter, the DWS has taken water samples from the well for further water quality analysis to confirm the presence of Arsenic, Barium, Chromium, Fluoride, Lead, and Nitrate.

The water distribution system to be served by the well is under the jurisdiction of the DWS.

Thank you for taking the time to review our environmental documents.

Sincerely,

David R. Craddick
Director

/HC:sc
cc: Valerie Suzuki - Fukunaga & Associates, Inc.

BENJAMIN J. CAYETANO
GOVERNOR

GARY GILL
DIRECTOR

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
220 SOUTH KING STREET
FOURTH FLOOR
HONOLULU, HAWAII 96813
TELEPHONE (808) 586-4185
FACSIMILE (808) 586-4186

received
9-10-96

September 4, 1996

The Honorable David Craddick, Director
County of Maui, Department of Water Supply
200 South High Street, 5th Floor
Wailuku, Hawai'i 96793

Dear Mr. Craddick:

We wish to submit for your response (required by Section 343-5(b), Hawaii Revised Statutes) the following comments on a July 1996, draft environmental assessment ("DEA") for "Haiku Well Pump Station" sent to our office by your July 29, 1996, letter. Notice of this draft environmental assessment was published in the August 8, 1996, edition of the *Environmental Notice*.

1. Please discuss how the present project relates to the State Commission on Water Resource Management's Ground Water Designation Plan.

2. Please discuss the indirect and cumulative effects of basal water development as they relate to the population of the Makawao Community and the overall Maui community.

3. Please discuss the physical infrastructure (lines, reservoirs, etc.) needed for the project.

4. Please reference a master plan for water use in the region and indicate whether such a plan was subject to environmental review under Chapter 343, Hawai'i Revised Statutes.

Please include this letter and your response in the final environmental assessment for this project. If there are any questions, please call Mr. Leslie Segundo, Environmental Health Specialist, at 586-4185. Thank you for the opportunity to comment.

Sincerely,

GARY GILL
Director

BOARD OF WATER SUPPLY
COUNTY OF MAUI
P.O. BOX 1109
WAILUKU, MAUI, HAWAII 96793-7109
Telephone (808) 243-7816 • Fax (808) 243-7833

November 12, 1996

Mr. Gary Gill, Director
Office of Environmental quality Control
State of Hawaii
220 South King Street
Honolulu, Hawaii 96813

Dear Mr. Gill:

Subject: HAIKU WELL PUMP STATION
DRAFT ENVIRONMENTAL ASSESSMENT (DEA)

We are in receipt of your agency's comments dated September 4, 1996 on the DEA. We have reviewed your comments and would like to offer the following responses:

1. Groundwater Designation Plan

The Commission on Water Resource Management has not "designated" any area on Maui for groundwater management. Some initial discussions have occurred relative to designation of the Iao Aquifer; the Haiku Well is not located within the Iao Aquifer.

2. Groundwater Development as They Relate to the Population of the Makawao Community and the Overall Maui Community

The Community Plans of the County of Maui, mandated by the Charter of Maui County (1977) and the Maui General Plan, dictate the desired sequence, patterns and characteristics of future developments on Maui. It has been the Department of Water Supply's policy to develop new water sources to meet the water demands set forth by these plans. Accordingly, groundwater is being developed to meet some of the current and future needs of the Maui communities.

The Upcountry area of Maui has traditionally depended on surface water sources, and this has led to recurring stresses from periodic droughts. The Haiku Well is expected to provide 0.5 million gallons per day (mgd) of "stable" input from the basal source, thereby providing more reliability

On the long-term, more basal water development would give the Department of Water Supply a more reliable source, as long as the sustainable yields hare not exceeded. The Haiku Well development does not threaten sustainable yields.

3. Physical Infrastructure Needed for the Project

The project includes the installation of a new vertical turbine deepwell pump and motor unit in Haiku Well, pump controls and appurtenances, pump control building, chlorination facilities, sound attenuation enclosure, and installation of a drain line.

4. Master Plan for Water Use in the Region

A plan was prepared for the Maui County, Department of Water Supply, and the Commission on Water Resource Management, titled "State of Hawaii, Maui County Water Use and Development Plan", dated February 1992. The plan was not subject to the environmental review under Chapter 343, HRS.

Thank you for taking the time to review our environmental documents.

Sincerely,

David R. Craddick
Director

/HC:sc

cc: Valerie Suzuki - Fukunaga & Associates, Inc.

1096037

STATE OF HAWAI'I
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAI'I 96813-5249
PHONE (808) 594-1888
FAX (808) 594-1865

September 17, 30, 1996

Mr. David Craddick
Department of Water Supply
County of Maui
P.O. Box 1109
Wailuku, HI 96793

Dear Mr. Craddick:

Thank you for the opportunity to review the Draft Environmental Assessment (DEA) for the Haiku Well Pump Station, Makawao, Island of Maui. The County of Maui proposes to use the 350 gpm vertical turbine pump installed in the Haiku Well to withdraw 0.5 mgd for municipal use in the Haiku community.

The Office of Hawaiian Affairs (OHA) has no objections to the proposed well development as it apparently bears no adverse impacts on the high level streamflows in the Haiku-Paia region (such flows occur in stream channels situated hundreds of feet above the basal aquifer and are characteristically intermittent) nor upon the sustainable yield of underground water resources. The estimated average withdrawal of 0.33 mgd for the proposed well is virtually negligible when compared with sustainable yields of 8 and 33 mgd for the Paia and Haiku aquifers, respectively. But OHA is concerned with the presence of the soil fumigant DBCP (dibromochloropropane) in the well water.

Although organic analyses of 1995 water samples have shown levels of DBCP below DOH standards, the presence of DBCP for a pesticide that has not been used for years raises serious concerns about the use of Haiku Well water for municipal uses. OHA urges the preparers to establish a long-term monitoring program with denser sampling periods than those performed in 1995 (February 12 and 13 and August 24 to September 1) to truly assess DBCP levels year round. Please contact me, or Linda K. Delaney, LNR Division Officer (594-1938), or Luis A. Manrique (594-1755), should you have any questions on this matter.

Sincerely yours,

Martha Ross
Deputy Administrator

LM:lm

LM:lm

BOARD OF WATER SUPPLY
COUNTY OF MAUI
P.O. BOX 1109
WAILUKU, MAUI, HAWAII 96793-7109
Telephone (808) 243-7816 • Fax (808) 243-7833

November 12, 1996

Ms. Martha Ross, Deputy Administrator
Office of Hawaiian Affairs
State of Hawaii
711 Kapiolani Boulevard, Suite 500
Honolulu, Hawaii 96813-5249

Dear Ms. Ross::

Subject: **HAIKU WELL PUMP STATION**
DRAFT ENVIRONMENTAL ASSESSMENT (DEA)

We are in receipt of your agency's comments dated September 30, 1996 on the DEA. We note that you have no objections to the subject project. Regarding your concerns over the DBCP levels found in Haiku Well, The County of Maui, Department of Water Supply (DWS) will monitor the well water for DBCP and other contaminants as required by the State Department of Health (DOH). Should the DBCP level exceed the DOH standards, the DWS proposes to use granular activated carbon as a means of treating the Haiku Well water.

Thank you for taking the time to review the environmental documents.

Sincerely,

David R. Craddick
Director

/HC:sc

cc: Valerie Suzuki - Fukunaga & Associates, Inc.

University of Hawai'i at Mānoa

Environmental Center
A Unit of Water Resources Research Center
2550 Campus Road • Crawford 317 • Honolulu, Hawai'i 96822
Telephone: (808) 956-7361 • Facsimile: (808) 956-3980

September 9, 1996
EA:0146

Mr. David Craddick
County of Maui
Department of Water Supply
P.O. Box 1109
Wailuku, Hawaii 96793

Dear Mr. Craddick:

received
9-10-96

Draft Environmental Assessment
Haiku Well Pump Station
Haiku, Maui

The County of Maui, Department of Water Supply proposes to use a 350 gallon per minute vertical turbine pump in Haiku Well (No. 5419-1) to withdraw 500,000 gallons per day for municipal use. The well is located one mile south of Haiku Town in the Makawao District of Maui. The well water will be used to supply potable water to the nearby Haiku community.

This review was completed with the assistance of Frank Peterson, Emeritus Geology and Geophysics; Roger Babcock, Civil Engineering; and Paul Berkowitz of the Environmental Center.

General Comments

The overall analysis and conclusions contained in this draft Environmental Assessment (EA) seem reasonable; however a few details ought to be clarified in the final document. First, the EA describes the East Maui Water Development Plan as an unrelated project which is "... addressed in a separate environmental impact statement" (p. 1). Given that the proposed project is scheduled to withdraw water from the same aquifer as the East Maui Development Plan and is intended to serve the same community, it appears that the projects are closely related. According to Section 11-200-7, Hawaii Administrative Rules, the first criterion for treating a group of actions as a single action is that "... [t]he component actions are phases or increments of a larger undertaking." In this case, the Haiku Well Pump Station could easily be interpreted as part of the larger East Maui Development Plan which aims to meet the potable water demands of Haiku community over the next 20 years. In the absence of more information on the East Maui Development Plan, it is difficult to determine if the two projects should be part of a single document. At the very least, the final EA needs to provide more details about the how the Haiku Well Pump Station fits into the overall Development Plan.

Second, while pumpage from Haiku well should have no impact on high-level streams, it is possible that it could have a minor impact on the flow in Maliko Gulch. In order to assess this potential impact the public needs to be given information on the gulch's bottom elevation and flow. The final EA should correct this deficiency.

Third, in terms of salinity it is unlikely that any effects would have been observable within the short 7-day pump testing period. Also since concerns have been raised about the Hokoana well (p. 17) in lower Maliko Gulch, it would be useful to include this well in Figure 8 and Table 1.

Fourth, as stated in Section 2L, hydrogeologists have been unable to determine if Haiku well lies in the Paia or Haiku Aquifer System. If the well belongs to Haiku Aquifer, then the amount of pumpage is insignificant relative to the current use and sustainable yield; however if the well falls in the Paia Aquifer, then is seems that total pumpage may approach sustainable yield. Based on the data provided it is impossible to determine how close current use is to sustainable yield. We are only informed that Paia Aquifer's sustainable yield is 8 mgd, and that the aquifer currently has six wells, including one with a pump capacity of 6.81 mgd. In the final EA, information on current use relative to sustainable yield should be clearly stated.

Finally, relating to water quality, what is the source of DBCP in Haiku well? In other words what land uses within the watershed have contributed to this contamination? The answers to these questions have important implications for the intensity and duration of future DBCP contamination.

Thank you for the opportunity to comment.

Sincerely,

John T. Harrison
Environmental Coordinator

cc: OEQC
Roger Fujioka
Roger Babcock
Frank Peterson
✓Valerie Suzuki
Paul Berkowitz

BOARD OF WATER SUPPLY
COUNTY OF MAUI
P.O. BOX 1109
WAILUKU, MAUI, HAWAII 96793-7109
Telephone (808) 243-7816 • Fax (808) 243-7833

November 12, 1996

Mr. John T. Harrison, Environmental Coordinator
University of Hawaii
Environmental Center
2550 Campus Road, Crawford 317
Honolulu, Hawaii 96822

Dear Mr. Harrison:

Subject: HAIKU WELL PUMP STATION
DRAFT ENVIRONMENTAL ASSESSMENT (DEA)

We are in receipt of your agency's comments dated September 9, 1996 on the DEA. We have reviewed your comments and would like to offer the following responses:

1. The East Maui Water Development Plan (EM Plan)

The Haiku Well Pump station is considered a separate project from the EM Plan. At this time, the haiku Well project involves pumping groundwater into the adjacent 250,000 gallon Haiku-Kauhikoa Tank. From the tank, water is supplied only to nearby consumers downhill of the tank, via a 12-inch water line running makai along Kokomo Road. The environmental impacts relating to the project are addressed in the DEA.

The environmental impacts related to the EM Plan, which proposes to supplement the Central Maui System will be addressed in the Supplement to the Environmental Impact Statement (SEIS) for the EM Plan. Should there be any change to the EM Plan, whereby Haiku Well water is distributed beyond the Haiku-Kauhikoa Tank's existing distribution area, all environmental impacts resulting from this change will be addressed in a future SEIS or environmental assessment.

2. Impact on High-Level Streams

According to a letter from the Department of Land and Natural Resources, Commission on Water Resource Management (CWRM) dated October 8, 1996, commenting on the subject DEA, the Haiku Well appears to have no impact on Maliko Stream based on the

pump test data presented in the DEA. The letter stated the following observation, which was made by Mr. Charles Hunt of the U.S. Geological Survey along with a CWRM staff geologist:

> "The ground-water levels in the Hamakuapoko and Haiku wells are about 4 feet above msl. Pump test did not show a recharge boundary, which would appear if pumping affected streamflow. We thus do not see any evidence of Hai'ku Well impact on Maliko Gulch streamflow based on the pump test".

3. Hokoana Well

The Hokoana Well (discussed on page 17 of the DEA) is located close to Maliko Tunnel, which is shown near the mouth of Maliko Gulch on Figure 8.

4. Sustainable Yield

The Haiku Well, with a proposed pump capacity of 0.5 million gallons per day (MGD) and an average withdrawal rate 0.33 mgd (based on 16-hour per day pumping schedule), is not expected to impact the 31 mgd and 8 mgd sustainable yield estimates of the Haiku and Paia Aquifers, respectively. The Haiku Well's location and principal source of recharge is believed to be in the Haiku Aquifer, which is largely undeveloped.

5. Source of DBCP Contamination

In the past, sugarcane and pineapple were the primary crops grown in the area. Their cultivation involved using pesticides such as DBCP. DBCP is no longer used in the area.

Initial water quality analysis was conducted on water samples taken from the Haiku Well in 1993. DBCP was detected at a level slightly exceeding the Department of Health (DOH) requirements. Subsequently, three more water quality tests were performed on Haiku Well. One of the tests showed no detection of DBCP. The other two tests detected DBCP at levels below the DOH requirements. Consequently, the DWS will monitor the Haiku Well regularly for DBCP and other contaminants. Should DBCP levels exceed the DOH requirements, the DWS proposes to use granular activated carbon as a means of treating the Haiku Well water.

The above information will be incorporated in the Final Environmental Assessment. Thank you for taking the time to review our environmental documents.

Sincerely,

David R. Craddick
Director

/HC:sc

cc: Valerie Suzuki - Fukunaga & Associates, Inc.

LINDA CROCKETT LINGLE
Mayor

DAVID W. BLANE
Director

GWEN OHASHI HIRAGA
Deputy Director

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

August 28, 1996

received
9/3/96

Ms. Valerie Suzuki
Fukunaga & Associates
1388 Kapiolani Boulevard, 2nd Floor
Honolulu, Hawaii 96814

Dear Ms. Suzuki:

RE: HAIKU WELL PUMP STATION DRAFT ENVIRONMENTAL ASSESSMENT, TMK: 2-7-33:1, HAIKU, MAUI, HAWAII

The Planning Department has reviewed the above Draft Environmental Assessment. The subject property is located within the State Agricultural District and the proposed project would be a permitted use in said district. We have no further comments to offer.

Thank you for the opportunity to comment. If further clarification is required, please contact Ms. Ann Cua of this office.

Very truly yours,

Gwen Ohashi Hiraga

for DAVID W. BLANE
Director of Planning

DWB:ATC:cmp
cc: Colleen Suyama, Planning Program Manager-Land Use Management Division
Ann Cua, Staff Planner
General File
Project File (g:\planning\all\ann\haikuwel.ltr)

BOARD OF WATER SUPPLY
COUNTY OF MAUI
P.O. BOX 1109
WAILUKU, MAUI, HAWAII 96793-7109
Telephone (808) 243-7816 • Fax (808) 243-7833

November 12, 1996

Mr. David W. Blane, Director
Planning Department
County of Maui
250 S. High Street
Wailuku, Hawaii 96793

Dear Mr. Blane:

Subject: HAIKU WELL PUMP STATION
DRAFT ENVIRONMENTAL ASSESSMENT (DEA)

We are in receipt of your agency's comments dated August 28, 1996 on the DEA. We appreciate the information provided by your agency that the project site is located within the State Agricultural District, and that the project is a permitted use within the district.

Thank you for taking the time to review the environmental documents.

Sincerely,

David R. Craddick
Director

/HC:sc

cc: Valerie Suzuki - Fukunaga & Associates, Inc.

"By Water All Things Find Life"

DEPARTMENT OF
PARKS AND RECREATION
COUNTY OF MAUI

1580-C Kaahumanu Avenue, Wailuku, Hawaii 96793

LINDA CROCKETT LINGLE
Mayor
HENRY OLIVA
Director
ALLEN SHISHIDO
Deputy Director

(808) 243-7230
FAX (808) 243-7934

August 23, 1996

received
8/20/96

Ms. Valerie Suzuki, Engineer
Fukunaga & Associates, Inc.
1388 Kapiolani Boulevard, 2nd Floor
Honolulu, Hawaii 96814

Dear Ms. Suzuki:

SUBJECT: Haiku Well Pump Station
Draft Environmental Assessment

We have reviewed the Draft Environmental Assessment for the above-referenced project and have no comments or objections to the proposed action.

If you require additional information, please contact Patrick Matsui, Chief of Parks Planning and Development, at 243-7387.

Sincerely,

HENRY OLIVA
Director

PTM:ik

c: Patrick Matsui

BOARD OF WATER SUPPLY
COUNTY OF MAUI
P.O. BOX 1109
WAILUKU, MAUI, HAWAII 96793-7109
Telephone (808) 243-7816 • Fax (808) 243-7833

November 12, 1996

Mr. Henry Oliva, Director
Department of Parks and Recreation
County of Maui
1580-C Kaahumanu Avenue
Wailuku, Hawaii 96793

Dear Mr. Jencks:

Subject: HAIKU WELL PUMP STATION
DRAFT ENVIRONMENTAL ASSESSMENT (DEA)

We are in receipt of your agency's comments dated August 23, 1996 on the DEA. We note that you have no comments or objections to the project.

Thank you for taking the time to review the environmental documents.

Sincerely,

David R. Craddick
Director

/HC:sc

cc: Valerie Suzuki - Fukunaga & Associates, Inc.

LINDA CROCKETT LINGLE
Mayor

CHARLES JENCKS
Director

DAVID C. GOODE
Deputy Director

AARON SHINMOTO, P.E.
Chief Staff Engineer

COUNTY OF MAUI
DEPARTMENT OF PUBLIC WORKS
AND WASTE MANAGEMENT
200 SOUTH HIGH STREET
WAILUKU, MAUI, HAWAII 96793

RALPH NAGAMINE, L.S., P.E.
Land Use and Codes Administration

EASSIE MILLER, P.E.
Wastewater Reclamation Division

LLOYD P.C.W. LEE, P.E.
Engineering Division

BRIAN HASHIRO, P.E.
Highways Division

Solid Waste Division

August 27, 1996

received
9/4/96

Ms. Valerie Suzuki
Fukunaga & Associates, Inc.
1388 Kapiolani Boulevard
2nd Floor
Honolulu, HI 96814

Dear Ms. Suzuki:

Subject: Haiku Well Pump Station
TMK: 2-7-33:01
Draft Environmental Assessment

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

If you have any questions, please contact Aaron Shinmoto at 243-7845.

Sincerely,

Charles Jencks
Director of Public Works
and Waste Management

cc: Land Use and Codes Administration
Engineering Division
Solid Waste Division
Wastewater Reclamation Division

g:\pw admin\haiku well

BOARD OF WATER SUPPLY
COUNTY OF MAUI
P.O. BOX 1109
WAILUKU, MAUI, HAWAII 96793-7109
Telephone (808) 243-7816 • Fax (808) 243-7833

November 12, 1996

Mr. Charles Jencks, Director
Department of Public Works and Waste Management
County of Maui
200 S. High Street
Wailuku, Hawaii 96793

Dear Mr. Jencks:

Subject: HAIKU WELL PUMP STATION
DRAFT ENVIRONMENTAL ASSESSMENT (DEA)

We are in receipt of your agency's comments dated August 27, 1996 on the DEA offering no comments.

Thank you for taking the time to review the environmental documents.

Sincerely,

David R. Craddick
Director

/HC:sc

cc: Valerie Suzuki - Fukunaga & Associates, Inc.

Maui Electric Company, Ltd. • 210 West Kamehameha Avenue • PO Box 398 • Kahului, Maui, HI 96732-0398 • (808) 871-8461

September 6, 1996

received
9-10-96

Ms. Valerie Suzuki
Fukunaga & Associates
1388 Kapiolani Boulevard, 2nd Floor
Honolulu, HI 96814

Dear Ms. Suzuki:

Subject: Haiku Well Pump Station
(Draft Environmental Assessment, TMK: 2-7-33:1)

Thank you for allowing us to comment on the subject above.

In reviewing the information transmitted and our records, Maui Electric Company (MECO) at this time has no objections to the subject project.

MECO currently serves the project site with electric power. Original service date was February 1996. The electric service request number was M126360.

If you have any questions or concerns, please call Fred Oshiro at 872-3202.

Sincerely,

Edward Reinhardt

Edward Reinhardt
Manager, Engineering

FO:jn

BOARD OF WATER SUPPLY
COUNTY OF MAUI
P.O. BOX 1109
WAILUKU, MAUI, HAWAII 96793-7109
Telephone (808) 243-7816 • Fax (808) 243-7833

November 12, 1996

Mr. Edward Reinhardt, Manager
Engineering Department
Maui Electric Company, Ltd.
P. O. Box 398
Kahului, Hawaii 96732

Dear Mr. Reinhardt:

Subject: HAIKU WELL PUMP STATION
DRAFT ENVIRONMENTAL ASSESSMENT (DEA)

We are in receipt of your agency's comments dated September 6, 1996 on the DEA. We note that Maui Electric Company currently serves the project site, original service date was February 1996, and the electric service number was M126360.

Thank you for taking the time to review the environmental documents.

Sincerely,

David R. Craddick
Director

/HC:sc

cc: Valerie Suzuki - Fukunaga & Associates, Inc.

ISAAC DAVIS HALL
ATTORNEY AT LAW
2087 WELLS STREET
WAILUKU, MAUI, HAWAII 96793
(808) 244-8017
FAX (808) 244-6775

OF COUNSEL:
G. RICHARD GESCH

September 9, 1996

Via Hand Delivery

Mayor Linda Crockett Lingle
County of Maui
200 S. High St.
Wailuku HI 96793

Chairperson Norma Piltz
c/o Board of Water Supply
County of Maui
200 S. High St.
Wailuku HI 96793

Re: Comments on the DEA for the Haiku Well Pump Station: TMK 2-7-33:1

Dear Mayor Linda Crockett Lingle and Chairperson Norma Piltz of the Board of Water Supply, County of Maui:

This letter is written on behalf of the Coalition to Protect East Maui Water Resources. I have received a copy of the Draft Environmental Assessment ("DEA") for the Haiku Well Pump Station, located on TMK 2-7-33:1. This DEA has been prepared by Fukunaga and Associates, Inc. for the County of Maui, Department of Water Supply. Our comments on this DEA follow:

1. Inaccurate Project Description

a. This project is a component of a larger action

The Haiku Well is now or will become a component of the East Maui Water Development Plan ("EM Plan"), a much larger project connecting numerous new wells in the Haiku region to a 36 inch transmission line and delivering at least 16 mgd of Haiku's groundwater resources to Central Maui, Kihei and Makena. The understanding of the Commission for Water Resources Management ("CWRM") has always been that the Haiku Well is a component of the larger EM Plan. The Board of Water Supply admits that the Haiku Well is to become a component of the EM Plan.

Component actions "shall be treated as a single action." See H.A.R. §11-200-7. The separation of the Haiku Well project from the project as a whole constitutes illegal segmentation in violation of Chapter 343 and the regulations promulgated thereto. A Supplemental Environmental Impact Statement ("SEIS") is being prepared under Court Order for the project as a whole. An injunction is now in place forbidding the implementation of the EM Plan without the preparation of an SEIS. Segmenting a component of the EM Plan for separate treatment in a DEA violates this Court Order. Prior to proceeding with a DEA for the Haiku Well, permission should have been obtained from the Court. As a matter of fact and law, this DEA must be withdrawn and its cumulative, long-term impacts must be addressed in the SEIS.

b. Inaccurate Description of Even the Haiku Well Project

Department of Water Supply documents already exist containing several different descriptions of the purpose for the Haiku Well project. First, it was proposed for emergency pumping only. The application for a pump installation permit now pending before the CWRM contains this representation. Second, it was proposed for use in a particular area of Haiku only (pipelines from the well only lead to a distinct area).

The DEA contains yet another description of the project and this description is woefully inadequate. The water is now to be made a part of the Makawao Water System serving the Haiku, Makawao, Pukalani, Hallimaile and Kula communities. See p. 1 of the DEA.

The project description contained within the DEA should be corrected. The CWRM, as permitting agency, and the Board of Water Supply should all be analyzing the same project. The environmental impacts of a project cannot be properly addressed unless the project is described accurately. It is not at this point. Interested community members have a right to know what specific areas of Haiku or the Makawao Water System will benefit from the water from the Haiku Well. Growth inducement impacts in these particular areas must then be addressed. They were not.

2. Inadequate Description of the Need for the Project

Only general figures are contained within the DEA describing the need for the project. The DEA contains only data on the need for more water in the Makawao Water System in general and not in the specific area which the Well is allegedly intended to serve. The projected demand for the Makawao Water System of 19 mgd is not substantiated. There is no description of what would add to or reduce this demand. There is no description of what constitutes this demand, e.g. municipal uses, agricultural uses or the like and why the demand exists. There is no discussion of alternative manners in which this demand can be met, e.g. reused water or sources elsewhere.

3. Misdesignation of the Accepting Authority

The accepting authority or the authority to determine whether or not an EIS is necessary for an agency action proposing the use of county lands, such as this one, is the Mayor. See H.A.R. §11-200-4(a)(2). The DEA designates another entity, the Department of Water Supply, to make this determination. There is no basis for this mis-designation. If the preparer believes there is some basis for this mis-designation, the DEA should explain why and how the accepting authority has been designated in this case and the authority for that designation.

4. Failure to Consult with Interested Community Groups

In the assessment process, the agency is required to consult with citizens groups and individuals with respect to the impacts of the project. See H.A.R. §11-200-9(a). The Coalition to Protect East Maui Water Resources is obviously such a citizens group. The preparer of the DEA has never consulted with the Coalition. The Coalition has had no input on the contents of this DEA. The DEA must be withdrawn until appropriate consultation has taken place.

5. Inadequate Analysis of Environmental Impacts

a. Analysis of Impact on Stream Flows Indeterminate

The DEA contains an inadequate analysis of the impact on streams in the area due to groundwater pumping through the Haiku Well. There is no discussion in the DEA about diversions of the stream in Maliko Gulch. The DEA states: "The streams in the Haiku-Paia area do not drain any high-level dike or basal water bodies" (p. 11 of the DEA). How was this determined? This statement is simply made without any reference to any supporting document or study. Even if this statement could be true for a single well located in this particular place, such a statement cannot extend to the whole project area for the EM Plan.

There may or may not be an impact on the springs and streams in Maliko Gulch. The attached study contains an admission that this is not really known. This should be addressed in more detail in the SEIS.

b. Inadequate Assessment of "Sustainable Yield"

Statements are contained within the DEA about the estimated groundwater "recharge" and the estimated "sustainable yield" for the Haiku and Paia Aquifer Systems. See p. 11 of the DEA. There is no satisfactory definition of "sustainable yield." There is no acceptable discussion about how these figures were established. Sustainable yield is not an appropriate basis for addressing water resource issues. The sustainable yield figures have not apparently been addressed with respect to wells which are already being pumped in the region. There is certainly no data included within the DEA about these pumps.

There are existing wells within Maliko Gulch and within the vicinity of the Haiku Well. There has been no discussion in the DEA about the impacts of the pumping of the Haiku Well on these existing pumps. Public records available within the Department of Water Supply amply demonstrate that there is at least one landowner within Maliko Gulch who is or was very concerned about the impacts of the pumping of these wells on his own well. These matters should have been addressed in the DEA.

Among the groundwater issues which should have been addressed in the DEA are the following: (1) what are the water resource objectives for the area (e.g. do we want fresh water to reach the ocean, do we want to protect in-stream environments and do we want to reserve water for future uses, and other matters?); (2) what is the degree of pumping which is taking place currently?; and (3) what head to we wish to maintain in this aquifer? None of

these important issues with regard to water resource allocation have been addressed in the DEA.

c. Water Quality Assessment Inadequate

The Court was concerned with the quality of the groundwater to be pumped. This was especially so because of prior tests indicating contamination of groundwater resources by such chemicals as DBCP and EDB which had been applied to agricultural lands in the area. There is no discussion in the DEA of the use of these chemicals in the area or the extent of this use.

Water quality issues are addressed in Appendix A to the DEA. The study admits that DBCP was detected at a level exceeding Department of Health requirements in 1993 -- not very long ago. The explanation given for this is that: "The long-standing static condition of the well may account for the level detected." See p. 7 of Appendix A to the DEA. This is self-serving and unreasonable speculation. There are many more reasonable explanations for the existence of DBCP rendering the water undrinkable in the Haiku Well as of 1993. Groundwater is not static. It moves. The groundwater moving underneath the Haiku Well in 1993 in contaminated levels may well move within the well again containing unpotable amounts of cancer-causing DBCP.

The DEA should be withdrawn and these water quality issues addressed in more detail, because the Haiku Well has pumped unacceptable, unpotable water containing cancer-causing DBCP in the recent past, and the availability of uncontaminated, potable water which does not exceed the limits in the State of Hawaii cannot be assured in the future. As such, the DEA should have included a discussion of how this contamination is to be removed, what techniques will be used for removal, whether a treatment plant is required and at what cost. The cumulative impact of the water quality problems being addressed here should have been studied, particularly with respect to the presence of DBCP and EDB in the groundwater in these regions. DBCP and EDB have been found consistently in a nearby well, Hamakuapoko No. 2, and now have been also found in the Haiku Well. This is an issue which needs to be more thoroughly addressed than it was in the DEA. At the very minimum, water quality samples at the Haiku Well should be taken at regular intervals and information on the content of these samples made available to the public to assure that this groundwater source is potable.

6. The Study of Alternatives is Inadequate

The analysis of alternatives in the DEA is totally inadequate. It does not address conservation or water reuse. My clients are entitled to the rigorous exploration and objective evaluation of all reasonable alternative actions in an EIS. See H.A.R. §11-200-17(f).

7. The Determination is Flawed

The determination that an EIS is not required is flawed as a matter of fact and law. First, the Haiku Well is required to be studied in the SEIS now being prepared for the EM Plan as a whole. A Negative Declaration or Finding of No Significant Impact ("FONSI") is inappropriate for this reason alone.

Second, if a project "may" have a significant adverse impact, an EIS is required. A Negative Declaration or FONSI is only appropriate if it is possible to determine, applying the appropriate criteria, that the project "will not" have any significant adverse impacts. Because the DEA is so inadequate, no proper determination can be made. Even based upon what is known about the Haiku Well and the information disclosed in the DEA, it would be arbitrary and capricious to determine that a Negative Declaration or FONSI can be entered. Finally, because the accepting authority has been improperly designated, without a correction of this error, the wrong person or entity will be making the determination which will further render it arbitrary and capricious.

8. Public Hearing on Determination

The determination as to whether a Negative Declaration or FONSI can be entered in this case should be made after a public hearing or meeting during which members of the public are given the opportunity to testify and present information on the propriety of entering a Negative Declaration or FONSI. Kindly notify me well in advance of the scheduled date for any hearing and meeting so that my clients and I may attend and address issues appropriate to that determination.

Please contact me if you have any questions about any of the above. I look forward to hearing from you.

Sincerely yours,

Isaac Hall

IH/jp

cc: Coalition to Protect East Maui Water Resources
Commission on Water Resources Management
OEQC
Fukunaga and Associates

BOARD OF WATER SUPPLY
COUNTY OF MAUI
P.O. BOX 1109
WAILUKU, MAUI, HAWAII 96793-7109
Telephone (808) 243-7816 • Fax (808) 243-7833

November 12, 1996

Mr. Isaac Davis Hall, Attorney at Law
2087 Wells Street
Wailuku, Hawaii 96793

Dear Mr. Hall:

Subject: HAIKU WELL PUMP STATION
DRAFT ENVIRONMENTAL ASSESSMENT (DEA)

We are in receipt of your comments dated September 9, 1996 on the DEA. We have reviewed your comments and would like to offer the following responses:

1. Inaccurate Project Description

a. This Project is a Component of a Larger Action.

The Haiku Well Pump Station is considered a separate project from the EM Plan. At this time, the Haiku Well project involves pumping groundwater into the adjacent 250,000 gallon Haiku-Kauhikoa Tank. From the tank, water is supplied to consumers downhill of the tank, via a 12-inch water line running makai along Kokomo Road. The environmental impacts relating to the project are addressed in the DEA.

The environmental impacts related to the EM Plan, which proposed to supplement the Central Maui Water System will be addressed in the Supplement to the Environmental Impact Statement (SEIS) for the EM Plan. Should there be any change to the EM Plan, whereby Haiku Well water is distributed beyond the Haiku-Kauhikoa Tank's existing distribution area, all environmental impacts resulting from this change will be addressed in the future SEIS or environmental assessment.

b. Inaccurate Description of Even the Haiku Well Project.

The project's purpose has always been to use the well as a primary water source

for the Haiku Community. The DEA states that the Haiku Well will supply potable water to the nearby Haiku Community and that the Haiku Community is within the Makawao Water System.

Presently, the Haiku-Kauhikoa Tank receives water from the Kamole Weir Water Treatment Plant (WTP). The Haiku Well will feed directly into the tank, allowing water from the Kamole Weir WTP to be used elsewhere. The area the well is intended to serve is a portion of the Haiku-Pauwela area. The 1995 water demand for the Haiku-Pauwela area is 0.24 mgd. According to the report titled, "Hawaii Water Plan, Maui County Water Use and Development Plan", dated February 1992, the projected demand to the year 2010 for the area is 0.50 mgd. The increase is due to the anticipated growth in agriculture.

2. Inadequate Description of the Need for the Project

The DEA adequately describes the need for the project on page 1.

3. Misdesignation of the Accepting Authority

The approving agency, the DWS, makes the decision if an EIS is required. Accordingly, the Director of the DWS or his representative, has the authority to make the decision.

4. Failure to Consult with Interested Community Groups

Three copies of the DEA were sent to the Coalition to Protect East Maui Water Sources c/o your office, on August 12, 1996 for the Coalition's review and comment. All comments made on the DEA will be incorporated in the final environmental assessment.

5. Inadequate Analysis of Environmental Impacts

a. Analysis of Impact on Stream Flows Indeterminate

The impact of developing basal water from the Haiku Well on streamflows is discussed in detail in appendix A, "Hydrogeologic analysis of Test Data for Haiku Well", of the EA (See appendix A, paragraph "Surface Water", page 4, paragraph "Surface Water/Groundwater Relationship", page 10, paragraph "Surface Water", page 12, and Figures 1 and 3). Figure 1 of Appendix A, taken from Stearns and Macdonald, 1942 "Geology and Groundwater Resources of the Island of Maui", Bulletin 7, Division of Hydrography, Territory of Hawaii, amply illustrates why development of the underlying basal aquifer will have no impact on streamflows or

The diversion of streamflows in the region. The fact that streams in the area cannot and do not drain any basal water bodies is amply illustrated by Figure 1 of Appendix A. The statement that streams in the area do not drain any high-level, dike-confined groundwater bodies is predicated upon the fact that there is no mention in any published reports on the existence of any high-level, dike-confined water bodies in the streams of the Haiku area or the existence of any evidence of dikes occurring in such streams, including the deeply-eroded Maliko Gulch.

b. Inadequate Assessment of "Sustainable Yield"

The term "Sustainable Yield" referred to in the DEA and its Appendix A is used by the State Commission on Water Resource Management (CWRM) and is referenced extensively in its publications. The sustainable yields of 31 mgd and 8 mgd for the Haiku and Paia Aquifers, respectively, were presented in the DEA to illustrate that ample ground water resources exist in the region to accommodate the Haiku Well development (in the Haiku Aquifer) and other existing basal water wells (primarily HC&S Pumps 11, 12, 13, 17, and 18 located approximately two miles away in the Paia Aquifer). The concern of the owner (Mr. Hokoana) of an existing well in Maliko Gulch is addressed on page 13 of Appendix A.

c. Water Quality assessment Inadequate

Only DBCP was detected in the Haiku Well. After the initial water quality analysis was conducted on water samples taken from the well in 1993, where DBCP was detected at a level slightly exceeding the Department of Health (DOH) requirements, three more water quality tests were performed on Haiku Well. One of the tests showed no detection of DBCP. The other two tests detected DBCP at levels below the DOH requirements. Consequently, the DWS will monitor the Haiku Well regularly for DBCP and other contaminants. Should DBCP levels exceed the DOH requirements, the DWS proposes to use granular activated carbon as a means of treating the Haiku Well water.

6. The Study of Alternatives is Inadequate

Water reuse is a viable alternative to water conservation, which is being implemented on parts of Maui where recycled wastewater is available from wastewater treatment plants. Since the Haiku area utilizes septic tanks and cesspools for wastewater disposal, water reuse is not an option for the area at this time. The DWS does encourage the installation of low flow water fixtures and devices to conserve water; however, this measure is not expected to preclude the need to develop a reliable water source.

7. The Determination is Flawed

As previously mentioned, the DEA addresses only the Haiku Well Pump Station, which is a separate project from the EM Plan. The well development project was found to have no significant impacts and, therefore, a negative declaration was anticipated.

8. Public Hearing on Determination

Environmental Assessments do not require public hearings.

Thank you for taking the time to review the environmental documents.

Sincerely,

David R. Craddick
Director

/HC:sc

cc: Valerie Suzuki - Fukunaga & Associates, Inc.